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Final
Environmental Impact Statement

Increased Flight and Related Operations in the Patuxent River Complex Patuxent River, Maryland

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Abstract

The Final Environmental Impact Statement (FEIS) identifies and evaluates the potential environmental impacts of increasing flight and related ground operations in test areas of the Patuxent River Complex that are controlled and scheduled by the Naval Air Warfare Center, Aircraft Division (NAWCAD). The complex includes all the flight and ground test facilities at NAS Patuxent River and OLF Webster Field Annex, as well as the restricted airspaces, aerial and surface firing range, and targets (Hooper, Hannibal, and Tangier Island) comprising the Chesapeake Test Range (CTR). The FEIS assesses the impacts of the No Action Alternative and three proposed future Operational Workload Alternatives. The No Action Alternative would maintain the complex's current level of flight hours into the future (18,200 annually, which represents an approximate ten-year average of annual flight hours). The three Operational Workload Alternatives propose increases in baseline operations by as few as 2,500 annual flight hours or as many as 6,200 annual flight hours.

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EXECUTIVE SUMMARY

S.1 Purpose and Need

The Department of the Navy is preparing this Environmental Impact Statement (EIS) to assess the potential environmental effects of increasing flight and related operations in test areas under the exclusive control and scheduling authority of the Naval Air Warfare Center, Aircraft Division (NAWCAD). The purpose of the proposed action is to enhance the use of taxpayer-funded facilities at the Patuxent River Complex by increasing efficiencies and lowering costs to users. The proposed action is needed for the Navy to successfully meet current and future national and global defense challenges posed by a post-Cold War environment.

Accordingly, the Navy would continue and enhance existing aviation-related research, development, test, and evaluation (RDT&E) activities that have been historically conducted at the Patuxent River Complex and provide support to military aircraft acquisition programs (flight test, simulation/stimulation laboratories, ground test, carrier suitability tests, etc.). The proposed action would also enhance the complex's role in supporting the military training needs of the Navy's operational airwings and other military services by providing access to the complex's unique resources, including, but not limited to, the airspace of the Chesapeake Test Range (CTR), targets, electronic warfare emitters, and radars.

Decisions made by the Base Closure and Realignment Committee (BRAC) in recent years have resulted in the collocation of most major elements of Navy aircraft acquisition and RDT&E at Naval Air Station (NAS) Patuxent River. This situation has uniquely positioned NAWCAD to efficiently and effectively use its combined resources in the Patuxent River Complex to meet Naval aviation's future requirements. Given the magnitude of opportunities for the complex, the Navy is developing an overarching guidance document, the *Integrated Management Plan (IMP) for the Patuxent River Complex* (March 1997). The IMP (currently in draft form) provides a complete description of flight and ground-based activities and capabilities occurring within the Patuxent River Complex that are controlled and exclusively scheduled by NAWCAD, as well as those capabilities that occur outside the complex, are not controlled by NAWCAD, and are of independent utility.

However, the proposed action that is the scope of this EIS is focused solely on those flight and related operations conducted in the Patuxent River Complex that are exclusively controlled and scheduled by NAWCAD. Specifically addressed are operations that occur at NAS Patuxent River and Outlying Landing Field (OLF) Webster Field, and in the CTR (including its restricted airspace, aerial and surface firing range, as well as Hooper, Hannibal, and Tangier Island targets).

In accordance with the National Environmental Policy Act (NEPA), the Navy is documenting the potential environmental impacts of this proposed action and its alternatives and providing for public participation through the preparation of this EIS. This EIS complies with the Council on Environmental Quality (CEQ) regulations implementing provisions of NEPA and with the Chief of Naval Operations Instructions (OPNAVINST) 5090.1B.

S.2 Proposed Action and Alternatives

In addition to the No Action Alternative, three alternative future operational workload levels for the Patuxent River Complex have been evaluated in this EIS. (Operational Workload Alternative III has been identified as the Navy's preferred alternative.) The No Action and Operational Workload Alternatives were all developed based on foreseeable mission requirements and the complex's unique airfield, facility, and range capabilities. The implementation of one of these proposed alternatives would provide the complex with the flexibility to accept new workloads, if required.

The first step in the development of the alternatives was an evaluation of Fiscal Year (FY) 1996 data (the most recent and complete available) on aircraft flight operations conducted in the Patuxent River Complex. These data were evaluated using the Naval Aviation Simulation Model (NASMOD), which was developed by the Navy in 1993 to analyze problems and issues related to airfield and special use airspace operations. The results of NASMOD showed that in FY 1996, about 80 percent (or 18,400 flight hours) were flown exclusively within the Patuxent River Complex. RDT&E flight operations (16,000 flight hours) accounted for nearly 87 percent of the annual flight hours.

Also considered in the development of alternatives were ground-based operations at NAS Patuxent River and OLF Webster Field (hereinafter Webster Field). Ground-based operations at the Patuxent River Complex include: (1) ground-based activities related to aircraft flight operations (pre-flight, post-flight, and ground taxi operations); (2) non-flight RDT&E and laboratory testing; and (3) basekeeping operations.

S.2.1 No Action Alternative

The No Action annual number of flight hours (18,200) would be slightly less than those described for existing (1996) conditions (18,400). The projection of No Action conditions reflects:

- The same annual flight hours associated with support of military training activities and other flights as have been identified for existing (1996) conditions.
- The expected future mix of aircraft, including the primary aircraft types at the complex, the V-22 Osprey, as well as other platforms that may be tested to support Navy acquisition programs.

- Future changes in the conduct of operations at the NAS Patuxent River airfield (e.g., planned reductions in the number of pattern hours for certain aircraft types).

S.2.2 Operational Workload Alternatives I, II, and III

Each of the alternatives provides for increased RDT&E levels of flight operations and support for military training activities with other flight operations remaining at No Action levels. (As mentioned previously, Operational Workload Alternative III has been identified as the Navy's preferred alternative for implementation.) Increases in ground-based operations would vary depending on the type of activity under consideration. The assumptions applied to the development of the three Operational Workload Alternatives are outlined in Table S-1. A comparison of the increased aircraft flight and ground-based operations for each Operational Workload Alternative is provided in Table S-2.

While the types of RDT&E missions expected to be flown in the complex in the future would be the same as currently are flown, proposed operations in support of military training would accommodate Intermediate Level training, in addition to the Unit and Advanced Levels currently provided at the complex. Intermediate Level training support would involve air wing exercises using a mix of aircraft and interfacing with surface ships at sea. Also, Advanced Level training would be expanded to include exercises of the US Army Airborne that could occur from two to possibly three times per year for a ten-day duration. Approximately 350 to 400 troops, bivouacked in a hangar at NAS Patuxent River, would be involved in each exercise.

S.3 Affected Environment and Impacts of the Proposed Action and Alternatives

This EIS provides a generalized overview of the affected environment within the Patuxent River Complex, as well as extended discussions on those environmental factors that could be potentially affected by aircraft flight and ground-based operations. Consequently, this EIS examines the affected environment for the following multi-level study areas, where appropriate:

- Land, water, and airspace encompassing the Chesapeake Test Range (CTR);
- NAS Patuxent River and its surrounding environs;
- OLF Webster Field and its surrounding environs; and
- Localized target areas (Hooper, Hannibal, and Tangier Island targets).

Table S-1
Future Operational Workload Assumptions

- All sorties are assumed to be conducted in the Patuxent River Complex. This assumption was made to provide a more rigorous assessment of any environmental impacts within the Patuxent River Complex.
- Proposed increases in future RDT&E flight operations would be conducted entirely within the Patuxent River Complex. This reflects NAWCAD information that future RDT&E customers may prefer to conduct as many flight tests as possible within the Patuxent River Complex (instead of accessing the Atlantic Warning Areas) due to the high level of precision measurement and close control that can be achieved in the instrumented CTR. This assumption is considered to be conservative because, in reality, not all future testing could or would be accommodated within the complex.
- Similar to the assumption on future RDT&E flight operations, proposed future increases in flight operations associated with support of military training (2,500 additional flight hours) would be conducted entirely within the Patuxent River Complex.
- Increases in the flight operations in the complex would grow gradually over time, rather than occurring abruptly. Therefore, it has been assumed that the proposed increased levels of flight activity for any of the alternatives would be gradually phased in over a five-year period beginning in late 1998.
- The existing boundaries of the restricted airspace and restricted surface areas within the CTR would be maintained; proposed future operating hours would be essentially the same as current operating hours.
- The permanent employment base at NAS Patuxent River or Webster Field would be expected to remain the same as under the current level of operations (e.g., full post-BRAC employment); the number of transient workers that would be associated with specific test programs would also remain the same as described for current operations levels.
- No new facilities, beyond those constructed under BRAC realignment, are part of the scope of this EIS and any new facilities proposed for the complex in the future would require separate environmental documentation.
- The mix of aircraft using the Patuxent River Complex would likely change. This change would be influenced by two primary factors: (1) Navy actions to replace older model aircraft with new acquisitions, both fixed- and rotary-wing; and (2) Department of Defense efforts to increase joint service testing and evaluation, as well as training.

Table S-2
Comparison of Operational Workload Alternatives

Activity	No Action Alternative	Workload I Alternative	Workload II Alternative	Workload III Alternative (Preferred Alternative)
Annual Flight Hours				
RDT&E	16,000	16,000	17,900	19,700
Support of Military Training	800	3,300	3,300	3,300
Other	1,400	1,400	1,400	1,400
Total	18,200	20,700	22,600	24,400
Ground-Based Operations				
Annual Hours of Operation	2,920	2,920	3,210	3,500

Implementation of the proposed action or selection of the No Action Alternative would result in no significant environmental impacts with respect to:

- **Land Use and Transportation** - The permanent and transient employment base of NAS Patuxent River and OLF Webster Field would remain the same as under the current level of operations (e.g., full post-BRAC employment). In addition, no new facilities are planned beyond those constructed under BRAC realignment. As a result, there would be no impacts to land use or transportation.

- **Air Quality** - Emission rates would be less than the General Conformity Rule applicability rates for nitrogen oxides (NO_x) or volatile organic compounds (VOCs), and thus a formal conformity analysis would not be required.

- **Cultural Resources** - Aircraft noise-related vibrations and frequencies generated in the Patuxent River Complex would not be sufficient to damage a historic structure; furthermore, the brief and transitory nature of aircraft noise and overflights would not adversely impact qualities of integrity or affect a property's eligibility for listing in the National Register of Historic Places.

- **Ordnance Stores, Hazardous Materials Management, and Radio Frequency Sources** - Existing management practices regarding these impact categories would continue into the future and adherence to existing environmental and safety procedures and policies would avoid potential adverse impacts.

- **Topography, Geology, and Soils** - No construction or other disturbances to surface or subsurface soils would occur in the Patuxent River Complex since new military construction projects would not be required to support implementation of the proposed action or its alternatives.

- **Vegetation -** Aircraft overflights in the complex would not adversely affect wetlands, submerged aquatic vegetation (SAV), or other vegetation in the Chesapeake Bay, and no new military construction projects are planned for either NAS Patuxent River or Webster Field. Therefore, there would be no change to existing plant communities.

The potential for environmental impacts in other areas is discussed below given the complexity of each subject.

S.3.1 Socioeconomics

The socioeconomic baseline (demographics, employment, and housing) shows the land areas surrounding the Chesapeake Bay and within the CTR to be growing in population and level of development. Since the proposed action would involve the enhanced use of existing personnel and facilities within the Patuxent River Complex, the permanent employment base is expected to remain the same as under the current level of operations (e.g., full post-BRAC employment). The number of transient workers that would be associated with specific test programs would also remain the same as described for current operational levels. In addition, no new facilities are planned beyond those constructed under BRAC realignment. (BRAC realignment impacts were discussed in EISs finalized in 1993 and 1994.)

S.3.1.1 No Action Alternative

Socioeconomic impacts associated with the No Action Alternative are summarized as follows:

- Impacts to socioeconomic resources would not be significant as there would be no new permanent or temporary personnel nor is construction of new military facilities planned.

- The CTR extends over areas where poultry production is an important sector of the economy and where concern has been expressed regarding the impact of aircraft overflights on poultry. Studies have shown that low-level, high-speed aircraft overflights could induce panic reactions in poultry not acclimated to such overflights, causing them to crowd together or pile. Poultry farms underlie two, low-level, high-speed military training routes (MTRs) -- VR 1711 and VR 1712 -- that converge to enter the CTR from Maryland's Eastern Shore. Because aircraft activities along these MTRs would be too brief and intermittent to allow poultry to become acclimated (and in consideration of public comments that have been received), NAWCAD has implemented a management initiative to address this issue. NAWCAD has advised the US Air Force (the scheduling authority for the two MTRs is the Air National Guard's 113th Fighter Wing at Andrews Air Force Base) of the potential problems associated with flights along these MTRs and requested that:

    - The routes be restructured to avoid impacts to the farms; and/or

    - A Route Brief be prepared that informs pilots filing flight plans that would use VR 1711 or VR 1712 of the existence of the poultry farms and provide guidance for minimizing impacts to the farms.

- The localized target areas would continue to be cleared of commercial fishing and other users, as necessary, to accommodate Navy tests/exercises, accounting for about

36 hours per month. The surface area to be cleared would involve between 0.1 and 0.3 percent of the surface water areas underlying the CTR, the same surface area cleared under existing (1996) conditions.

- As evaluated in accordance with Executive Order 12898 (Environmental Justice), flight operations in the CTR under the No Action Alternative would not cause any disproportionately high and adverse environmental or health impacts specific to any groups or individuals residing within the CTR, including those from minority or low-income populations. Furthermore, no persons would be displaced.

S.3.1.2 Operational Workload Alternatives I, II, and III

Socioeconomic impacts associated with the three Operational Workload Alternatives are summarized as follows:

- Implementation of any of the three alternatives would involve no on-ground disturbances or planned military construction projects, and there would be no changes in projected employment. Hence, there would be no demographic or employment impacts on persons residing within the footprint of the CTR.

- The localized target areas would be cleared to accommodate Navy tests/exercises for an average of 58 to 70 hours per month. While this level of closure would be of greater duration than presently occurs, it would not pose a significant limitation to commercial fishing activities as the area to be cleared would be the same as described for existing (1996) conditions (and the No Action Alternative), and would involve only one to three hours per operation. In addition, the area to be cleared would exclude the relatively shallower portions of the Bay (Tangier Sound, Pocomoke Sound, or Hooper, Holland or Kedges straits) and only involve the immediate vicinity of or around the targets. Also, the clearance area would average about 7.8 square kilometers (three square miles), or only about 0.3 percent of the surface water area underlying the CTR, including the prohibited areas surrounding the targets that are not available for navigation or fishing at any time. As currently occurs, watermen would be able to fish in other areas of the Bay during tests/exercises, and return to the cleared area after Navy tests/exercises have been completed.

- Impacts to poultry farmers in the areas underlying the CTR would be the same as described for the No Action Alternative.

- In the area of environmental justice, potential impacts for Operational Workload Alternatives I, II, and III would be the same as described for the No Action Alternative.

S.3.2 Community Facilities and Services

For this EIS, community facilities and services are defined as emergency services (police, fire, and rescue) and open space resources (national and state wildlife refuges, parks, and other recreational facilities).

S.3.2.1 No Action Alternative

There would be no impacts to emergency services with the No Action Alternative as there would be no significant changes to current conditions. However, a number of open space resources lie within the footprint of the CTR; these areas, including National Wildlife Refuges (NWRs), Wildlife Management Areas (WMAs), and state and local parks, would continue to experience aircraft overflights under No Action conditions. The minimum altitude allowed by the Navy over these areas is 1,050 meters (3,500 feet), or 450 meters (1,500 feet) more restrictive than Federal Aviation Administration (FAA) guidelines (FAA Advisory Circular 91-36C) allow. Therefore, there would be no significant impacts to open space resources under the No Action Alternative.

In addition, recreational boating and fishing are permitted within the aerial and surface firing range and the Tangier Island target danger zone when not in use. Clearance of small portions of the Bay in these areas prior to test/exercise commencement would continue; however, this level of restriction would not have significant impacts on either recreational boaters or fishermen given the duration of the exercises and the limited portion of the Bay that would be closed.

S.3.2.2 Operational Workload Alternatives I, II, and III

Under Operational Workload Alternatives I, II, and III, impacts to emergency services and open space resources would be similar to those described for the No Action Alternative and would not be significant.

S.3.3 Noise

Noise impacts from aircraft flight operations were considered from both physiological and behavioral perspectives, including: annoyance (measured by consideration of the Day-Night Average Sound Level [DNL] of 65 decibels [dB]); speech interference; sleep disturbance; and effects on domestic animals and wildlife (see Section S.3.4). The 65 dB DNL guideline is the best means for determining noise impacts on airport communities.

The noise generated by subsonic and supersonic flight operations in the CTR was studied through the use of computerized noise models. The results of the modeling showed that there were no significant noise impacts among the three alternatives. The average L_{dnmr} (a variation of the DNL noise metric) noise levels for all alternatives produced by subsonic operations were below a level of 55 dB. For supersonic flight operations in the CTR, only a single 40 dB L_{Cdn} (another variation of the DNL noise metric) contour in the vicinity of Smith Island was documented for each of the alternatives.

In a similar manner, computer models were used to determine noise impacts in terms of land area, dwellings, and population in the vicinity of the airfields at NAS Patuxent River and Webster Field (Table S-3).

Table S-3

Noise Impacts Within the 65 dB Contour[1]

Impact Category		No Action Alternative	Operational Workload Alternative		
			I	II	III
Land Area	Hectares (Acres)	270 (674)	306 (766)	352 (879)	380 (950)
Dwellings		318	375	430	471
Population		806	961	1,105	1,205

Notes:
1. Impacts calculated for land area outside Navy ownership.

In addition to the above analyses, a study was undertaken of noise impacts at specific sensitive receptor locations (e.g., residences, schools, hospitals, etc.) in the CTR with respect to noise levels and the potential for speech interference and sleep disturbance. There was little difference among the alternatives, with DNL levels generally ranging from less than 45 dB to 64 or 65 dB at the locations studied. All levels were at or below the 65 dB guideline used by DoD and FAA. As well, exterior noise levels at school locations would be within compatibility guidelines. Similarly, there was little difference among the alternatives with respect to the potential for speech interference and sleep disturbance. For example, the number of locations with the potential for indoor speech interference (expressed as sentence intelligibility of less than 100 percent) ranged from four to five out of 20 locations studied for all alternatives, and the number of locations with sleep disturbance (expressed as maximum percentage awakened greater than 0 percent) was eight out of 20 locations studied for all alternatives.

S.3.4 Wildlife and Fisheries

As part of the assessment of impacts of the proposed action on wildlife and fisheries, coordination has been undertaken with federal and state agencies under the Endangered Species Act of 1973 and the Marine Mammal Protection Act of 1972.

S.3.4.1 No Action Alternative

Issues examined as a result of increased aircraft overflights and the release of stores during RDT&E weapons/stores testing or military training activities include: noise disturbance to wildlife; bird/aircraft strike hazards (BASH); deer/aircraft strike hazards (DASH); direct contacts or strikes on fish and wildlife; and release of chemicals associated with inert stores. Potential impacts are summarized as follows:

- There would be no significant increase in aircraft noise impacts that could adversely impact wildlife. Of the threatened and endangered species that may occur in the area, the northeastern beach tiger beetle is not likely to breed at NAS Patuxent River, and although the bald eagle and peregrine falcon have been sighted in the area, nesting has not been observed.

- BASH and DASH would continue to be of primary concern, particularly regarding blackbirds and other flocking birds in the vicinity of the airfields. The NAS Patuxent River Natural Resources staff monitors the location of bird roosts in order to provide advance warning to pilots. In addition, effective ongoing programs for reducing the potential for BASH and DASH would continue.

- The probability of direct contacts or strikes on fish and wildlife by released stores would be very low. However, even if some individuals were struck directly by a store, given the diversity of these species in the Bay overall, their mortalities would be unlikely to have a significant impact on populations as a whole.

- Both shortnose and Atlantic sturgeon are likely present in the Bay, but in very small numbers. The Atlantic sturgeon is being considered for listing as a threatened or endangered species. The smaller, federally-endangered shortnose sturgeon is now very rare all along the Atlantic Coast. Thus, the likelihood of a store striking an Atlantic or shortnose sturgeon would be very unlikely. The Navy has coordinated with the National Marine Fisheries Service on this issue, and the agency has verbally concurred with this conclusion (Nichols, September 11, 1998).

- Unrecovered and unrecoverable inert stores would remain buried in the Bay bottom, would ultimately corrode, and their contents would be absorbed into the environment. The stores would also displace infaunal invertebrates, but this impact would not be significant. On the positive side, the displacement would have the potential to provide additional habitats for many other species.

- Although some expended military small arms ammunition contains lead, it is unlikely that fish or wildlife would be adversely affected, due to the fact that the Bay's pH makes lead very insoluble and the size of the spent bullets would be too large for most wildlife to ingest.

- Similarly, chaff would be unlikely to cause significant adverse effects on fish or wildlife. Studies of chaff show that, overall, benthic worms, crabs, and fish species appear to be unaffected by the aluminum-coated and uncoated fiber material (Cataldo, et al., January 1992).

- The use of flares would be unlikely to adversely affect fish or wildlife populations, as flares burn quickly and only incidental debris from packaging would remain. This debris has not been shown to induce illness or mortality when ingested by animals.

S.3.4.2 Operational Workload Alternatives I, II, and III

Potential impacts are summarized below:

- Impacts related to aircraft noise and BASH/DASH impacts would be the same as described for the No Action Alternative.

- Despite a projected increase in the release of practice bombs at the target areas, the probability of direct contact or strikes on fish and wildlife would still be extremely low. Also, although the increased number of the practice bombs released would displace additional infaunal invertebrates, this displacement would still consist of small isolated areas that may have the positive impact of providing additional habitats for many other species.

- The potential for chemical impacts from stores released under any of the alternatives would be similar to that described for the No Action Alternative for most stores, including chaff and flares. Compounds contained in signal cartridges (red phosphorus or titanium tetrachloride) that are used during military training activities to score ordnance delivery accuracy would not adversely impact the Bay due to their rapid dilution and small quantities. The increased release of small arms ammunition would not be anticipated to adversely affect fish or wildlife, including threatened or endangered species for the same reasons as described for the No Action Alternative.

S.3.5 Water and Sediment Quality

S.3.5.1 No Action Alternative

Potential surface water and groundwater impacts are summarized as follows:

- Overflights of the CTR and the targets would not impact surface water resources. Should an aircraft mishap occur, however, fuel or hydraulic fluids could be released. The magnitude and duration of the spill would be adequately controlled and contained through existing rescue and spill response procedures.

- The release of inert (nonexplosive) stores into the Bay near the targets would not adversely affect water quality in the Bay given the fact that the stores are iron/steel forms filled with sand, concrete, or vermiculite (materials common in the environment). Lead in some expended small arms rounds would be very insoluble given the Bay's pH, and what small concentrations that are released into the overlying water column would be diluted rapidly. Further, the results of water quality sampling by the Navy at several ranges and targets in North Carolina support the fact that continued use of the targets under the No Action Alternative would not adversely affect water or sediment quality in the Bay.

- Some stores (missiles and general purpose bombs) may have attached telemetry units, with a battery-powered electrical system. While Ni-Cd batteries were used in telemetry units in the past, environmentally-friendly lithium iron disulfide batteries have proved a successful substitute for the Ni-Cd battery in recent testing activities. Consequently, the future use of Ni-Cd batteries would be greatly reduced and eventually eliminated (see Section S.3.7, Cumulative Impacts).

- The use of chaff and flares in the CTR would also be unlikely to adversely affect water or sediment quality given their constituents and quantities.

- The No Action Alternative would not further affect groundwater resources underlying the CTR or localized target areas since there would be no additional employees, either permanent or transient, nor would release of materials occur that could contaminate groundwater.

- At NAS Patuxent River and Webster Field, there would be no changes to stormwater flow or collection systems or to any 100-year floodplain, since there would be no planned military construction or other disturbances to the ground surface.

- C The air station currently has in effect an Oil and Hazardous Substance Spill Contingency Plan that provides a course of action for site specific spill response. Continued adherence to this plan would minimize the impacts of a spill of oil and hazardous substances at the air station, Webster Field, and in the CTR.

S.3.5.2 Operational Workload Alternatives I, II, and III

The surface water impacts for these alternatives would be the same as those described for the No Action Alternative, with the exception of impacts associated with the use and discharge of signal cartridges in the Bay. However, use of these signal cartridges would not adversely affect water quality in the Bay due to their limited use and the dilution that is achieved in the Bay.

S.3.6 Aircraft Operations and Safety

Flight safety is accomplished through rigorous test planning, test article preparation, use of CTR Instrumentation and Air Traffic Control, and safety precautions for weapons/stores separation tests. Elements of flight safety responsibility have common, as well as separate, applicability to various components of the Patuxent River Complex. Within the CTR and localized target areas, aspects to be considered are: risk of crashes/accident potential zones; risk of store release over areas other than the target areas; airspace use conflicts; impact hazards (night flights, BASH/DASH, flights over National Wildlife Refuges, etc.). These elements are also applicable to NAS Patuxent River and Webster Field, along with the Air Installation Compatible Use Zone (AICUZ) program and Navy occupational safety and health issues.

Aircraft operations and flight safety in the CTR and at the target areas under the No Action Alternative would be similar to existing (1996) conditions. The potential for mishaps on the ground and in the air under the increased flight and related operations proposed for the three Operational Workload Alternatives could be expected to increase. Ground mishaps could include fuel spills and BASH/DASH issues. Mishaps in the air could lead to an increase in fuel dumping due to emergency situations and the jettisoning of stores in areas outside the vicinity of the targets. Contributing factors to the potential for mishaps would include increased maintenance requirements and stress on personnel accomplishing an additional workload in the same allotted time. Continued adherence and emphasis on airfield safety policies and procedures and range-related safety and clearance practices would minimize the potential for mishaps due to the proposed increased level of flight and related operations under any of the alternatives. Air Traffic Control at NAS Patuxent River would continue to enforce its “ten aircraft rule” for safety in the CTR.

With respect to unmanned aerial vehicles (UAVs), this program experienced aircraft losses in the past; however, since these are unmanned vehicles, only minor property damage was involved. Since these mishaps occurred, the reliability of the engine has been substantially increased through redesign and no incidents have occurred in the last two years. In any event, the Navy specifically selects UAV training areas to avoid overflights of densely populated areas.

S.3.7 Cumulative Impacts

Cumulative impacts for this EIS relate to concerns with the Chesapeake Bay ecosystem and human community thresholds. Cumulative impacts to the Bay's ecosystem would be minor, and principally associated with the release of stores into the Bay. However, these stores would corrode and would be unlikely to affect benthic organisms. In this regard, NAS Patuxent River has already instituted two management initiatives:

- **Stores Database** - NAWCAD is developing a comprehensive and uniform electronic database to link separate stores databases. This database, to be administered by NAS Patuxent River's Office of Environmental Planning (OEP), would provide for efficient tracking of the types and quantities of stores released into the Bay.

- **Use of Environmentally-Friendly Batteries** - NAWCAD has instituted a management initiative to reduce future use of Ni-Cd batteries via the required environmental reviews conducted by the Patuxent River Complex's Environmental Review Board (ERB) and OEP for each test or other activity proposed for the CTR. The use of Ni-Cd batteries in the Patuxent River Complex would only be permitted if lithium iron disulfide or other environmentally-friendly batteries were not available or would not meet technical requirements.

Within the context of the human community considered in this EIS, the following two areas of potential cumulative impacts have been identified and evaluated:

- **Frequency of Closure of Areas in the Chesapeake Bay to Accommodate Military Activities** - Proposed closure of Bay surface areas associated with NAWCAD activities, in addition to other proposed military activities, would not pose a significant limitation for either commercial fishing activities or recreational boating/fishing since these existing and proposed military activities would be of short duration, involve limited surface areas of the Bay, and allow the closed areas to be used after test/exercises were completed.

- **Aircraft Noise (Jets, Helicopters, and UAVs)** - In the area of aircraft noise, there would be a minor cumulative increase in the use of the MTRs in the vicinity of the CTR. Additional users of the MTRs would be other military services, including the US Air Force and the Air National Guard. Another contributing noise source in the

Chesapeake Bay area would continue to be the firing of guns at the Naval Surface Warfare Center Dahlgren, Virginia.

With respect to UAV operations, the scope of the proposed action encompasses the level of operations associated with existing programs. As new UAV programs are considered, they will be evaluated by the Patuxent River Complex ERB to determine if they meet the operational type and tempo forecast, and are within the envelope of environmental impacts as analyzed in this EIS. Should such new programs exceed the scope of this EIS, as determined by the ERB, separate NEPA documentation would be required.

S.4 Mitigation Measures

Mitigation measures that would minimize potential environmental impacts as identified in this EIS are discussed below. These proposed mitigation measures were developed in response to comments received during the public review period for the DEIS and focus on mitigating public "annoyance factors" associated with certain Navy flight and related operations.

S.4.1 Aircraft Noise and Sonic Booms

The results of the noise impact analysis for CTR flight operations (as documented in this EIS) did not initially indicate a need for developing and applying mitigation measures to reduce aircraft noise, including sonic booms. However, the level and nature of public comment received during the DEIS public review period resulted in the Navy's reviewing the issues and proposing the following mitigation measures:

- The establishment of a new centralized Noise Disturbance Reporting System;
- Expansion of existing briefings on aircraft operations procedures that are conducted with all users of the CTR, and others, as appropriate, to ensure an understanding of proper procedures and EIS mitigation measures; and
- Restrictions on supersonic flights within the CTR and implementation of a sonic boom monitoring system in the CTR that will be used to enable corrective action to be taken, or to alter operations or procedures to minimize sonic boom impacts, as appropriate.

With respect to aircraft noise in the vicinity of the NAS Patuxent River and Webster Field airfields, the 75+ dB DNL and the 70+ dB DNL contours would not extend beyond the property boundaries of each installation, respectively. Therefore, no aircraft noise-related mitigation measures are proposed for operations at these locations, although the Navy would continue its current practices of routing aircraft over water rather than populated areas, weather or other conditions permitting.

S.4.2 Overflights by UAVs

UAVs presently operate in a constricted area of the CTR over the Northern Neck of Virginia, the constraints of which have resulted in multiple UAV overflights of the same locales numerous times per mission. As a result, residents have been subjected each day to the low level noise and almost continuous presence of the UAVs, both of which are considered to be highly annoying. To mitigate this annoyance factor, the Navy will increase the area within the CTR available to UAVs for routine training purposes, an action that will greatly reduce UAV exposure time over any one location and thus eliminate the almost continuous presence of UAVs which annoyed many citizens. The additional UAV operating areas are being identified by the Navy using detailed demographic and land use data to avoid overflights of densely populated areas. It is estimated that this mitigation plan will be fully implemented between February 1999 and August 1999.

S.4.3 Operations at the Open-Air Test Cell

During the first and second quarters of 1998, the tempo and type of operations that occurred at the open-air engine test facility at NAS Patuxent River (located near the Patuxent River shoreline) differed from those that were predicted in the EIS, resulting in increased noise levels in the Solomons, Maryland area. Although these changes were temporary, the Navy anticipates a continuing need to conduct critical engine tests at the open-air facility when open-air testing is required. Accordingly, a noise mitigation plan has been developed and the Navy has committed to eliminating the use of the open-air engine test facility for aircraft jet (turbofan and turbojet) engine maintenance runs. The only exception would be for mission-critical tests in situations where the primary engine maintenance test cell (the T-10) is unavailable for an extended period of time, and this use would require the approval of the Commanding Officer of NAS Patuxent River. In addition, the Navy will investigate feasible technical solutions to reduce the noise associated with operations at the open-air engine test facility and evaluate the technical feasibility of developing an alternative back-up site for the T-10, such as the hush house, to further reduce the likelihood that the open-air engine test facility will be required for aircraft jet engine maintenance runs.

S.5 Relationship of the Proposed Action to Federal, State, and Local Plans, Policies, and Controls

The proposed action would comply with existing federal regulations and with state, regional, and local policies and programs. The proposed action would be in compliance with all applicable federal acts, executive orders, and policies.

S.6 Unavoidable Adverse Effects; Relationship Between Local Short-Term Uses of the Environment and the Enhancement of Long-Term Productivity; and Irreversible and Irretrievable Commitment of Resources

Unavoidable adverse effects resulting from the proposed action would be related to aircraft noise. In addition, none of the activities addressed in this EIS is categorized as short-term. From the long-term perspective, the expanded use of the targets, airspace, and facilities would increase the productivity of the Patuxent River Complex and achieve the purpose of the proposed action -- to enhance the use of taxpayer-funded facilities by increasing efficiency and lowering costs to users. The negative impacts of achieving this goal would not be significant. Implementation of the proposed project would positively affect long-term productivity of the Chesapeake Bay region.

Commitments of resources associated with the proposed action would include: fuel used by aircraft and by range clearance boats; energy expended in operating existing facilities during extended hours; supplies of water; and sewage treatment capacity. Also committed would be the stores released into and not recovered from the Chesapeake Bay. In addition, the use of the land area comprising NAS Patuxent River, Webster Field, and the targets would be irreversibly and irretrievably committed to the proposed action during its life.

S.7 Public Review Process and Response to Comment

Public involvement in the review of EISs is stipulated by 40 CFR Part 1503 of CEQ's regulations implementing the NEPA and by OPNAVINST 5090.1B. The Notice of Intent (NOI) for this project was published in the *Federal Register* on April 1, 1997 and five public scoping meetings were held during May 1997. To assist the public in making comments on the proposed action, 19 informational repositories were set up around the Chesapeake Bay.

Following the May 15, 1998 publication of the Notice of Availability (NOA) in the *Federal Register*, the Draft EIS (DEIS) underwent an 81-day public comment period during which the Navy held four public hearings. Comments received on the DEIS are addressed in this FEIS. Comments on the FEIS may be entered into the official record for 30 days following the publication of the Notice of Availability in the *Federal Register*.

How to Comment on this FEIS

- Mail or fax written comments to: *Ms. Kelly Burdick*
  Naval Air Warfare Center, Aircraft Division
  c/o Office of Legal Counsel
  47031 Liljencrantz Road, Bldg 435, MS 39
  Patuxent River, MD 20670
  (Fax) 301-342-1840
- Record comments using the EIS toll-free number: *1-888-276-5201*
- Access the Internet website at: *http://www.tamsconsultants.com/paxriver/*

Both the toll-free telephone voice mail and the Internet website will remain available for public access for 60 days following publication of the Navy's Record of Decision (ROD) in the *Federal Register*. All comments will receive the same attention and consideration, regardless of the method of submission.

TABLE OF CONTENTS

TABLE OF CONTENTS

Section **Title** **Page**

TABLE OF CONTENTS

Section	Title	Page

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF FIGURES

LIST OF TABLES

LIST OF TABLES

Chapter 1

Purpose and Need

1 PURPOSE AND NEED

The Department of the Navy is preparing this Environmental Impact Statement (EIS) to assess the potential environmental effects of increasing flight and related operations in test areas under the exclusive control and scheduling authority of the Naval Air Warfare Center, Aircraft Division (NAWCAD). Proposed flight operations would be increased as described in the Draft Integrated Management Plan (IMP) for the Patuxent River Complex. The Draft IMP is a strategic plan developed by NAWCAD for conducting future operations at the complex.

All affected test areas are within the Patuxent River Complex, located on the Chesapeake Bay in Southern Maryland, about 95 kilometers (60 miles) southeast of Washington, DC (Figure 1-1, Patuxent River Complex). For more than 50 years, the Navy has actively used the complex for aircraft test and evaluation purposes. Components of the complex include:

- Naval Air Station (NAS) Patuxent River (with all its flight and ground test facilities, runways, and associated airspace);
- Outlying Field (OLF) Webster Field (with its flight test facilities, runways, and associated airspace); and
- Chesapeake Test Range (CTR) (including its restricted airspace, aerial and surface firing range, and Hooper, Hannibal, and Tangier Island targets).

NAS Patuxent River (with OLF Webster Field) serves as host to about 50 tenant commands and most components of NAWCAD. NAWCAD is the Navy's primary Research, Development, Test, and Evaluation (RDT&E), engineering, and fleet support activity for naval aircraft, engines, avionics, and aircraft support systems. NAWCAD is responsible for the scheduling and conduct of operations within the Patuxent River Complex.

The purpose of the proposed action is to enhance the use of taxpayer-funded facilities at the Patuxent River Complex by increasing efficiency and lowering costs to users. The proposed action is needed for the Navy to successfully meet current and future national and global defense challenges posed by a post-Cold War environment. Accordingly, the Navy would continue and enhance existing aviation-related RDT&E activities that have been historically conducted at the Patuxent River Complex and provide support to military aircraft acquisition programs (flight test, simulation/stimulation laboratories, ground test, carrier suitability tests, etc). The proposed action would also enhance the complex's role in supporting the military training needs of the Navy's operational airwings and other military services by providing access to the complex's unique resources, including but not limited to its restricted airspace, targets, electronic warfare emitters, and radars.

Patuxent River Complex

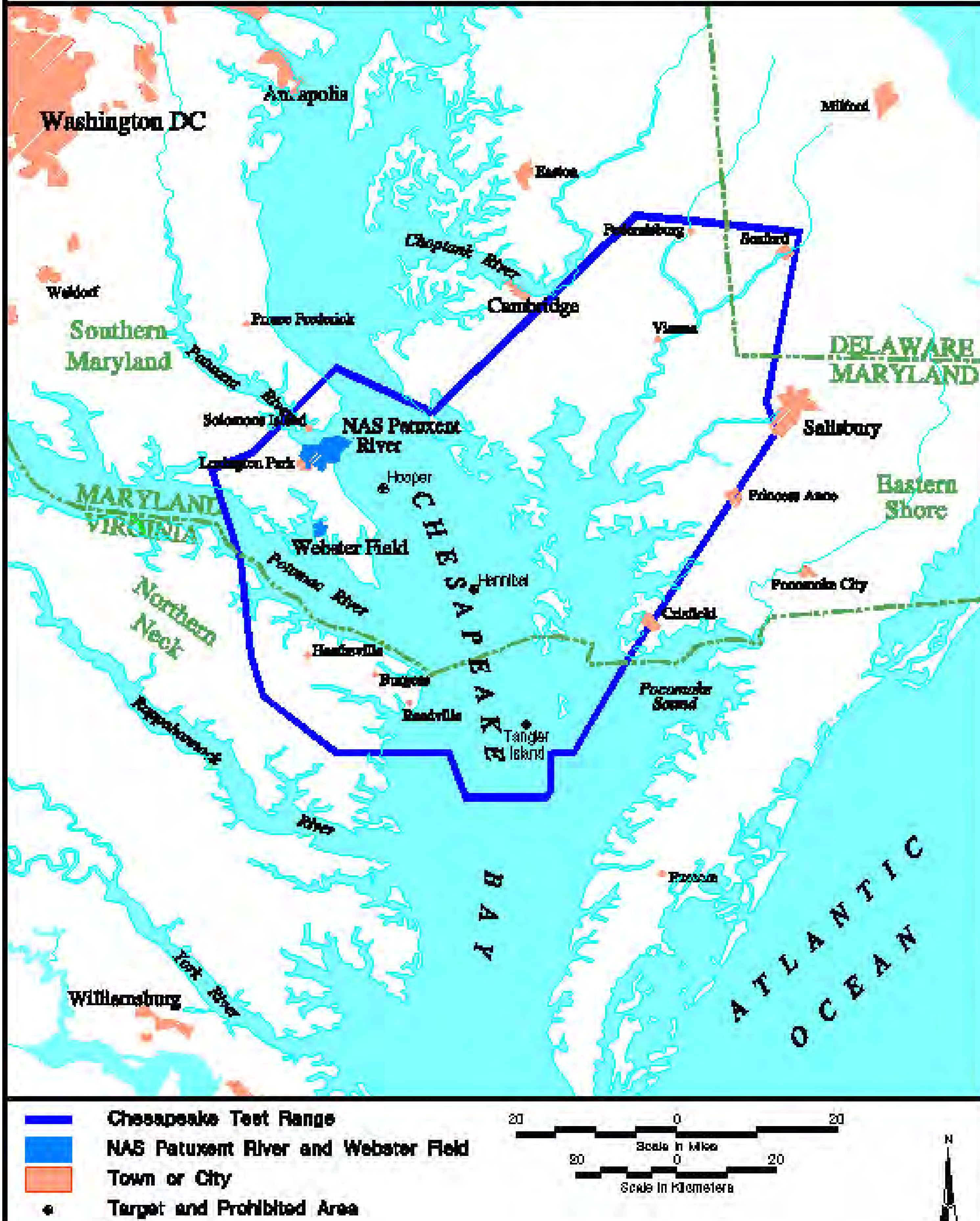


Figure 1-1

1.1 Background

1.1.1 Effect of Post-Cold War Conditions on the US Military

The end of the Cold War in 1989 and the subsequent dissolution of the Soviet Union two years later ushered in a perception that future global military threats to the United States were substantially diminished. As a result, the military buildup that had occurred during the Cold War was viewed as expensive and no longer necessary. The President and Congress responded by reducing defense spending in an attempt to balance domestic priorities with perceived post-Cold War defense needs. Since 1989, the defense budget has decreased by nearly 33 percent (in constant dollars). During that same general period, the number of active duty military and Department of Defense (DoD) civilian personnel declined by 33 and 27 percent, respectively.

As recent experience has proved, however, global threats to American security still exist, but they now involve interrelationships and issues far more complex than existed during the Cold War years. Furthermore, these new threats are more variable in their nature, timing, and location, contrasting significantly with the focused Cold War threat of a large-scale European war. One of the chief factors driving these differences is the current trend toward increasing global interdependence. For example, exporting and importing activities are growing sectors of the US economy, involving about one-quarter of the 1995 and 1996 US Gross Domestic Product (Bureau of Economic Analysis, 1997). Thus, disruptions in the security and stability of regions abroad represent significant future threats to the security and well-being of US citizens.

Motivated by post-Cold War uncertainties, the international community has exerted significant pressure on the US to maintain its leadership role in world affairs (US DoD, March 1996). This is because the US has been perceived as the only nation capable of unilaterally conducting large-scale, effective military operations far beyond its borders. Consequently, the US has been drawn into committing its forces to a number of international operations such as have occurred in Kuwait, Somalia, Bosnia and Herzegovina, Korea, Rwanda, Southwest Asia, Haiti, Grenada, Cuba, Peru, and Ecuador. Missions have ranged from full-scale engagement in regional conflicts, such as Operation Desert Storm, to assisting with natural disaster relief.

Meeting global demands for active US military leadership is expensive, particularly in light of continued declines in defense budgets. DoD has compensated for this disparity by requiring more efficient use of its resources. Major efforts are underway to reform the acquisition system to reduce costs, improve quality, and increase the purchase of commercial products for defense use. Another important effort has been to streamline the DoD infrastructure. DoD is currently implementing more than 500 decisions of the Base Closure and Realignment Commission (BRAC) to realign or consolidate military activities, or to close military installations.

BRAC decisions in 1991, 1993, and 1995 have caused significant physical and organizational changes at the Patuxent River Complex in terms of personnel, facilities, and infrastructure. The principal physical change has been the relocation and consolidation of major naval aviation research and development (R&D) activities from Warminster, Pennsylvania and Trenton, New Jersey with NAWCAD's existing test and evaluation (T&E activities) at NAS Patuxent River. Another physical change has been the relocation of the Naval Air Systems Command (NAVAIR) headquarters, which includes naval aircraft and weapons systems acquisition and program management functions, from Arlington, Virginia to the air station. The merger of these RDT&E and aircraft acquisition activities at a single location will have a significant effect on how the Navy conducts future RDT&E and acquisition for naval aircraft weapons systems. To accommodate this consolidation, significant new construction and renovation of existing facilities has and continues to occur at NAS Patuxent River. Environmental impact statements, finalized in 1993 and 1994, assessed the environmental effects of realigning these functions and the construction of new buildings.

The overriding importance of these BRAC decisions, however, is that most major elements of Navy aircraft acquisition and RDT&E are now collocated at NAS Patuxent River. The benefits of this are especially significant considering DoD's needs for developing and testing technologically superior weapons and weapons systems for use on the battlefield of the future. DoD's *Fiscal Year 1996-2001 Future Years Defense Program* (FYDP) provides for the modernization and recapitalization of aging US military equipment, focusing on "true force multipliers" -- multi-mission weapons platforms (aircraft, ships, etc.) and weapons capable of meeting a broad variety of mission requirements. These future acquisition programs will also involve the development of high technology systems such as advanced sensors, computers, and communications (US DoD, March 1996).

As a result of BRAC, NAWCAD is uniquely positioned at the Patuxent River Complex to efficiently and effectively use its shared RDT&E resources (facilities and personnel) to meet Naval aviation's future technology requirements. Additionally, NAWCAD is positioned to meet the aviation-related technology requirements of other US military services and agencies, foreign governments, and commercial customers, as facilitated by DoD's commercial pricing policy, which applies to the Patuxent River Complex and other components of DoD's Major Range and Test Facility Base (MRTFB).

DoD has redirected, and continues to redirect, the savings realized from BRAC-related infrastructure streamlining to meet another critical national defense need -- maintaining the readiness of the armed forces. In fact, the need for maintaining the readiness and sustainability of the armed forces is the "number one priority" of DoD (US DoD, March 1996) and is also reflected in DoD's FYDP.

Readiness equates to military forces that are proficient at their jobs -- ready to deploy quickly, capable of conducting joint operations (multi-service and/or multi-nation), and able to fight effectively. Proficiency in any skill requires frequent and repetitive practice. In this respect, the training of the armed forces for combat is similar to training for athletics. In the case of the armed forces, however, mastering complicated equipment, particularly current high technology operating and weapons systems, is more than mere repetition of a series of exercises. Intensive and realistic training with that equipment -- aircraft, vehicles, weapons, and logistic support -- on a simulated battlefield is the key to survival in actual wartime conditions.

In view of the critical need for military training, and given the limited number of range facilities available on the East Coast of the US, the Navy has recognized that the well-equipped range-related assets of the Patuxent River Complex, particularly the instrumented CTR, have the potential for meeting the needs of its operational airwings and other military services. This view was validated by a Carrier Air Wing Eight (CVW-8) report [to the Commander, Naval Air Forces Atlantic (COMNAVAIRLANT)], which stated that the complex had the capability to provide valuable fleet training and that the Air Wing had an interest in conducting future single- and multi-plane strikes and electronic warfare scenarios at the complex (*MRTFB Gazette*, December 1996).

1.1.2 Development of the Patuxent River Complex Integrated Management Plan

Given the magnitude of future opportunities for the Patuxent River Complex, the Navy decided to incorporate its ongoing strategic planning activities in a guidance document. This effort culminated in the preparation of an Integrated Management Plan (IMP) for the Patuxent River Complex (hereafter cited as Draft IMP, March 1997). The purpose of the Draft IMP is to provide a framework that would enable the Navy at the Patuxent River Complex to assist in meeting current and future defense needs through more effective using taxpayer-funded facilities resulting in increased efficiency and lower costs to users. This would be achieved through:

- Flexible use of the complex's ground-based and range-related facilities and its workforce to conduct the core mission of providing RDT&E for naval aircraft and associated systems;
- Expansion of the complex's role in providing support for military training activities; and
- Continuation of the Navy's commitment to environmental resource conservation and protection.

The Draft IMP is an overarching guidance document that addresses the independent components that comprise the Patuxent River Complex. Each component has utility and function independent of other components. One such component is the NAWCAD flight operations. The Draft IMP reviews the capabilities of the assets owned, exclusively controlled, and scheduled by NAWCAD, specifically the following components: NAS Patuxent River, OLF Webster Field, and the CTR. For completeness, however, the Draft IMP also identifies other locations (or complex components) where NAWCAD maintains detachments and associated facilities to which NAWCAD or tenants of the complex have access. These components are: (1) outside the Patuxent River Complex; (2) outside the exclusive control and scheduling authority of NAWCAD; and (3) are of independent utility. They include the:

- Offshore Atlantic Warning Areas;
- Bloodsworth Island Shore Bombardment and Bombing Range; and
- NAWCAD detachments at Naval Station Washington (NSW) Solomons Complex; Naval Air Engineering Station (NAES) Lakehurst; NAS Key West; National Aeronautics and Space Administration (NASA) Wallops Flight Facility; Letterkenney Army Depot; and Arnold Engineering Development Center.

The Draft IMP also describes the operations of several NAS Patuxent River tenants -- Air Test and Evaluation Squadron One (VX-1), Fleet Air Reconnaissance Squadron Four (VQ-4), and Naval Research Laboratory (NRL) Flight Support Detachment. About 50 percent of the operations conducted by VX-1, VQ-4, and NRL occur outside the Patuxent River Complex.

The Draft IMP builds on existing agreements with other services, foreign governments, domestic government agencies, and the civilian commercial sector, including but not limited to a:

- Memorandum of Understanding (MOU) with US Army Aberdeen Test Center and Commander Training Command Atlantic Fleet to collaborate in supporting Test and Evaluation requirements and to cooperate in supporting Joint Task Force Exercises and unit training;
- MOU with US Army Fort AP Hill and Aberdeen Test Center to allow operational forces to use existing test and evaluation and training range facilities in the Chesapeake Bay to improve military training; and
- Participation in the Patuxent Partnership, an alliance joining government, industry, and academia in Southern Maryland to expand the business base.

This EIS, prepared in accordance with the National Environmental Policy Act (NEPA), documents the potential environmental impacts of increases in flight related operational workload levels for the NAWCAD component of the Patuxent River Complex.

1.2 Environmental Impact Analysis Process

The Navy is preparing this EIS pursuant to:

- National Environmental Policy Act (NEPA) of 1969, which requires a detailed environmental analysis for major federal actions with the potential to significantly affect the quality of the human environment;

- Council on Environmental Quality (CEQ) regulations as contained in 40 CFR Parts 1500 to 1508, which implement the provisions of NEPA; and

- Chief of Naval Operations Instruction (OPNAVINST) 5090.1B, which documents the Navy's internal operations instructions on how the department implements the provisions of NEPA.

Adherence to this legislative and regulatory framework will enable informed and balanced decision-making regarding the environment, and will assure public participation. The overall NEPA process and the specific public participation program undertaken in support of this EIS are reviewed below.

1.2.1 The NEPA Process

In 1969, the US Congress passed the National Environmental Policy Act (NEPA), our national charter for environmental planning. NEPA provides for the consideration of environmental issues in federal agency planning and decision-making. Guidelines for federal agency implementation of the act were established by the President's Council on Environmental Quality (CEQ).

NEPA requires federal agencies to prepare an environmental impact statement (EIS) for actions that may significantly affect the quality of the human and natural environment. The EIS must provide full disclosure of significant environmental impacts and inform decision-makers and the public of the reasonable alternatives, including the No Action Alternative.

The first step in the NEPA process is the publication of a formal Notice of Intent (NOI) in the *Federal Register* and regional and/or local newspapers. The NOI announces the intent of an agency to prepare the EIS (Figure 1-2, The NEPA Process). In addition, the NOI provides an overview of the proposed project and the scope of the EIS, as well as a description of public participation opportunities, the schedule for public scoping meetings, and the location where written comments will be received.

Scoping is an early and open mechanism for developing the "scope" of issues to be addressed in the EIS. It also is important for identifying significant or controversial issues related to a proposed

The NEPA Process

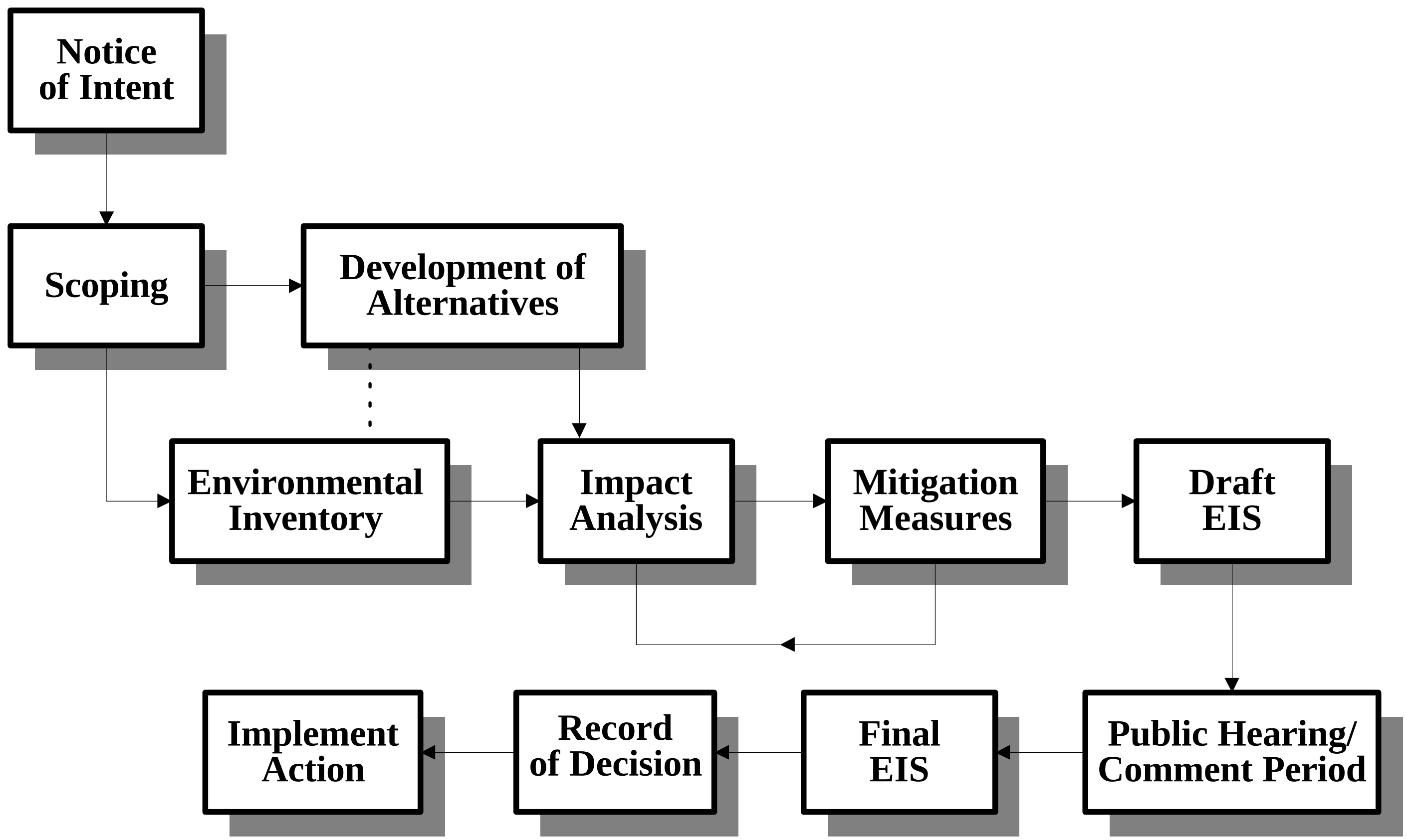


Figure 1-2

action. It is through scoping that the public helps define and prioritize issues of concern and convey these issues to the agency through both oral and written comment. The period for public scoping is generally 45 to 60 days in length.

After scoping, a Draft EIS (DEIS) is prepared. This document provides an assessment of the potential impacts the federal action might have on the human or natural environment. Future environmental conditions with proposed action implementation are compared to current or baseline conditions. The EIS also informs decision-makers and the public of reasonable alternatives, including the No Action Alternative, that would avoid or minimize adverse impacts, or enhance the quality of the environment.

When a DEIS has been completed, the US Environmental Protection Agency (USEPA) publishes a Notice of Availability in the *Federal Register*. The DEIS is circulated for review and comment, typically over a 45-day period, to government agencies, interested private citizens, and local organizations, and is available for general review in public libraries and other publicly-accessible locations. Also, a public hearing is held. During the review of the DEIS, public comment is sought.

A Final EIS (FEIS) is then prepared that incorporates, and formally responds to, all public comment received on the DEIS. This response can take the form of corrections of DEIS data inaccuracies, clarifications of and modifications to analytical approaches, inclusion of additional data or analyses, modification of the proposed action or alternatives, or acknowledgment of a comment. The preferred alternative for implementation is identified in the FEIS, if it was not presented in the DEIS. The FEIS is then circulated for public review for 30 days.

A Record of Decision (ROD) may be issued by an agency, not less than 30 days after the FEIS is made available or following the FEIS review period. The ROD establishes the proposed action, describes the public involvement and agency decision-making process, and presents the agency's commitments to mitigation measures. The decision maker may approve the proposal even if it is not the environmentally preferable alternative. Implementation of the action can begin only after the ROD is signed.

1.2.2 Public Participation Program for this EIS

1.2.2.1 Overview of Program

EISs are issue-oriented, and input from the public -- including citizens, elected officials, special interest groups, and local, state, and federal agencies -- is very important. Public involvement programs associated with an EIS can:

- Promote understanding on the part of the public about the way environmental problems are studied and solved;

- Keep the public informed about the project and the EIS; and

- Actively seek opinions and perceptions from all concerned citizens.

The public participation program designed for the *EIS for Increased Flight and Related Operations in the Patuxent River Complex* was intended to meet these guidelines by providing as much opportunity as possible for members of the public to first learn about the proposed action, the Patuxent River Complex Draft IMP, CTR operations, and the EIS, and secondly, to provide their comment.

Public scoping meetings were held between May 6 and May 15, 1997 in five Maryland and Virginia geographically diverse communities underlying or adjacent to the footprint of the CTR: Prince Frederick, Leonardtown, Westover, and Cambridge, Maryland and Burgess, Virginia. Copies of the Draft IMP were made available for public review in 18 informational repositories located around the Chesapeake Bay. The 60-day public scoping period ended on June 1, 1997. Details on the public participation program and the results of the public scoping meetings are included in Chapter 10 of this document.

On May 15, 1998, the DEIS, along with a copy of the public hearing notice, was distributed to agencies and officials of federal, state, and local governments, interested groups and associations, and private citizens. Copies of the DEIS were available for review at the same 18 informational repositories that the Draft IMP and scoping materials were available. The results of the public review period for the DEIS are included in Chapter 10 of this document.

1.2.2.2 Commenting Opportunities

Comments on the FEIS may be entered into the official record for 30 days following the publication of the Notice of Availability in the *Federal Register*:

- Mail or fax written comments to:

  Ms. Kelly Burdick
  Naval Air Warfare Center, Aircraft Division
  c/o Office of Legal Counsel
  47031 Liljencrantz Road, Bldg. 435, MS 39
  Patuxent River, MD 20670
  (Fax) 301-342-1840

- Record comments using the EIS toll-free number:

  1-888-276-5201

- Access the Internet website for the *FEIS for Increased Flight and Related Operations in the Patuxent River Complex* at:

  http://www.tamsconsultants.com/paxriver/

Both the toll-free telephone voice mail and the Internet website will remain available for public access for 60 days following publication of the Navy's Record of Decision in the *Federal Register*. All comments will receive the same attention and consideration, regardless of the method of submission.

Chapter 2

Proposed Action and Alternatives

Increased Flight and Related Operations
in the Patuxent River Complex

2 PROPOSED ACTION AND ALTERNATIVES

The purpose of the proposed action is to enhance the use of taxpayer-funded facilities by increasing efficiency and lowering costs to users. The proposed action is needed in order for the Navy to successfully meet current and future national and global defense challenges posed by a post-Cold War environment. In order to achieve this, the Navy proposes increasing flight and related operations in the Patuxent River Complex to support:

- RDT&E associated with Navy aircraft acquisition programs and activities associated with potential commercial and other military customers, including but not limited to flight test, simulation/stimulation laboratories, ground test, carrier suitability tests, etc.); and

- Military training exercises by providing access to the complex's unique resources, including but not limited to its targets, electronic warfare emitters, and radars.

Increased aircraft flight operations in the Patuxent River Complex would affect test areas under the exclusive control and scheduling authority of NAWCAD -- principally the airfields at NAS Patuxent River and OLF Webster Field (hereinafter Webster Field), and the airspace, aerial and surface firing ranges, and targets within the Chesapeake Test Range (CTR). These increased flight operations would be accompanied by increases in ground operations directly related to aircraft flight operations such as aircraft pre- and post-flight activities, ground taxi, and static engine runs at NAS Patuxent River and Webster Field. Other operations increases projected to occur at NAS Patuxent River and Webster Field would be associated with non-flight RDT&E ground testing, laboratory testing, and basekeeping functions.

Three alternative future operational workload levels are proposed for the complex. These alternatives would increase the no action level of operations in the future (18,200 annual flight hours) by 2,500 to 6,200 annual flight hours. These alternatives were based upon forseeable mission requirements and the complex's unique airfield, facility, and range capabilities and would provide the complex with the flexibility to accept new workloads, if required. In all cases, the level of operations proposed by these alternatives would be less intensive than the historic high point of Patuxent River Complex operations in the 1970s. Outside the scope of this EIS are operations conducted by NAWCAD in the Offshore Atlantic Warning Areas and at the US Navy's Bloodsworth Island Shore Bombardment and Bombing Range, and operations conducted by NAWCAD detachments situated elsewhere in the US. Also outside the scope of this EIS are operations conducted outside the Patuxent River Complex by NAS Patuxent River tenants: VX-1, VQ-4, and NRL.

To put the proposed action in the proper context, Subchapter 2.1 provides a descriptive overview of those Patuxent River Complex components that would be affected by proposed action implementation, including the CTR, NAS Patuxent River, and Webster Field. Subchapter 2.2 discusses the complex's current level of flight and ground-based operations. The alternatives proposed for increasing future flight and ground-based operations in the complex are addressed in Subchapter 2.3.

2.1 The Patuxent River Complex

Those components of the Patuxent River Complex that would be affected by implementation of the proposed action would include the CTR (including the underlying surface target areas associated with Hooper, Hannibal, and Tangier Island targets), NAS Patuxent River, and Webster Field. Each of these components is described below.

2.1.1 Chesapeake Test Range

The airspace comprising the CTR overlies about 4,680 square kilometers (sq km) or 1,800 square miles (sq mi) of portions of Southern Maryland, Maryland's Eastern Shore, and the Northern Neck of Virginia (Figure 2-1, Chesapeake Test Range). About 50 percent or 2,340 sq km (900 sq mi) of the CTR lies over the waters of the middle portion of the Chesapeake Bay. The remaining 50 percent is over land. The vertical extent of the CTR varies from surface level to more than 25,500 meters (m) or 85,000 feet (ft) in altitude and includes six restricted airspaces: R-4002, R-4005, R-4006, R-4007A, R-4008, and R-6609 (Table 2-1).

Table 2-1

Restricted Airspaces in the CTR

Restricted Area	Minimum Altitude	Maximum Altitude
R-4002	Surface	up to 6,096 m (20,000 ft)
R-4005	Surface	up to, but not including 7,620 m (25,000 ft)
R-4006	1,067 m (3,500 ft)	up to, but not including 7,620 m (25,000 ft)
R-4007A	Surface	up to 1,524 m (5,000 ft)
R-4008	7,620 m (25,000 ft)	25,908 m (85,000 ft)
R-6609	Surface	6,096 m (20,000 ft)

Chesapeake Test Range

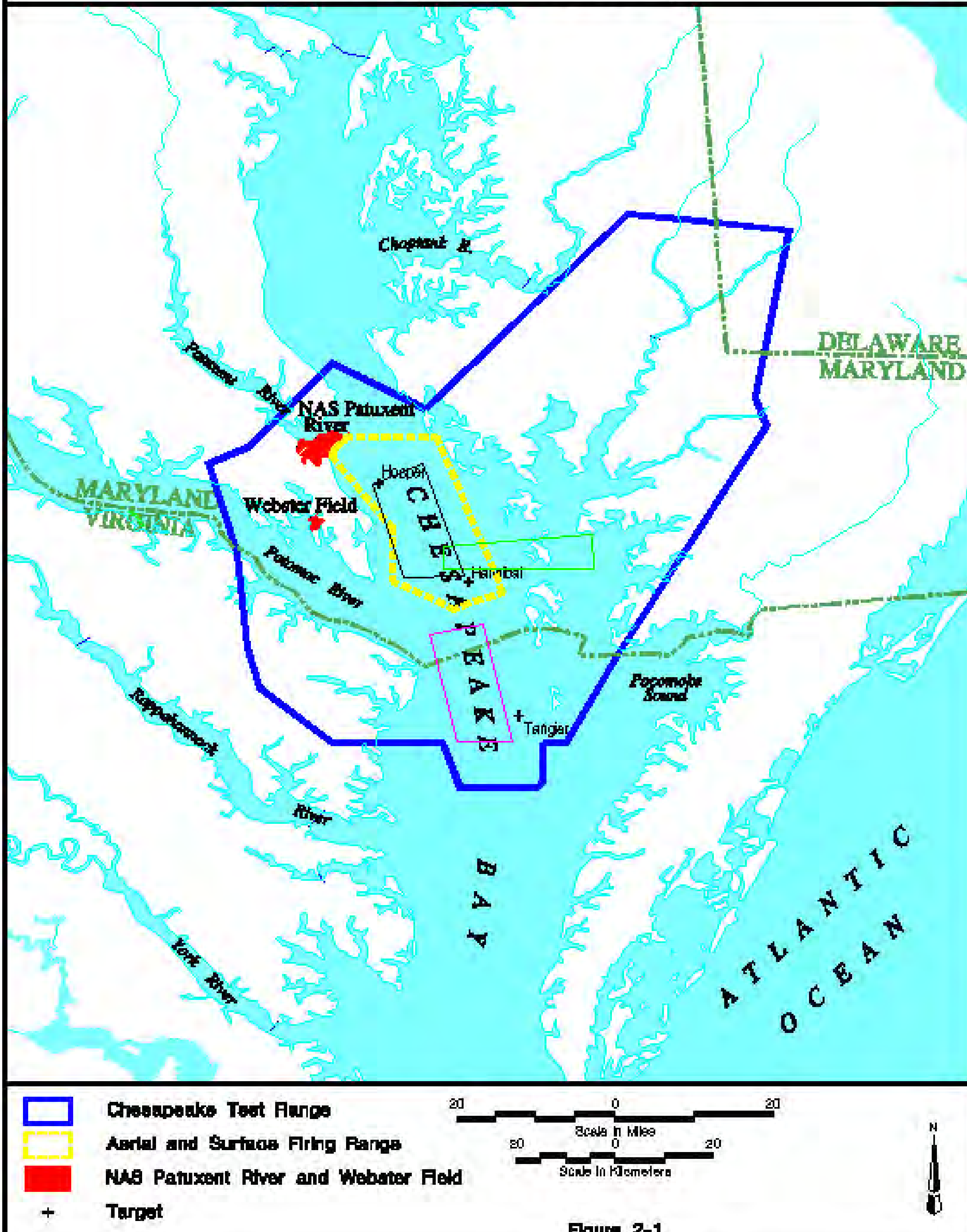


Figure 2-1

The Federal Aviation Administration (FAA) identifies the airspaces of the CTR as Special Use Airspace (US Department of Defense, July 1997). This designation allows Navy control of the airspaces in order to restrict use to authorized tests and other flights. Navy-authorized users of the airspace can then operate safely and separately from nonparticipating military and civilian aircraft. Each day, at about 7:00 am, the Navy requests and receives use of the CTR's airspace from the FAA. During the period of time when the range is in use (i.e., activated) by the Navy, the Air Operations Division at NAS Patuxent River provides air traffic control services in the CTR for both military and civilian operations. In fact, NAS Patuxent River provides air control services for 29 civilian airports around the Chesapeake Bay during the time period when the range is activated. When the range is not activated (i.e., normally after 11:00 pm), the FAA controls the airspace.

The three established surface target areas within the CTR that are owned, scheduled, and exclusively controlled by NAWCAD are commonly known as Hooper, Hannibal, and Tangier Island targets (as defined in 33 CFR Parts 334.180 to 334.220). These targets provide safe, controlled locations where weapons/stores separation testing or air-to-surface firing can be conducted. All three targets are surrounded by small areas closed to navigation at all times (prohibited areas). Hooper and Hannibal targets are further surrounded by a restricted area known as the aerial and surface firing range. Tangier Island target is surrounded by a restricted danger area. All ordnance (or stores) used at these targets is inert (nonexplosive), meaning that it contains steel, concrete, vermiculite, and other nonexplosive materials in a weighted shape similar to the explosive ordnance it is intended to replicate.

Another surface target area located within the boundaries of the CTR is the Bloodsworth Island Shore Bombardment and Bombing Range in the eastern portion of the Chesapeake Bay. While the airspace (R-4002) overlying the Bloodsworth Island range is controlled by NAWCAD, use of the surface impact area located immediately beneath R-4002 is controlled and scheduled by Naval Amphibious Base (NAB) Little Creek, Norfolk, Virginia. Activities seeking to use the surface impact area must coordinate with NAB Little Creek (as specified in NAVPHIBASELCREEKINST 3120.1 of June 23, 1995 or as updated) prior to dropping any ordnance. Use of the CTR airspace is sought from NAWCAD after NAB Little Creek approves an activity's request. The Bloodsworth Island range's surface impact area is controlled and scheduled by NAB Little Creek and is outside the scope of this EIS. NAB Little Creek is responsible for preparing the proper NEPA documentation for actions to be undertaken at Bloodsworth Island.

Although the CTR is normally activated between 7:00 am and 11:00 pm, about 97 percent of air operations conducted in the CTR occurs between 7:00 am and 10:00 pm. The highest level of activity occurs at midmorning with a lull at midday and a slight increase in operations in mid-afternoon (ATAC Corporation, October 1997). While night operations currently can occur after 10:00 pm, almost no operations begin after midnight (ATAC Corporation, October 1997). Weekend air traffic includes transient military reservists and high priority flight tests.

The responsibility for planning and controlling actual flight testing in the CTR lies with NAWCAD's Atlantic Ranges and Facilities Department. Flight test facilities available at the complex provide for aircraft tracking, data acquisition and relay, range surveillance, targets, and communications/control for multiple aircraft test events in the Chesapeake Bay. An integrated network of cinetheodolites (video trackers), laser, and radar trackers along the western Chesapeake shore from Cedar Point to Point Lookout are linked to computation and control facilities at NAS Patuxent River.

2.1.2 NAS Patuxent River

NAS Patuxent River occupies a total of 3,096 hectares (7,741 acres), of which about 2,552 hectares (6,379 acres) are situated on the broad headland known as Cedar Point at the confluence of the Patuxent River and the Chesapeake Bay. The remaining land area comprising NAS Patuxent River includes Webster Field (described below), and a number of smaller remote sites in Southern Maryland and on Maryland's Eastern Shore.

The air station serves as host to more than 50 tenant activities (including the US Navy Test Pilot School) and most of the components of NAWCAD and the Naval Air Systems Command (NAVAIR). NAS Patuxent River operates and maintains the land areas, airfield, and infrastructure required to support its tenants' activities and NAWCAD's RDT&E activities. In addition, on-station housing accommodates about 2,500 military personnel and their dependents.

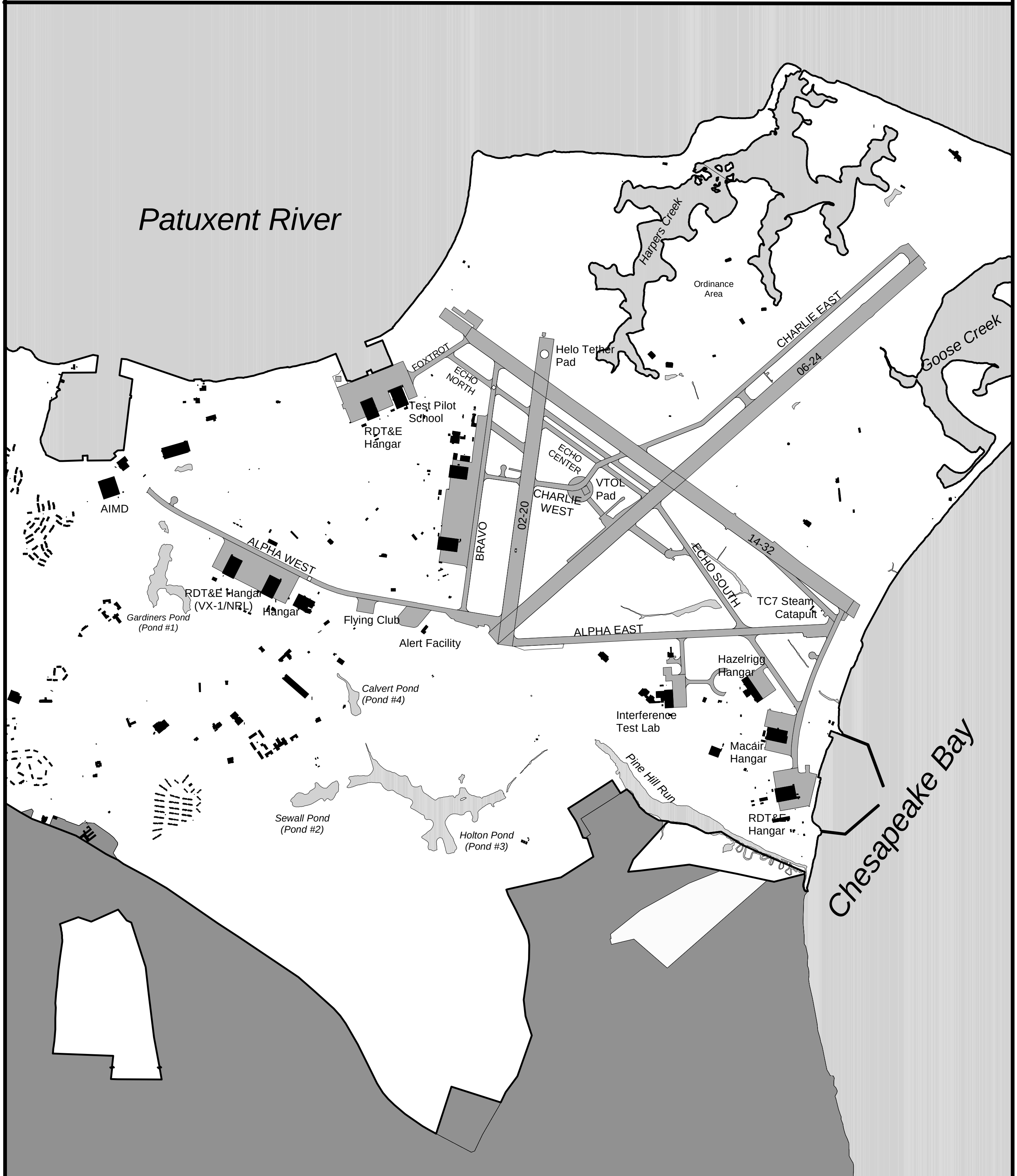
The NAS Patuxent River airfield underlies CTR airspace R-4007A. Figure 2-2 (Airfield Diagram for NAS Patuxent River) shows facilities at NAS Patuxent River that include the airfield and its three heavy duty runways of 3,540 m, 2,910 m, and 1,920 m (11,800 ft, 9,700 ft, and 6,400 ft); 12 hangars with 19 bays; three seaplane basins; and a seadrome with two sea lanes with lengths of 4,050 m (13,500 ft) and 3,480 m (11,600 ft).

In 1996, employment at NAS Patuxent River (including Webster Field) was 12,764 persons, with transient personnel associated with specific RDT&E or training programs comprising a minor component of overall employment. By 1998, employment at the air station is projected to increase to about 16,600 persons as a result of BRAC-related consolidations. As mentioned previously, EISs finalized in 1993 and 1994 assessed the environmental effects of the BRAC realignment and consolidation.

2.1.3 OLF Webster Field

Webster Field is in St. Inigoes, Maryland, about 13 km (seven mi) to the south of Lexington Park on the St. Mary's River, just north of the confluence of the Potomac River and the Chesapeake Bay. The 341-hectare (852-acre) facility maintains two 1,500-m by 45-m (5,000-ft by 150-ft) runways that are available primarily for Category I aircraft (up to 4,536 kilograms [10,000 pounds]) operations (Figure 2-3, Airfield Diagram for OLF Webster Field). There are no lighting, hangar, flight planning, maintenance, or service facilities available.

Airfield Diagram for NAS Patuxent River



NAS Patuxent River

Permanent Building

Airfield Surface

Restrictive Easement

Figure 2-2

Airfield Diagram for OLF Webster Field

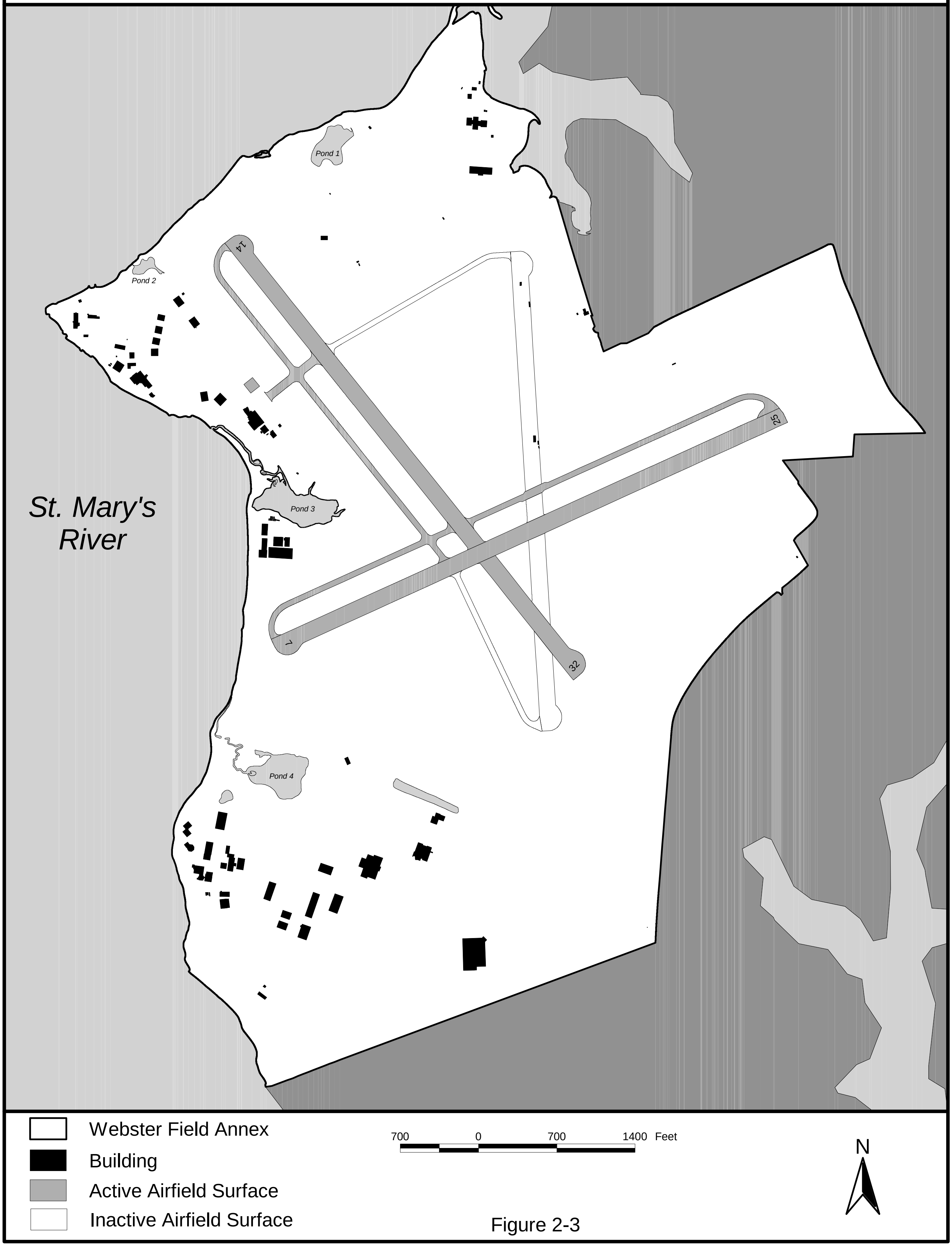


Figure 2-3

Webster Field is used primarily by Navy aircraft from NAS Patuxent River for a variety of military training and testing purposes. Activities include helicopter, glider, unmanned aerial vehicles (UAVs), and fixed-wing operations (ATAC Corporation, October 1997). The normal days and hours of operation for Webster Field are Monday through Friday, excluding holidays, from 8:00 am to 4:00 pm during the winter and 9:00 am to 5:00 pm during the summer months.

2.2 Fiscal Year 1996 Operations in the Complex (Existing Conditions)

Operations conducted in the Patuxent River Complex may be separated into the following broad categories:

- **Aircraft Flight Operations** - all aircraft flight operations using the airfields at NAS Patuxent River and Webster Field and/or the airspace comprising the CTR.
- **Ground Operations** - ground operations directly related to flight tests (such as aircraft pre- and post-flight activities, ground taxi, and static engine runs) and non-flight activities (such as laboratory testing and basekeeping functions) at both NAS Patuxent River and Webster Field.

These aircraft flight and ground operations were examined in more detail in order to establish the existing level of operations. Fiscal Year (FY) 1996 was chosen as representative of existing conditions in the Patuxent River Complex, the most recent FY for which the most complete data are available. Development of this existing level of operations is discussed in more detail below.

2.2.1 Aircraft Flight Operations in the Patuxent River Complex

Aircraft flight operations conducted in the Patuxent River Complex in FY 1996 were evaluated using data derived from the Navy Aviation Simulation Model (NASMOD). This analysis examined the airspace capabilities of the airfields at NAS Patuxent River and Webster Field and in the CTR (see Appendix D for the technical analysis process). All flight activity originating and terminating at NAS Patuxent River or Webster Field and utilizing the airspace of the CTR was assessed.

2.2.1.1 Overview of NASMOD

NASMOD was developed by the Department of the Navy in 1993 to analyze problems and issues related to airfield and special use airspace operations. NASMOD can be used to conduct simulation analyses that:

- C Quantitatively assess airfield and airspace capacity in support of proposed operational alternatives;
- C Calculate the impacts of changes in special use airspace;
- C Analyze pilot training system resource requirements (including airfields, airspace, instructors, syllabus, aircraft type, maintenance, fuel, and operating costs);
- C Analyze the impacts of using alternative aircraft types to meet training and operational objectives; and
- C Aid in the analysis of noise and other environmental impacts.

NASMOD merges the capabilities of the FAA's Airfield and Airspace Capacity Model (known as SIMMOD) with an enhanced Naval Aviation Training System (NATS) model developed in 1986. SIMMOD is an advanced state-of-the-art model that simulates both airfield and airspace traffic operations and addresses en route or Instrument Flight Rule (IFR) traffic. It has been used extensively by the FAA in studies and analyses aimed at planning for operational changes in the National Airspace System and has proven to be extremely valuable as a tool for analyzing airport and airspace problems, identifying potential solutions, and quantitatively assessing the delay, capacity, traffic loading, and operating cost impacts of potential operational alternatives. The Navy's NATS model was developed to address Visual Flight Rule (VFR) traffic in a training environment.

NASMOD combines and improves on both SIMMOD and NATS by incorporating the capability to model dynamic runway plan changes, and touch-and-go, field carrier landing practice (FCLP), and ground controlled approach (GCA) operations. NASMOD also includes other features necessary to model military aviation operations, such as special ground operations (i.e., hover and taxi to ordnance loading areas and high power engine operating [runup] areas) and the unique vertical and short takeoff and landing (V/STOL) characteristics and operating procedures of such aircraft as the AV-8B or the V-22. Thus, NASMOD provides the Navy with a tool to evaluate a wide array of proposed special use airspace alternatives and training requirements, the capability to quantify impacts on other users of the National Airspace System, and the ability to work with the FAA to mutually resolve critical special use airspace issues.

2.2.1.2 NASMOD Results

Using NASMOD, the Navy's aviation-related RDT&E operations that presently occur in the Patuxent River Complex (as well as the potential for additional military training operations), and the utilization of special use airspace of the CTR were assessed. The modeling effort addressed all flight activity originating and terminating in the complex and flights that transit the airspace but do not use the airfields. Input to the model was based on information obtained and compiled from Navy military and civilian personnel at NAS Patuxent River. This information took the form of specific flight profiles and involved the formulation of operational assumptions. Also, the spatial relationships of the NAS Patuxent River and Webster Field airfields were taken into account in the analysis.

The NASMOD analysis evaluated the following general categories of aircraft flight operations that occur in the Patuxent River Complex:

- **RDT&E Test Flights** - These flight operations are those conducted by NAWCAD activities (Strike, Force Warfare, Rotary-Wing), the US Navy Test Pilot School, and the air station and its tenants. The majority of these flights are in direct support of Navy acquisition programs or in association with potential commercial customers and other military programs, US agencies, or foreign governments to assess the performance, reliability, and safety of a new aircraft and/or its associated systems. The testing required for non-Navy customers is the same as or similar to that conducted for Navy projects. The existing types of RDT&E flight operations are defined in Table 2-2 with a brief description of each test.

- **Flights Supporting Military Training** - These flights provide realistic training opportunities that are essential to a pilot's survival on the battlefield. They currently occur on a unit (Navy squadron or one to two aircraft at a time) or advanced (multiple units) level. The training activity can be passive (e.g., an authorized flight transiting through the CTR) or highly interactive (e.g., where a greater combination of resources is needed to complete the training mission, such as land-based facilities at NAS Patuxent River, restricted airspace, targets, real-time data retrieval, threat emitters, etc.). Participation in DoD's biannual Joint Task Force Exercises (JTFEX) is an example of an advanced level of military training currently supported by NAWCAD using the assets of the Patuxent River Complex. The JTFEX involves combined air, naval, and ground operations responding to a simulated threat. During a recent JTFEX, transient flights were authorized through the CTR and refueling services and aircraft parking were provided at NAS Patuxent River. The types of flight operations supporting military training currently using assets controlled by NAWCAD are shown in Table 2-3.

Table 2-2

Patuxent River Complex Existing RDT&E Flight Test Operations

Test	Description
Flying Qualities and Performance	Aircraft and its Flight Control System (FCS) are quantitatively and qualitatively evaluated to determine if the aircraft meets safety, performance, growth potential, and mission technical requirements. Aircraft performance characteristics assessed include operating range, climb rate, etc. A slow, carefully monitored buildup with an instrumented aircraft is conducted to determine the edges of the safe flight envelope. This information is then used to develop a safety buffer, and these performance limits are announced to fleet pilots through the Naval Aviation Training and Operating Procedure Standardization (NATOPS) Program.
Carrier Suitability	Aircraft compatibility with ship-based takeoff, approach, and recovery equipment is determined under various environmental conditions. Aircraft carrier launch catapult and recovery systems are built into the runway at NAS Patuxent River to simulate shipboard conditions. This equipment is used to determine the handling performance characteristics of an instrumented test aircraft during taxi, takeoff, approach, and landing. Only after careful evaluation of data collected at this land-based facility can the aircraft be cleared for further testing aboard a ship.
Propulsion	Engine operating characteristics and performance on the ground and in flight are assessed. Engine characteristics are first evaluated/validated in a ground test cell, then ground engine runups are conducted with the engine installed in an instrumented test aircraft to evaluate the interface between the airframe and the propulsion system. Only after these tests are satisfactorily completed is engine performance evaluated in-flight on an instrumented aircraft.
Mission Systems Test	Proper operational functionality of the system under test is verified, as well as its interaction with other systems. The equipment is first tested in a laboratory on a test bench to evaluate if it is performing properly. It is then installed in an aircraft and evaluated while on the ground. If the system passes these tests satisfactorily, it is then evaluated using instrumentation for data collection while the aircraft is in flight.
Electronic Warfare (EW)	The capability of aircraft EW systems to detect, analyze, and/or counter electronic signals is evaluated. The equipment is first tested in a laboratory on a test bench to evaluate if it is performing properly. It is then installed in an aircraft and evaluated in a ground test facility. If the system passes these tests satisfactorily, it is then evaluated using instrumentation for data collection while the aircraft is in flight, with actual electronic signals being beamed to the aircraft.
Search and Rescue	These flights locate and recover military personnel and/or materiel that have been lost as a result of RDT&E test flight operations.
Logistic Flights (C-12)	These flights are flown to transport materiel or equipment to and from NAS Patuxent River in support of RDT&E operations.
Flight Crew Proficiency	These flights are designed to maintain the flight skills of squadron pilots and aircrew personnel.

Table 2-2

Patuxent River Complex Existing RDT&E Flight Test Operations

Test	Description
Weapons/Stores Separation	Safe and satisfactory store carriage and separation envelopes, as well as the effects of inert weapons firings/releases, are determined. Firstly, ordnance store loading and release characteristics on the ground are evaluated using inert ordnance stores. The stores are then loaded onto an instrumented aircraft, and flights are conducted to evaluate what, if any, effects the presence of the stores has on the aircraft's flying qualities and performance characteristics (carriage tests). Only after these tests are satisfactorily completed are in-flight separation (drop) tests of inert ordnance stores conducted at designated target areas using cleared safety buffers appropriate to that individual store type. As with all in-flight testing, there is a slow, monitored buildup process -- initially, the stores are dropped from level flight; only then is a dive angle gradually introduced to develop the tactics which will eventually be used by a fleet pilot for a store of that type.
Human Factors (Aircrew Systems Test)	These tests determine the technical suitability of aircrew station design, aircrew control and information display systems, operator workload, survival and rescue systems, crew communication/coordination, and bioenvironmental factors of the aircraft weapon system and related equipment. Such testing involves ergonomic measurements, direct operator observation, and operator interviews/debriefs.

- **Other Flight Operations** - The remaining category of flight operations involves tenant squadrons, logistics flights, and transient flight operations (e.g., weekend reservists), and are not directly involved with RDT&E activities or in support of military training. Other flight operations are listed in Table 2-4 along with a brief description of the need for each.

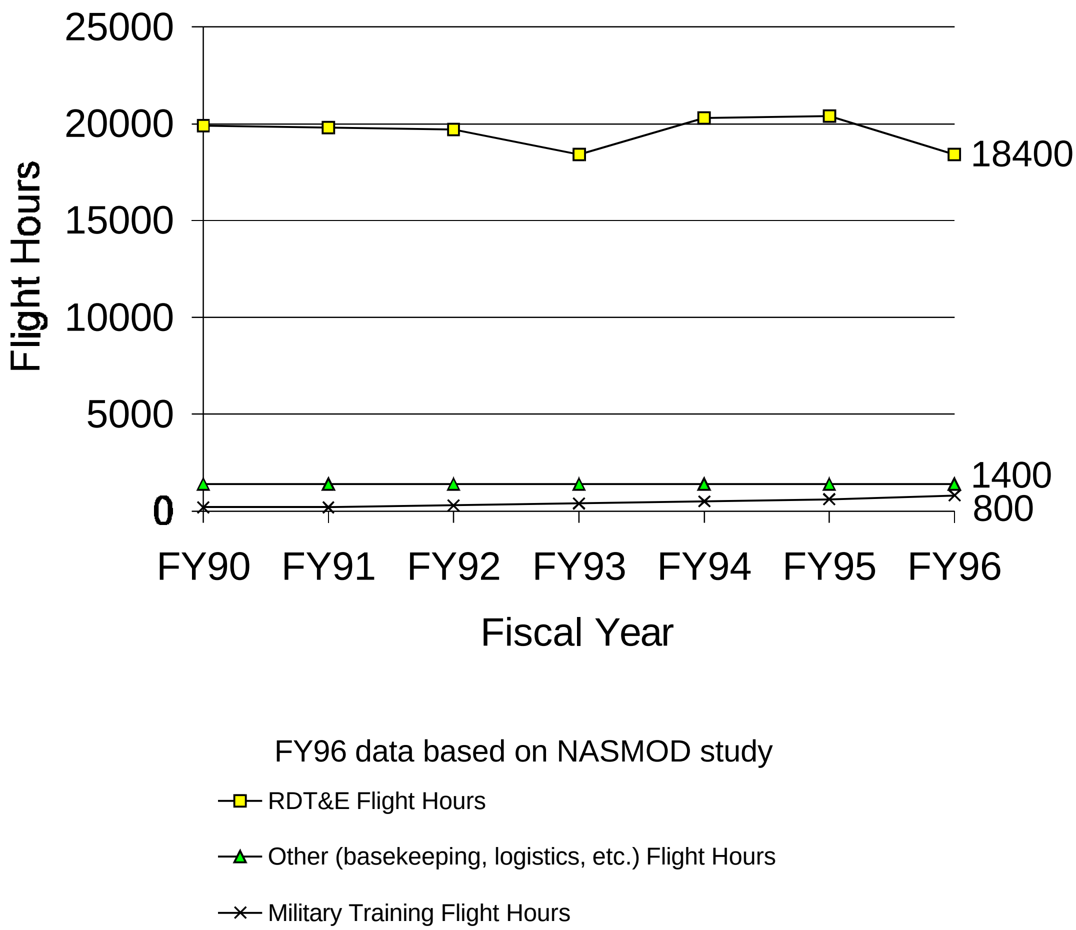
In FY 1996, 14,530 sorties (each landing and takeoff combination is referred to as a sortie) were flown by NAWCAD and tenant activities at NAS Patuxent River and Webster Field. Most of these sorties (about 97 percent) were flown between the hours of 7:00 am and 10:00 pm (ATAC Corporation, October 1997). Furthermore, about 80 percent (or 18,400 flight hours) were flown exclusively within the Patuxent River Complex (at NAS Patuxent River or Webster Field or within the CTR).

This level of flight activity is within a seven percent band of the ten-year flight activity average for the complex (Figure 2-4, Patuxent River Complex Flight Hours for 1986-1996). Variations that have occurred in Patuxent River Complex flight activity have been a direct result of the number and status of the RDT&E programs being undertaken by NAWCAD during any single year. In 1993, for example, flight activity levels were lower because RDT&E activities involving the F/A-18C/D had been completed during that year. Increases that have occurred since 1993 have been due to the BRAC-related reassignment of aircraft from Warminster, Pennsylvania to NAS Patuxent River and increased levels of flying by the US Navy Test Pilot School. Since late 1995, T&E activities for the F/A-18E/F program have caused increases in flight activity.

Overall, RDT&E flight operations within the Patuxent River Complex accounted for nearly 87 percent of all flight hours flown in the complex in FY 1996 (includes UAV operations) or about 16,000 annual flight hours. Flight operations in support of military training accounted for about four percent of total 1996 annual flight hours (800 flight hours). Other flight operations accounted for about 1,400 annual flight hours in 1996.

The types of aircraft flown in the Patuxent River Complex in FY 1996 involved both fixed-wing and rotary-wing (helicopters) aircraft, gliders, and UAVs. The primary types of aircraft currently in use at the complex are shown in Table 2-5. In addition, unique aircraft associated with operations of the US Navy Test Pilot School are sometimes flown in the complex (i.e., the TF-51, a two-seat version of the propeller-driven high performance fighter flown during World War II and the Korean War). Most fixed- and rotary-wing and glider operations are conducted at NAS Patuxent River. Operations involving UAVs are mainly conducted at Webster Field.

Patuxent River Complex Flight Hours for 1990-1996



Source: Patuxent River Complex Integrated Management Plan, 1997.

Figure 2-4

Table 2-3

Patuxent River Complex Existing Missions for Support of Military Training

Mission	Description
Electronic Warfare	Examine the capability of the aircrew and aircraft EW systems to detect, analyze, and/or counter electronic signals radiated by NAWCAD facilities toward the fleet aircraft operating in the NAS Patuxent River airspace.
Field Carrier Landing Practice	Practice carrier landings at NAS Patuxent River (a subset of the types of operations covered under RDT&E Carrier Suitability tests).
Reconnaissance Overflights	Transient flights through NAS Patuxent River/CTR airspace to practice use of reconnaissance equipment (a subset of Logistics Flights).
In-flight Refueling Support	Flights where fuel is transferred between two or more aircraft in flight (a subset of Logistics Flight Operations).

Table 2-4

Patuxent River Complex Existing Missions for Other Flight Operations

Mission	Description
Search and Rescue	Flights flown to assist efforts to locate/recover military or civilian personnel who have been injured or lost from any cause (not necessarily military-related) within the general vicinity of the Patuxent River Complex's operating areas.
Logistic Flights	Flights to transport personnel, materiel, or equipment to and from NAS Patuxent River in support of basekeeping operations.
Transit Flight Operations	Routine flights into and out of NAS Patuxent River by aircraft stationed elsewhere. These flights use the military airfield as an airport.
Flight Crew Proficiency	Flights flown to maintain the flying skills of station pilots and aircrew personnel.
Touch-and-Go Flights	Practice landings and takeoffs where the aircraft does not stop at the airfield (a subset of RDT&E Flight Crew Proficiency tests).

Table 2-5

Primary Aircraft in the CTR

Type of Aircraft	Designation
Fixed-Wing	A-10 Thunderbolt C-12 (Super King Air 200) C-130 Hercules EA-6B Prowler E-2/C-2 Hawkeye/Greyhound F-14 Tomcat F/A-18 Hornet/Superhornet P-3 Orion S-3/ES-3 Viking/Shadow T-2 Buckeye T-34 Turbo Mentor T-38 Talon
Rotary-Wing	H-1 Iroquois/Super Cobra H-3/UH-3 Sea King H-53 Super Stallion/Sea Dragon H-60 Sea Hawk/Blackhawk
Other	UAV
Source: ATAC Corporation, October 1997.	

2.2.1.3 Flight Test Planning

Of paramount concern to NAWCAD personnel at the Patuxent River Complex is ensuring the safety of the public, test participants, and property during aircraft flight testing. This is achieved through careful flight test planning. Qualified safety personnel participate throughout the test process from initial planning, through aircraft maintenance and instrumentation, to actual performance of the flight test. A detailed test plan, subject to stringent peer review, is developed for all flight tests. This test plan identifies project requirements, approaches to meeting those requirements (including test flight profiles), and a safety plan. The safety plan addresses aircraft, range, and operational safety issues. Aircraft safety issues are discussed in more detail in Subchapter 3.14.

In addition, all mission planning is conducted with attention to the potential for environmental impacts. As delineated in NASPAXRIVINST 5090.3 (July 21, 1997), all proposed tests or actions undertaken at the Patuxent River Complex must be submitted to the complex's Environmental Review Board (ERB) for review. The voting membership of the ERB includes representatives from NAS Patuxent River's Operational Environmental Planning (OEP) Office, the Public Works

Environmental Support Group, Public Affairs Office, Occupational Safety and Health/Hazardous Material Control and Management offices, and the Office of General Counsel. In addition, environmental concerns and mitigation measures identified and approved during the NEPA process are incorporated into test plans.

2.2.2 Ground-Based Operations in the Patuxent River Complex

Ground-based operations at the Patuxent River Complex include the following functions:

- Ground-based activities related to aircraft flight operations;
- Non-flight RDT&E and laboratory testing; and
- Basekeeping operations.

Each of these functions is defined and discussed in more detail below. In addition, an estimate of FY 1996 existing level of operations is provided.

2.2.2.1 Ground-Based Activities Related to Aircraft Flight Operations

This category of ground-based operations encompasses a series of activities involved in maintaining aircraft at optimum and safe performance levels, including aircraft pre- and post-flight checks, ground taxiing, static engine runs (test cells and hush house), aircraft ground testing, aircraft servicing, and aircraft engine maintenance activities.

Aircraft pre- and post-flight activities involve systems and propulsion tests and hydraulic checks performed before a mission is undertaken and after it is completed. Pre- and post-flight activities generally occur with engines running (although this may vary) for a duration of about 30 minutes to four hours, depending on the aircraft type. The longest pre- and post-flight activities are associated with the P-3. Aircraft pre- and post-flight activities, together with ground taxi operations, have been incorporated into the existing level of flight operations as identified in this EIS.

Static Engine Runs are conducted in the six engine test cells and/or the Aircraft Test and Evaluation Facility (ATEF) at NAS Patuxent River. The ATEF, or "hush house," is an enclosed and noise-abated ground test facility providing 24-hour, indoor, full-scale aircraft engine and mechanical systems testing and maintenance check capability. Existing operations for the engine test cells and the ATEF have been estimated at 760 annual events, including high-power runup operations by F/A-18, EA-6B, and F-14 aircraft.

Aircraft ground tests include outdoor runups, steam ingestion, hoverpad, and aircraft run stand testing. These tests have been included in the estimate of existing level of flight and related operations.

2.2.2.2 Non-Flight RDT&E and Laboratory Testing

Activities undertaken in this category of ground-based operations involve non-flight R&D, component testing, and laboratory-based modeling and simulation testing activities that are carried out at more than 70 dedicated facilities located at NAS Patuxent River. Overall product areas include materials R&D, fuels and lubes R&D, communications, systems capability, electromagnetic effects, electronic warfare, weapons/stores integration, and human factors. While non-flight or laboratory-based testing can serve as a major supplement to a flight test program, it does not involve flight testing nor can it replace actual flight testing. Some of the ground-based laboratory and test facilities at the complex are:

C **Aircraft Combat Environment Test and Evaluation Facility (ACETEF)** - a complex with a variety of labs that, when networked, can simulate virtually all aspects of aircraft operations and actual combat conditions through use of state-of-the-art simulation and stimulation techniques. The labs comprising the ACETEF include: the Anechoic Chamber; the Shielded Hangar; the Operations and Control Center (with Simulated Warfare Environment Generator); Electronic Warfare Integrated Systems Test Laboratory (EWISTL); the Threat Air Defense Laboratory (TADL); the Communication, Navigation, and Identification Laboratory (CNIL); the Offensive Sensors Laboratory (OSL); the Manned Flight Simulator (MFS); and the Aircrew Systems Evaluation Facility (ASEF).

C **Robert N. Becker Aircraft Technologies Laboratory** - supports materials R&D efforts, including the Polymer, Composites, and Coatings laboratories.

C **Aircraft Electrical and Environmental Evaluation Laboratory** - capable of testing and evaluating aircraft electrical systems and components of primary, secondary, and emergency power generation systems. Also tested are the effects of environmental phenomena (e.g., salt fog, fungus) on aircraft.

C **Ordnance Systems Test Facility** - tests and evaluates armament capability and includes gun firing tunnels, the ordnance electric laboratory, a rocket engine test-firing facility, and an indoor test stand.

C **Component Test Laboratories** - provides for R&D and simulation/stimulation of an aircraft's electronic systems with emphasis on communications and sensors testing.

- **Other Laboratories** - support such technologies as night vision, air crew systems, communications and navigation, anti-submarine warfare, etc.

- **Propulsion System Evaluation Facility (PSEF)** - houses propulsion and test functions relocated to the Patuxent River Complex from NAWCAD Trenton as a result of BRAC 93. The facility includes the Rotor Spin Facility, the Helicopter Transmission Test Facility, the UAV Altitude Test Cell, Fuel System Component Test Facilities, Fuels and Lubricants Test Cells and Analytical Laboratory, Aircraft Engine Emission Test Laboratory, and the High Volume Fuel Flow Facility.

The existing level of operations for laboratory-based RDT&E activities has been defined in terms of hours of operation and work shifts. The FY 1996 existing conditions for this category of ground operations has been determined to be operation for seven days per week with one eight-hour shift per day or 2,920 hours per year.

2.2.2.3 Basekeeping Operations

This area involves the overall maintenance of the air station and airfield, and includes grounds maintenance, infrastructure maintenance, and natural and cultural resources management tasks. Basekeeping operations would continue to occur in the future at the same levels as would occur under existing conditions. Current utility usage is discussed in Subchapter 3.7.

2.3 Alternatives

The CEQ regulations governing NEPA place significant importance on the discussion of alternatives in an EIS. As defined in 40 CFR 1502.14, the analysis of alternatives is the heart of an EIS, the purpose of which is to provide a decision maker and the public with "sharply defined issues and a clear basis for choice among options." In this EIS, the effects of increasing flight and related operations in the Patuxent River Complex are assessed for the No Action Alternative and three Operational Workload Alternatives.

2.3.1 No Action Alternative

Section 1502.14(d) of the CEQ's guidelines implementing NEPA requires that the alternative of "no action" be considered in an EIS. However, CEQ provides several ways of defining "no action." For the purposes of this EIS, "no action" would mean "no change" from current management direction, level, or management intensity. The flight hours associated with no action conditions were derived from data provided in the NASMOD analysis (ATAC Corporation, October 1997), with further analysis and refinement by Eagan, McAllister and Associates, Inc. (January 1998) to more accurately reflect:

- The expected future mix of aircraft, which would include the primary aircraft types listed in Table 2-5 in addition to other platforms that may be tested to support Navy acquisition programs (such as the joint strike fighter). In addition, flights by the V-22 Osprey (a tiltrotor aircraft that can operate as a helicopter when taking off and landing vertically) may increase. Several other aircraft currently flown at the complex are in, or are near, the final stages of retirement and/or replacement: two fixed-wing aircraft (A-6 and F-111) and two rotary-wing aircraft (H-2 and H-46). These aircraft were not included in the complex's future aircraft mix.

- Future changes in the conduct of operations at the NAS Patuxent River airfield (e.g., planned reductions in the number of pattern hours for certain aircraft types).

As a result, the annual number of flight hours projected under the No Action Alternative (18,200) would be slightly less than those described for existing (1996) conditions (18,400). Annual flight hours associated with RDT&E, support of military training activities and other flights would remain the same as for existing (1996) conditions (Patuxent River Complex flights only). The results of the Eagan, McAllister and Associates, Inc. analysis for the No Action Alternative are included in Appendix C.

2.3.2 Alternatives for Increased Flight and Related Operations in the Patuxent River Complex

As with the No Action Alternative, the three future Operational Workload Alternatives proposed in this EIS were derived from data provided in the NASMOD analysis (ATAC Corporation, October 1997) that were further refined by Eagan, McAllister and Associates, Inc. (January 1998). The results of the Eagan, McAllister analysis for the Operational Workload Alternatives are included in Appendix C. The Navy's preferred alternative is Operational Workload Alternative III.

Each of the three Operational Workload Alternatives provides for increased RDT&E levels of flight operations and support for military training activities. Other flight operations would remain at no action levels for each alternative. However, regardless of the alternative, total flight activity levels would be less intensive than those which occurred during the historic high point of Patuxent River Complex operations of the 1970s (about 28,000 to 30,000 flight hours per year). Increases in ground-based operations would vary depending on the type of activity under consideration. Furthermore, each alternative has been developed based on the following assumptions:

C All sorties would be conducted in the Patuxent River Complex.

C Proposed increases in future RDT&E flight operations would be conducted entirely within the Patuxent River Complex. This reflects NAWCAD information that future RDT&E customers may prefer to conduct as many flight tests as possible within the Patuxent River Complex (instead of accessing the Atlantic Warning Areas) due to the high level of precision measurement and close control that can be achieved in the instrumented CTR. This assumption is considered to be conservative because, in reality, not all future testing could or would be accommodated within the complex. For example, aspects of carrier suitability testing must always be performed on carriers at sea, which by necessity, are at locations outside the Patuxent River Complex. Other tests may require the use of facilities at NAS Key West, NAWS China Lake, or even Edwards Air Force Base.

C Similar to the assumption for future RDT&E flight operations, proposed future increases in flight operations associated with support of military training (3,300 flight hours) would be conducted entirely within the Patuxent River Complex.

C Increases in the flight operations in the complex would grow gradually over time, rather than occurring abruptly. Therefore, it has been assumed that the proposed increased levels of flight activity for any of the alternatives would be gradually phased in over a five-year period beginning in late 1998.

C The existing boundaries of the special use airspace and restricted surface areas within the CTR would be maintained; proposed future operating hours would be essentially the same as current operating hours.

C The permanent employment base at NAS Patuxent River and Webster Field would be expected to remain the same as under the current level of operations (e.g., full post-BRAC employment); the number of transient workers that would be associated with specific test programs would also remain the same as described for current operations levels.

C No new facilities, beyond those constructed under BRAC realignment, are part of the scope of this EIS (EISs, finalized in 1993 and 1994, assessed the environmental effects of realigning these functions and the construction of the new buildings); any new facilities proposed for the complex in the future would require separate environmental documentation.

C The mix of aircraft using the Patuxent River Complex would likely change as influenced by two primary factors:

-- Navy actions to replace older model aircraft with new acquisitions, both fixed- and rotary-wing; and

-- DoD efforts to increase joint service testing and evaluation and training.

The same potential changes in aircraft mix described for the No Action Alternative have been incorporated into the Operational Workload Alternatives.

2.3.2.1 Operational Workload I Alternative

Proposed Increases in Flight Operations

Under the Operational Workload I Alternative overall flight hours are projected to reach a maximum of about 20,700 flight hours per year (Table 2-6). As can be seen in the table, RDT&E activities would account for 16,000 annual flight hours, the same as identified for the No Action Alternative. Annual flight hours projected for support of military training would be about 3,300, an increase of 2,500 flight hours over the no action level of 800 annual flight hours. Other flight operations conducted in the complex are projected to total 1,400 flight hours per year.

Table 2-6

Comparison of No Action Level of Flight Operations with the Operational Workload I Alternative

Flight Operations	Annual Patuxent River Complex Flight Hours	
	No Action	Operational Workload I Alternative
RDT&E Operations	16,000	16,000
Support for Military Training Operations	800	3,300
Other Flight Operations	1,400	1,400
Grand Total	18,200	20,700
Note: These estimates are rounded to the nearest 100.		

While the types of RDT&E missions expected to be flown in the complex in the future would be the same as currently are flown, proposed operations in support of military training would accommodate Intermediate Level training, in addition to the Unit and Advanced Levels currently provided at the complex. Intermediate Level training support would involve air wing exercises using a mix of aircraft and interfacing with surface ships at sea. Also, Advanced Level training would be expanded to include exercises of the US Army Airborne. A list of the new operations proposed for military training support and their purpose is shown in Table 2-7.

Table 2-7

Additional Future Missions for Support of Military Training

Mission	Description
Weapons Release (inert)	Practice releasing and targeting weapons from an aircraft, with or without an actual drop (a subset of the types of operations covered under RDT&E weapons/stores separation test).
Missile Exercises	Practice targeting, jettisoning, and dropping missiles, with or without actually dropping store (a subset of the types of operations covered under RDT&E weapons/stores separation test).
Staging Area for Helicopter Operations (US Army Airborne)	Up to 25 partially-assembled helicopters would be airlifted to NAS Patuxent River using C-5s, C-130s, C-141s, and/or C-17s (transport aircraft would land, unload, and takeoff and no refueling would be necessary). The types of helicopters unloaded would likely include Apaches, Blackhawks, Cobras, Kiowa Warriors (OH-58), and Iroquois.
Simulated Helicopter Assault -- NAS Patuxent River to Aberdeen Proving Grounds (US Army Airborne)	Before commencing the exercise, functional checks of the reassembled helicopters must first be performed through local flights. The helicopters would then be used in support of simulated attacks on Aberdeen Proving Grounds, and return to NAS Patuxent River. Navy fleet aircraft could be used to support the exercise. After the initial attack, routine operations would occur between NAS Patuxent River and Aberdeen's Phillips Field, possibly during both day and night. Aircraft loaded with paratroopers may also fly through the CTR for EW training. At the end of the exercise, the helicopters would return to NAS Patuxent River, be defueled, disassembled, and returned to point of origin in heavy lift aircraft.
Joint Task Force Operations with Fort AP Hill (US Army Airborne)	Some deployments may occur to Fort AP Hill, Virginia for forward firing missile training.
Special Operations Forces	Simulated attacks and training using certain fixed- or rotary-wing aircraft or land based facilities, e.g., rappel out of an aircraft, night vision exercises, etc. (a specialized subset of the operations covered under RDT&E human factors testing).

The exercises associated with the US Army Airborne would include: Staging Area for Helicopter Operations, Simulated Helicopter Assault - NAS Patuxent River to Aberdeen Proving Grounds, and Joint Task Force Operations with Fort AP Hill. These exercises would be expected to occur from two to possibly three times per year for a ten-day duration. A major lift would likely be planned for a weekend. Approximately 350 to 400 troops would be involved in each exercise and would include aircrews, specialists in ordnance, avionics, power plants, and intelligence support. The troops would bivouac in a hangar at NAS Patuxent River while helicopters were being assembled and disassembled.

The first two of the additional military training missions shown in Table 2-7 would be similar to the RDT&E tests already standard for the Patuxent River Complex. For example, the Military Training weapons release (inert) mission proposed under this alternative would be comparable to the RDT&E weapons/stores separation test. While the Simulated Helicopter Assault mission would be new to the complex, its individual operational elements would build on and be similar to test missions that already are being conducted at the complex.

Proposed Increases in Ground Operations

Under the Operational Workload I Alternative, changes in ground operations categories are summarized as follows:

- Aircraft-related ground operations would remain near or at no action levels since all RDT&E-related landings and takeoffs from NAS Patuxent River and Webster Field are already included in the no action estimate of annual flight hours and most operations conducted in support of military training would require minimal use of land-based facilities.

- Non-flight and laboratory testing has been projected to operate at baseline conditions of seven days per week and one eight-hour shift per day (2,920 hours per year). It is expected that the airfield hoverpad, run stand, and ski jump would be operational.

- Basekeeping functions would be adjusted to accommodate US Army Airborne or JTFEX utility requirements.

2.3.2.2 Operational Workload II Alternative

Proposed Increases in Flight Operations

Overall flight hours under the Operational Workload II Alternative would reach a maximum of about 22,600 per year, about 4,400 more than projected under the No Action Alternative. Implementation of the Operational Workload II Alternative would increase RDT&E operations by about 4,400 flight

Table 2-8

Comparison of No Action Level of Flight Operations with Operational Workload Alternatives I and II

Flight Operations	Annual Patuxent River Complex Flight Hours		
	No Action	Operational Workload I Alternative	Operational Workload II Alternative
RDT&E Operations	16,000	16,000	17,900
Support for Military Training Operations	800	3,300	3,300
Other Flight Operations	1,400	1,400	1,400
Total	18,200	20,700	22,600

hours more than would occur under the No Action Alternative. Support for military training operations would remain at the same level as shown in Operational Workload Alternative I (3,300 flight hours per year), or 2,500 flight hours more than under no action conditions. Other Flight Operations would remain at 1,400 annual flight hours (Table 2-8). All other aspects of this alternative (i.e., US Army Airborne and Special Forces Operations exercises) would be the same as described for Operational Workload I Alternative above.

Proposed Increases in Ground Operations

Under the Operational Workload II Alternative, changes proposed for ground operations categories are summarized as follows:

- Aircraft-related ground operations would increase proportionately by ten percent over no action conditions.
- Non-flight and laboratory testing is projected to increase level of operations by ten percent to about 3,210 hours per year.
- Basekeeping functions, specifically utility use and waste management requirements, would be adjusted to accommodate increased operating hours of non-flight RDT&E/laboratories and to account for US Army Airborne or JTFEX utility requirements.

2.3.2.3 Operational Workload III Alternative (The Preferred Alternative)

Proposed Increases in Flight Operations

Overall flight hours under the Operational Workload III Alternative, the Navy's Preferred Alternative, would reach a maximum of about 24,400 per year (Table 2-9) about 6,200 more flight hours than would occur in the CTR under the No Action Alternative. Implementation of this alternative would increase RDT&E operations by 1,800 flight hours over no action conditions, while support for military training operations would remain at the same level as shown for Operational Workload Alternatives I and II (3,300 flight hours per year). Other Flight Operations would remain at 1,400 annual flight hours. All other aspects of this alternative (i.e., US Army Airborne and Special Forces Operations exercises) would be the same as described for Operational Workload I Alternative above.

Table 2-9

Comparison of No Action Level of Flight Operations with all Operational Workload Alternatives

Flight Operations	Annual Patuxent River Complex Flight Hours			
	No Action	Operational Workload I Alternative	Operational Workload II Alternative	Operational Workload III Alternative
RDT&E Operations	16,000	16,000	17,900	19,700
Support for Military Training Operations	800	3,300	3,300	3,300
Other Flight Operations	1,400	1,400	1,400	1,400
Total	18,200	20,700	22,600	24,400

Proposed Increases in Ground Operations

Under Operational Workload III Alternative, changes in ground operations categories are summarized as follows:

- Aircraft-related ground operations would increase proportionately by 20 percent over no action levels.

- Non-flight and laboratory testing is projected to increase level of operations by 20 percent to about 3,500 hours per year.

- Basekeeping functions, specifically utility use and waste management requirements, would be adjusted to accommodate increased operating hours of non-flight RDT&E/laboratories and to account for US Army Airborne or JTFEX utility requirements.

2.3.3 Implementation of the Proposed Action

The selected alternative would be implemented under the guidance of the complex's ERB, with technical assistance by the NAS Patuxent River's OEP Office. An implementation plan would be developed to enable the ERB and the OEP Office to track compliance with the activities and ceilings delineated in this EIS as all proposed tests or actions undertaken at the Patuxent River Complex must be submitted to the complex's Environmental Review Board (ERB) for review.

Chapter 3

Affected Environment

Increased Flight and Related Operations
in the Patuxent River Complex

3 AFFECTED ENVIRONMENT

The Council on Environmental Quality's (CEQ) guidelines require that an EIS succinctly describe the environment of the area to be affected or created by the alternatives under consideration. This description of existing environmental conditions is critical to assessing the potential impacts of the proposed action in an EIS and serves two major purposes:

- To assess existing environmental quality; and
- To identify the existence of environmentally significant factors or geographical areas that could preclude the implementation of the proposed action (Canter, 1996).

The rationale for providing a description of existing environmental conditions in an EIS is also to provide decision makers with a general understanding of the geographic location and characteristics of the area to be potentially affected by implementation of the proposed action.

The CEQ guidelines caution that descriptions of the existing environment should concentrate on important issues and be no longer than is necessary to understand the potential effects of the proposed action. Accordingly, this chapter provides a generalized overview of the affected environment within the Patuxent River Complex (e.g., land use, socioeconomics, community facilities and services, transportation, and cultural resources), as well as extended discussions on those environmental factors that could be potentially affected by aircraft flight and ground-based operations (e.g., air quality, noise, and aircraft safety and operations).

Furthermore, given that the components of the Patuxent River Complex cover a broad geographic area, this EIS examines the affected environment for the following multi-level study areas, where appropriate:

- Land, water, and airspace encompassing the Chesapeake Test Range (CTR);
- NAS Patuxent River and its surrounding environs;
- Webster Field and its surrounding environs; and
- Localized target areas (Hooper, Hannibal, and Tangier Island targets).

3.1 Land Use and Coastal Zone Management

This subchapter discusses land use surrounding the CTR, NAS Patuxent River, Webster Field, and the localized target areas, as well as coastal zone management programs in place in Delaware, Maryland, and Virginia.

3.1.1 Land Use

3.1.1.1 Chesapeake Test Range

The open air test range comprising the CTR overlies approximately 4,680 sq km (1,800 sq mi) of the middle portion of the Chesapeake Bay and portions of Delaware, Maryland, and Virginia. Approximately one-half of the CTR, or 2,340 sq km (900 sq mi), lies over water, with the remainder overlying land. In Maryland, the CTR partially or wholly overlies the counties of Calvert, Dorchester, St. Mary's, Somerset, and Wicomico (Figure 3.1-1, Counties Underlying the Chesapeake Test Range). In Virginia, the CTR overlies portions of Accomack, Lancaster, Northumberland, and Westmoreland counties. In Delaware, the CTR overlies the southwest corner of Sussex County.

As shown in Figure 3.1-2 (Generalized Land Use of Areas Underlying the CTR), the predominant land uses within the CTR are low-density residential and rural agricultural uses, forests, and wetlands (both tidal and nontidal). This mixed pattern is consistent throughout southwest Delaware (Sussex), Southern Maryland (St. Mary's and Calvert counties), Maryland's Eastern Shore (Dorchester, Somerset, and Wicomico counties), and the Northern Neck of Virginia (Accomack, Lancaster, Northumberland, and Westmoreland counties). Since the mid-1970s, however, the Maryland portion of the CTR has been the focus of a significant increase in land development, with new low-density suburban residential and commercial development steadily moving outward from Washington, DC and Baltimore (including Annapolis) (Maryland Office of Planning, October 1991). Those portions of the study area nearest to metropolitan centers have grown the quickest, particularly western St. Mary's County and southern Calvert County.

Within the footprint of the CTR, new development tends to be clustered along major roadways (e.g., MD 235 or US Route 50) or along the shoreline of the region's many streams, rivers, and the Chesapeake Bay. The pattern of suburbanization is less pronounced on Virginia's Northern Neck and in southwestern Delaware, primarily due to the distance of those areas from the major metropolitan centers. The larger population centers underlying the CTR include:

- Seaford, Delaware;
- Heathsville, Burgess, and Reedville in Virginia; and

Generalized Land Use of Areas Underlying the CTR

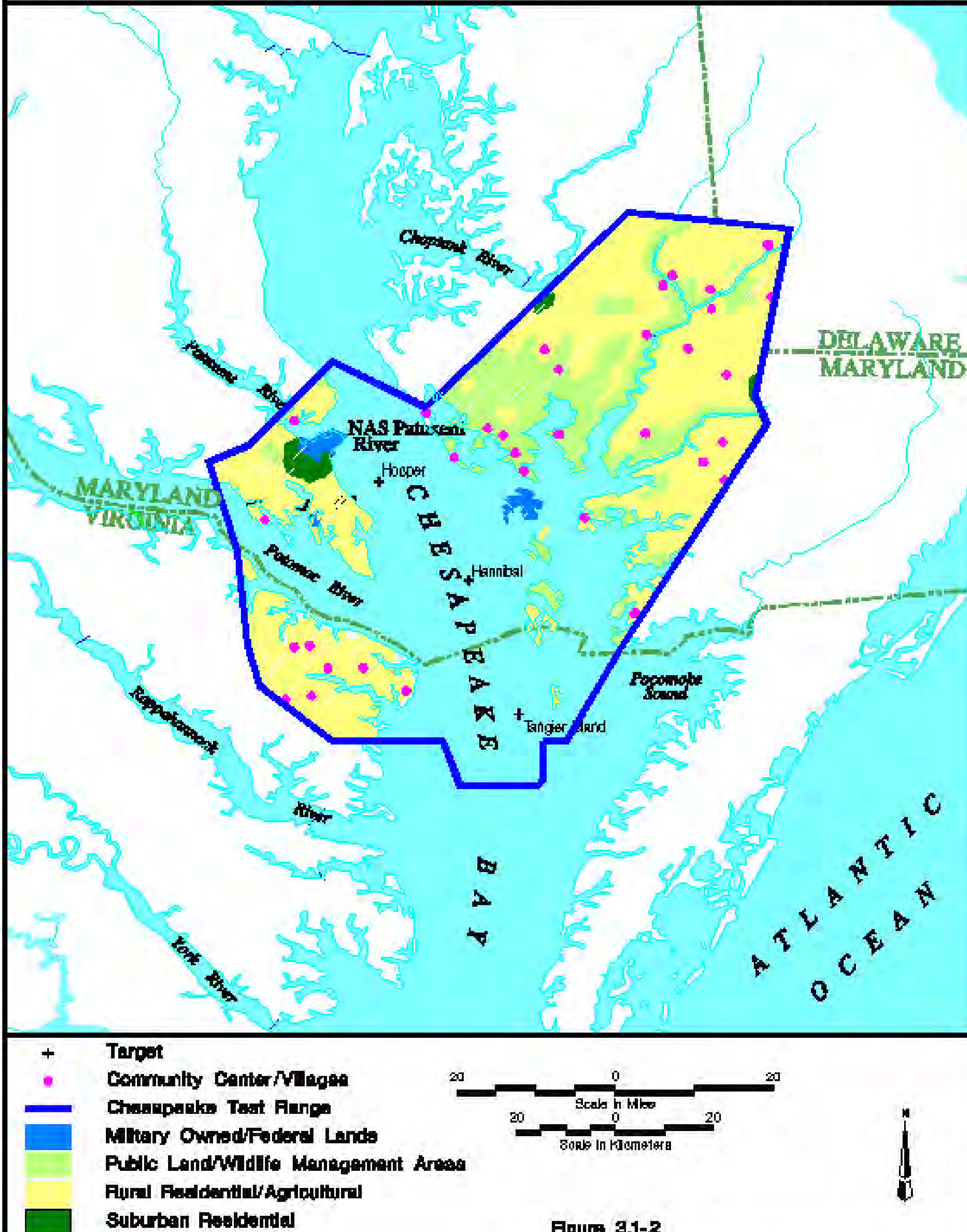


Figure 3.1-2

Counties Underlying the Chesapeake Test Range

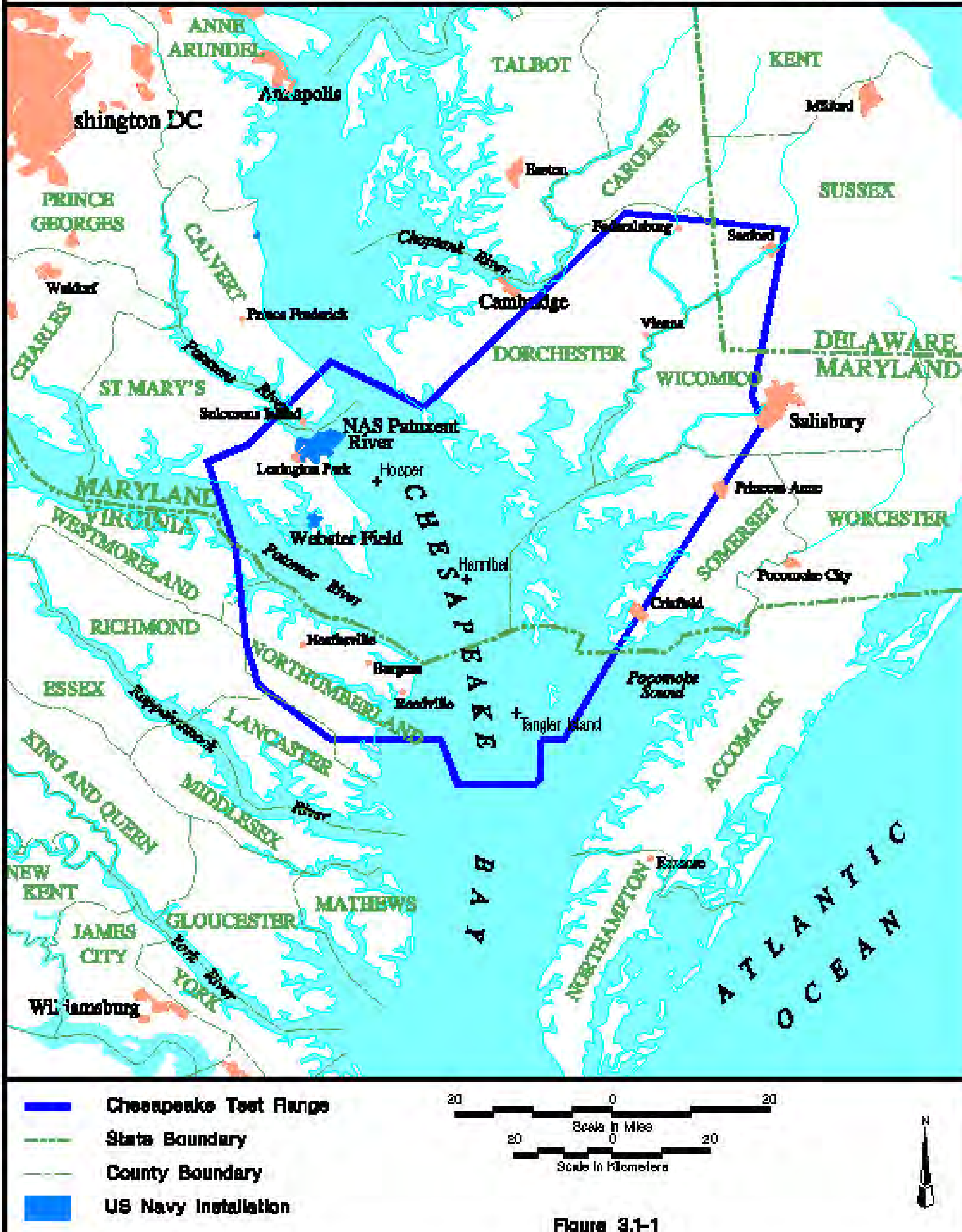


Figure 3.1-1

- Lexington Park, Crisfield, Federalsburg, Princess Anne, Solomons Island, and Vienna in Maryland.

In addition, the urbanized communities of Cambridge and Salisbury, Maryland lie just outside the bounds of the CTR.

3.1.1.2 NAS Patuxent River

The predominant land use at NAS Patuxent River is the developed land comprising the industrial (including the airfield), communications, utilities, administrative, residential, and commercial buildings and transportation facilities owned and operated by the Navy. Forested land is also a major land use at the air station. Semi-improved grounds (e.g., agricultural lands and other altered lands that require little maintenance) comprise another significant portion of the total land area (NAS Patuxent River, 1994). The remaining land uses include wetlands, waterways, and beaches.

As a steward of publicly-owned land, the Navy has recognized its obligation to manage and enhance the environmental and natural resources of its lands while completing its assigned mission. NAS Patuxent River and its tenants work closely together to ensure that operations are conducted in a manner that minimizes potential environmental impacts. Active land use-related programs in effect at the air station include the:

- **Integrated Natural Resource Management Plan (INRMP)** - a primary planning tool (currently in draft form) being developed to guide decision making involving cultural and natural resources at NAS Patuxent River.

- **Stormwater Pollution Prevention Plan** - a planning tool (recently completed) for use in managing and preventing nonpoint source runoff into the Chesapeake Bay through the use of best management practices (BMPs).

- **Agricultural Outlease Program** - a program that allows farmers to lease property within the air station’s boundaries for cultivation of different crops. The outlease benefits both the farmer and the air station -- the farmer acquires good agricultural soil to farm at a reasonable cost (Patuxent River Complex Draft Integrated Natural Resources Management Plan, Undated [hereafter cited as Draft INRMP, Undated]). The Navy secures airfield maintenance and improved airfield safety by reducing the area that otherwise would remain fallow with trees or tall vegetation.

Land use surrounding NAS Patuxent River is a mix of low-density residential and commercial uses. To the north (across the mouth of the Patuxent River) lies Solomons Island. This community has marinas, restaurants, hotels, shops, and other tourist-oriented facilities. In fact, tourism is an important sector of the Solomons Island economy, attracting a large number of visitors each year for regattas and other events. The residential areas of Solomons Landing and Chesapeake Ranch Estates lie to the north of Solomons and the air station. To the south of NAS Patuxent River is the unincorporated community of Lexington Park. Lexington Park features shopping centers, strip retail, and service businesses, including small three- to four-story office buildings, and residential areas with both single- and multi-family residences. Commercial areas are oriented along MD 235 (Three Notch Road) and MD 246 (Great Mills Road).

3.1.1.3 OLF Webster Field

Webster Field encompasses a total of about 341 hectares (852 acres) along the eastern shore of the St. Mary's River with St. Inigoes Creek and Molls Cove forming its northern boundary (Draft INRMP, Undated). Webster Field is characterized by a mix of forest, open field, wetlands, open waters, agriculture areas, and wildlife areas. Surrounding land use is rural low-density residential.

3.1.1.4 Localized Target Areas

The CTR contains an aerial and surface firing range and three exclusive-use target areas -- Hooper, Hannibal, and Tangier Island. The aerial and surface firing range and the targets are wholly surrounded by the waters of the Chesapeake Bay. The targets are characterized as follows:

- **Hooper target**, used as a training device since 1949, is a concrete structure with four peripheral concrete columns, each equipped with a sleeve for supporting five reflective plywood visual targets. It is located 10.5 km (5.6 nm) north of Point No Point, Maryland. The target is used for reference purposes only. In other words, the target is not actually fired upon; rather, the actual targets are expendable items, such as rafts or barrels that are floated in the vicinity of Hooper target. The nearest land to Hooper target is 4.8 km (2.6 nm) to the west at The Elms Wildlife Management Area in St. Mary's County.

- **Hannibal target** is a cargo ship (the ex-*American Mariner*) that was scuttled in 1969. The closest land to Hannibal target is South Marsh Island, approximately 6.4 km (3.5 nautical miles [nm]) to the northeast. South Marsh Island, comprising the South Marsh Wildlife Management Area, is not inhabited. The nearest inhabited land is Smith Island (1990 population of 2,190), located approximately 13 km (7.2 nm) east-southeast of the Hannibal target.

- **Tangier Island target** consists of two scuttled cargo ships; the condition of the target is poor, with most of the former ships below the water surface. The closest land to this target is Tangier Island, Virginia, an island community inhabited by 750 residents that is approximately 6 km (3.5 nm) to the northeast.

3.1.2 Coastal Zone Management

Delaware, Maryland, and Virginia have federally-approved CZM programs under Section 306 of the Federal Coastal Zone Management Act (CZMA) of 1972, as amended. These management plans provide for the protection of natural resources and the husbandry of coastal development. The CZMA provides a procedure for the states to review federal actions for consistency with their own approved coastal management program, and it also provides approved states with matching federal funding to administer their programs (US Department of Commerce, NOAA, February 1997).

Furthermore, Section 307 (c)(1) of the Federal Coastal Zone Management Act Reauthorization Amendments (CZMA and CZMARA) of 1979, states that each federal agency conducting or supporting activities affecting any land, water use, or natural resource of the coastal zone must do so in a manner to the maximum extent practicable, consistent with the enforceable policies of each state's CZM program and policies.

3.1.2.1 Chesapeake Test Range

The coastal management policies, objectives, and goals applicable to the proposed action are explained below for all three states with land areas underlying the CTR.

Delaware Coastal Management Program

Delaware's Coastal Management Program (DCMP) includes a policy for National Defense Facilities that recommends military agencies comply with regulatory and environmental standards imposed under federal law, and encourages those agencies to cooperate with state and local governments for the protection and enhancement of the environment (Delaware Department of Natural Resources, March 1993). Compliance with relevant federal and state regulatory programs constitutes consistency with these policies.

According to Delaware's *Comprehensive Update and Routine Program Implementation of 1993*, the specific DCMP policies that would require consideration with respect to the proposed action include:

- Coastal Waters Management;

- Natural Areas Management;

- Woodlands and Agricultural Lands;
- Living Resources; and
- Air Quality.

Maryland Coastal Zone Management Program

In Maryland, the CZM program is based on federal laws, such as Section 404 of the Clean Water Act of 1977, as well as existing state laws and authorities, such as the Chesapeake Bay Critical Area Program (established in 1984), the Tidal Wetlands Act of 1970, the Non-Tidal Wetlands Protection Act of 1989, and the state's authority under Section 401 of the Clean Water Act of 1977.

The Tidal Wetlands Act specifically exempts federal agencies from its jurisdiction. Similarly, the Critical Area Program is administered through local jurisdictions, and does not apply, per se, to federal agencies. However, the state review of the Navy's consistency determination would include consideration of whether the Navy has met the spirit of these regulations (Ghigiarelli, April 23, 1997). Compliance with relevant state and federal regulatory programs constitutes consistency with the policies of the Coastal Resources Division of the Maryland Department of Natural Resources (MDNR).

Virginia Coastal Resources Management Program

The Virginia Coastal Resources Management Program (CRMP) establishes policies and objectives to guide the use and development of coastal management areas to ensure their protection and preservation. In 1985, the Office of Ocean and Coastal Resources Management identified those environmental areas that require consideration when proposing any plan that may impact coastal zone areas. Policies that would potentially require consideration with respect to the proposed action would include:

- Fisheries Management;
- Subaqueous Lands Management;
- Point Source Pollution Control; and
- Air Pollution.

Compliance with relevant state and federal regulatory programs constitutes consistency with Virginia's coastal management policies (such as Sections 401, 402, and 404 of the Clean Water Act of 1977; the Chesapeake Bay Local Assistance Department and counterpart county/municipality regulations; and state pollutant discharge elimination system permits).

3.1.2.2 NAS Patuxent River

NAS Patuxent River is surrounded by Maryland's coastal zone. As such, the Navy complies, to the maximum extent practicable, with Maryland's CZM policies, as guided by the various federal and state regulations for work in Critical Areas. In fact, in recent years the air station has implemented several projects with the objective of improving water quality by controlling point and nonpoint sources of water pollution. One example is the shoreline stabilization project designed to prevent a former landfill at Fishing Point from eroding into the Patuxent River at the mouth of the Chesapeake Bay.

Other efforts to stabilize the NAS Patuxent River shoreline and prevent erosion have involved constructing stone groins or offshore breakwaters, regrading embankments to a stable slope, nourishing beaches with fresh sand, and establishing marsh grasses or dune vegetation. These types of projects are consistent with and support Maryland's CZM policies since they require little maintenance after completion, absorb rather than deflect wave energy, provide excellent habitat for marine organisms, afford safe recreational access to swimming and fishing areas, and are more aesthetically pleasing than traditional concrete and timber bulkheads (NAS Patuxent River Public Works Department, 1996).

3.1.2.3 OLF Webster Field

Webster Field is also surrounded by Maryland's coastal zone. Efforts similar to those described for NAS Patuxent River to control and reduce nonpoint sources of water pollution to the Bay have been implemented at Webster Field in support of Maryland's CZM policies.

3.1.2.4 Localized Target Areas

The targets, including the aerial and surface firing range and the prohibited and restricted areas surrounding them, lie within both Maryland and Virginia waters. Specifically, Hooper and Hannibal targets are within Maryland waters and Tangier Island target is within Virginia waters. In maintaining and using these targets, the Navy complies with both Maryland and Virginia's CZM policies to the maximum extent practicable.

3.2 Socioeconomics

This subchapter provides an overview of the socioeconomic baseline (demographics, employment, and housing data) for the entire area encompassed by the footprint of the CTR and does not address NAS Patuxent River, Webster Field, and the targets separately. This subchapter also discusses sport fishing, boating and sailing, and commercial fishing within the CTR, which are all important economic activities in the Chesapeake Bay.

3.2.1 Demographics and Employment

3.2.1.1 Demographics

US Census data for 1990 were used to characterize the population residing within the boundaries of the Patuxent River Complex under existing conditions. The 1990 Census data provide population statistics on a census tract basis, information that will not otherwise be available for the complex until the publication of 2000 Census data. In addition, in the noise analysis, the EIS uses the 1990 Census data for consistency in comparison between the existing environment and the environment under the proposed alternatives.

As shown in Table 3.2-1, the estimated 1990 population of those Delaware, Maryland, and Virginia counties underlying or partially underlying the CTR was 140,715, approximately 33 percent of the 421,300 persons residing within the counties underlying the CTR. Based on 1990 population data, the largest communities that lie under the CTR are: Seaford in Delaware (5,695) and Lexington Park (9,943), Crisfield (2,880), Princess Anne (1,666), and Vienna (250) in Maryland. By contrast, the 1990 populations for some large communities nearby, but outside of the CTR, were Salisbury (20,592), Waldorf (15,058), and Cambridge (11,514) in Maryland.

Overall, between 1980 and 1990, the population of the counties underlying the CTR increased by 16 percent. With the exception of Dorchester County (which experienced a one percent population decline), all of the counties in the study area increased in population by at least five percent during the decade. Calvert County, particularly the northern portions of the county that are outside the CTR, grew by almost 50 percent, the largest population increase of the counties in the CTR. This growth was due to the county's proximity to Washington, DC and Baltimore. Somerset County, with substantial land area within the CTR, also experienced substantial increases in population between 1980 and 1990, growing by about 17 percent. St. Mary's County, which surrounds NAS Patuxent River, grew by nearly 16,100 residents or about 27 percent, over the same time period.

In general, the counties located along Maryland's Eastern Shore (Dorchester, Somerset, and Wicomico) and Delaware (Sussex County) are more densely populated than those counties on the western shore of the Chesapeake Bay in Southern Maryland (Calvert and St. Mary's counties) and

Table 3.2-1

1990 Population and Ethnic Composition of the CTR's Population[1]

State	Total Population		Ethnic Composition (%)[2]					
	Persons	%	White	Black	American Indian/ Eskimo/Aleut	Asian/Pacific Islander	Other	Hispanic Origin[3]
Delaware	29,055	21	77.6	21	0.2	0.6	0.6	1
Maryland	93,193	66	72.8	26	0.2	0.7	0.3	1
Virginia	18,467	13	71.6	28.1	0.02	0.14	0.14	0.4
Total	140,715	100	73.6	25.2	0.2	0.6	0.4	0.9

Notes:

1. Ethnic and racial classifications used conform to those accepted by the Office of Management and Budget (*Federal Statistical Directive No. 15)*:

   White - a person having origins in any of the original peoples of Europe, North Africa, or the Middle East.

   Black - a person having origins in any of the black racial groups of Africa.

   American Indian - includes persons having origins in any of the original peoples of North America, who maintain cultural identification through tribal affiliation or community recognition.

   Asian - includes persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands.

   Hispanic - a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.

2. Totals may not add to 100 due to rounding.

3. The 1990 Census total for race consists of the sum of white, black, American Indian/Eskimo/Aleut, Asian/Pacific Islander, and other. Respondents of Hispanic descent may describe themselves as any racial category -- white, black, etc.

Source: US Department of Commerce, May and June 1992.

on Virginia's Northern Neck (Accomack, Lancaster, Northumberland, and Westmoreland counties). This difference in population density is due to such factors as their proximity to popular coastal resorts in Delaware and Maryland, and the existence of the larger, established communities of Salisbury, Cambridge, and Seaford (US Department of Commerce, May and June 1992).

The majority of persons in the study area as a whole are adults aged 20 to 64 (58 percent). Less than ten percent of the persons residing within the footprint of the CTR consists of children under five years of age, and about 20 percent of the population is comprised of school-age children (ages five to 19). Senior citizens (persons 65 years and older) account for less than 15 percent of the population. In 1989, the US Department of Agriculture characterized three of the counties underlying the CTR (Sussex, Delaware and Lancaster and Northumberland, Virginia) as "retirement destinations" (US Department of Agriculture, December 1989).

Table 3.2-1 also provides the 1990 ethnicity statistics for persons residing in the land area underlying the CTR. Ethnicity is as defined by the US Department of Commerce, Bureau of the Census (using the guidelines of the Office of Management and Budget contained in *Federal Statistical Directive No. 15*). As can be seen, the population was predominantly white (an average of about 74 percent overall) -- approximately 78 percent in Delaware, 73 percent in Maryland, and 72 percent in Virginia. Blacks (persons having origins in any of the black racial groups of Africa) accounted for about 25 percent of the 1990 population residing within the boundaries of the CTR -- about 21 percent in Delaware, 26 percent in Maryland, and 28 percent in Virginia. Asian and American Indian ethnic groups accounted for less than one percent of the total CTR population. Persons of Hispanic origin accounted for less than one percent of the population in the area underlying the CTR.

3.2.1.2 Economy

Overall Trends

Overall, the 1990 economy of the counties within the CTR was dominated by the private sector. Within this sector nearly two of every five jobs were in retail and service occupations. However, in Southern Maryland, particularly in St. Mary's County, the largest single employer is NAS Patuxent River (including Webster Field). Military jobs and civilian employment have increased steadily at the air station as a result of the BRAC-related relocations of functions and personnel from New Jersey, Pennsylvania, and Virginia to Southern Maryland. In 1996, the base year used for defining flight operations, employment at NAS Patuxent River (including Webster Field) was 12,764 persons, with transient personnel associated with specific RDT&E or training programs comprising a minor component of overall employment. Approximately 225 civil service employees, 15 military personnel, and 1,400 government contractors were employed at Webster Field. (As mentioned in Chapter 2, by 1998, employment at the air station is projected to increase to about 16,600 persons as a result of BRAC-related consolidations, a situation that was assessed in EISs finalized in 1993 and 1994.)

The total labor force of the CTR's counties for 1990 was about 76,300 persons. The region's overall unemployment rate was about six percent. In 1990, Delaware, Maryland, and Virginia's unemployment rates were 4.1, 4.4, and 4.4 percent, respectively, while the US experienced an unemployment rate of almost seven percent (US Department of Commerce, September 1993).

In 1989, median family income for the land area underlying the CTR as a whole was $28,711, approximately $12,500 less than the 1989 averages of the states of Delaware, Maryland, and Virginia ($40,252, $45,034, and $38,213, respectively), and approximately $6,500 less than the US median family income during this time ($35,225). The median income of the counties in Southern Maryland and the Northern Neck of Virginia was $30,724, while the median income of the counties on the Eastern Shore was $26,295 (US Department of Commerce, September 1993).

About nine percent of families and 12 percent of persons residing within the footprint of the CTR were considered to have incomes below the poverty level in 1990. In Sussex County, Delaware, about 7.8 percent of families and 10.7 percent of persons were below the poverty level in 1990. In the Southern Maryland/Northern Neck counties, the number of families and persons below the poverty level was about nine percent and 11 percent, respectively. Comparable statistics for Maryland's Eastern Shore show that nine percent of families and 13 percent of individuals had incomes below the poverty level. These statistics are also comparable to state-level data for Delaware, Maryland, and Virginia.

Agriculture

Agriculture, and poultry production in particular, plays an important role in the economy of the Chesapeake Bay region. The Maryland counties of Dorchester, Somerset, and Wicomico, as well as Sussex County, Delaware, collectively contain more than 1,300 poultry farms and about 339 million chickens (broilers and other meat-type chickens) were reported sold in 1992 (US Department of Commerce, April 1994). The average market value of livestock, principally chickens, sold in these counties was more than $621 million in 1992. Crops were the main agricultural product of Calvert and St. Mary's counties in Maryland and Virginia's Northern Neck counties.

Sport Fishing, Boating, and Sailing

Also important to the Bay economy are sport fishing, boating, and sailing. In fact, the National Marine Fisheries Service (NMFS) has reported that close to one million anglers from Maryland and Virginia took almost 600,000 fishing trips in 1991 (USEPA, April 1995). A study prepared by the Maryland Sea Grant Extension Program found that spending by Maryland's recreational boaters is about $1 billion annually (Maryland Sea Grant Extension Program, 1997). The study also identified three areas of major boater-related expenditures:

- **Boating Trips** - an estimated $438 million spent annually on boat fuel, food and lodging, fishing supplies, clothing, and equipment;

- **Slip Fees and Maintenance** - an estimated $428 million spent annually; and
- **Purchase of New or Brokered Boats** - an estimated $114.5 million in annual spending.

However, the study did not account for the additional economic benefits derived from out-of-state boaters, fishing charters, or tourist boat excursions.

3.2.1.3 Housing

In 1990, the total number of housing units in the area underlying the CTR was about 60,000 (US Department of Commerce, July and August 1991). On a regional basis, there were more than 10,300 units in Delaware, about 21,700 units in Southern Maryland and the Northern Neck, and 27,900 housing units on Maryland's Eastern Shore. As might be expected, given the population growth trends in the area between 1980 and 1990, the greatest growth in housing units occurred in Calvert County. Significant growth also occurred along all the major recreational waterways.

3.2.2 Commercial Fishing

3.2.2.1 Chesapeake Test Range

Approximately one-half of the CTR lies over the Chesapeake Bay and its tributaries. Commercial fisheries provide an important source of income for local residents and commercial fishing is an important sector of the Maryland and Virginia economies. Statistics on the commercial harvest of fish and shellfish are compiled by the Division of Fisheries Statistics and Economics of NMFS. However, these NMFS statistics are for the commercial harvest from all marine waters in the states of Maryland and Virginia, including the Chesapeake Bay (a breakdown of the commercial harvest of fish and shellfish caught only in the Bay's waters is not yet available from NMFS). The NMFS statistics show that in 1996, the commercial harvest of fish and shellfish from Maryland and Virginia waters totaled more than 330.5 thousand metric tons (364.4 thousand tons) for a reported retail value of more than $159 million. This harvest was about 13 percent less than the 1995 harvest of 383.4 thousand metric tons (422.8 thousand tons) (US Department of Commerce, NMFS, July 1996). Maryland waters were responsible for about 33 percent of the revenue derived from the 1996 catch.

Species-specific data for Maryland and Virginia's 1996 commercial fisheries harvests have been compiled by the Maryland Department of Natural Resources (MDNR) and the Virginia Marine Resources Commission (VMRC), respectively (MDNR Internet Website and VMRC Internet Website, Accessed January 24, 1998). These data, like the NMFS data, are not specific to the portion of the catch attributable to the Chesapeake Bay. However, when they are viewed with a knowledge of the fish species that inhabit the Bay waters underlying the CTR (fish species are discussed in Subchapter 3.11), some generalizations can be made regarding the potential nature of the harvest of fish and shellfish from the middle portion of the Chesapeake Bay:

- The single most valuable species harvested is blue crab. In 1996 Maryland watermen harvested nearly 17,200 metric tons (19,000 tons) of hard shell and soft shell blue crab with a value of about $33 million. Virginia statistics are comparable to Maryland's (15,520 metric tons [17,100 tons]) for a value of $24 million.

- Of the fish species, the most valuable is striped bass -- the 1996 Maryland catch was 748 metric tons (825 tons) with a value of about $2.7 million and the 1996 Virginia catch was 730 metric tons (805 tons) with a value of about $2.8 million.

- Menhaden and gizzard shad are important commercial fish species used for fertilizer and other industrial applications. More than 2,320 metric tons (2,560 tons) of these fish were harvested in Maryland in 1996 for a combined value of nearly $770,000. The Virginia 1996 combined yield of menhaden and gizzard shad was 3,200 metric tons (3,530 tons) for a value of more than $761,000.

- Other important commercial species of fish and shellfish likely in the middle portion of Chesapeake Bay would include bluefish, croaker, eel, spot, white perch, oysters, and soft clams.

In addition, the NMFS data show that fish and shellfish landed during the months of June, July, August, and September account for about two-thirds of all fish and shellfish harvested annually in Maryland and Virginia waters.

3.2.2.2 NAS Patuxent River and OLF Webster Field

Commercial fishing is not permitted within the bounds of the air station or Webster Field. However, fishing and shellfishing beyond 69 m (75 yards) offshore of the air station and Webster Field is unrestricted. Individual permits are issued at the air station and at Webster Field for saltwater fishing, freshwater fishing, and shellfishing.

Oyster shells have been placed in Harper and Pearson creeks (1987) on several occasions to encourage the settlement of oyster spat (larval oysters) on these manmade oyster bars. An artificial reef was also installed during the mid-1980s in the waters of the Chesapeake Bay near the Officers' Club to encourage the production and stabilization of fish and shellfish in that area (Draft INRMP, Undated).

3.2.2.3 Localized Target Areas

Commercial fishing and crabbing (including the setting-up of fishing structures) are allowed outside of the prohibited areas surrounding the three target areas and inside of the boundaries of the aerial and surface firing range when no Navy activities are scheduled. However, no temporary or permanent structures or oyster ground markers may be placed on the western side of the Chesapeake Bay between Point No Point and Cedar Point without prior written approval of the Commanding Officer, NAS Patuxent River (33 CFR 11, Section 334.200).

No specific data exist identifying the commercial fish and shellfish harvest in the vicinity of the target areas. However, as is later described in Subchapter 3.11, Hannibal and Tangier Island targets are identified in the *Chesapeake Bay Chartbook* (ADC of Alexandria, Inc., 1996) as being within "fishing areas" identified as "The Old Hannibal" and "The Targets," respectively. These designations suggest that fish populations in the target areas may be significant.

3.3 Community Facilities and Services

This subchapter focuses on emergency services and open space resources available in the footprint of the CTR. Emergency services for the purposes of this subchapter include police, fire, and rescue services, which could be impacted by increases in flight and other related operations in the Patuxent River Complex. Open space resources include national and state wildlife refuges, parks, and other recreational facilities.

3.3.1 Emergency Services

3.3.1.1 Chesapeake Test Range

The Chesapeake Bay region is linked by a combination of standard emergency services. Rescue, fire, and police squads serve the majority of the communities in the 10 counties underlying the CTR. With the exception of police and sheriff departments, most emergency services are provided by local volunteers. Additional specialized services in the region include area hospitals in St. Mary's, Calvert, and Charles counties, as well as hazardous material and sea rescue teams at NAS Patuxent River.

3.3.1.2 NAS Patuxent River

The Fire and Emergency Services Division, a branch of NAS Patuxent River's Department of Public Safety, operates out of three fire stations. The force, which employs more than 70 full-time uniformed firefighters, protects more than 16,500 citizens in a 26-sq-km (ten-sq-mi) area. While the Division's primary responsibility is airfield fire protection, other specialized duties involve structural fire protection, emergency medical services, a hazardous materials response team, and a fire prevention/inspection unit. Additional tasks include search and rescue missions and extrication services.

The Search and Rescue (SAR) Helicopter Division of the Air Operations Department at NAS Patuxent River specializes in SAR services for all aircraft in the local flight operations areas. In addition, the unit conducts medical evacuation (MEDEVAC) and aids the US Coast Guard in civilian rescue missions. SAR teams, as well as fire crews, are on call and "in a ready status" whenever the NAS Patuxent River airfields are in use.

NAS Patuxent River's Department of Physical Security/Public Safety provides general security of life and property, and also maintains a Disaster Preparedness Planning program. In addition, the Hazardous Materials Control and Management (HMC&M) Office at the air station is responsible for controlling hazardous materials through "material acquisition, warehousing, issue, delivery, waste pick-up/storage, waste disposal, spill control coordination, and management of associated reporting requirements" (Draft IMP, March 1997).

3.3.1.3 OLF Webster Field

The same procedures for emergency safety practiced by NAS Patuxent River are followed at Webster Field (NAWCAD, September 1995).

3.3.1.4 Localized Target Areas

The SAR Helicopter Division at NAS Patuxent River provides primary emergency rescue services for the target areas.

3.3.2 Open Space Resources

3.3.2.1 Chesapeake Test Range

The CTR overlies one of the nation's major recreation areas, the Chesapeake Bay, and many open space resources are found within its footprint. In fact, the presence of these resources has led many of the counties surrounding the Chesapeake Bay to include an element promoting eco-tourism in their respective land use plans. Open space resources located within the CTR include: National Wildlife Refuges (NWRs); state wildlife management and natural areas; state- and locally-designated nature and historic parks; beaches; harbors and marinas; regional recreation areas; and dozens of landings and wharves. Primary open space resources are shown in Figure 3.3-1 (Open Space Resources Underlying the CTR Footprint).

National Wildlife Refuges

The footprint of the CTR encompasses two NWRs, both in Maryland, which are maintained by the US Fish and Wildlife Service (USFWS): Blackwater NWR in eastern Dorchester County and Glenn L. Martin Refuge (Martin NWR) on Smith Island. A portion of Martin NWR is within Virginia waters. There are no National Wildlife Refuges located in the portion of Sussex County, Delaware that underlies the CTR.

Blackwater NWR was established on January 23, 1933 as a sanctuary for migrating waterfowl. The refuge contains 6,929 hectares (17,121 acres) of tidal marsh, freshwater ponds, woodlands, and cropland. Three threatened and endangered species (bald eagle, Delmarva fox squirrel, and peregrine falcon) inhabit the refuge. Additional resident wildlife includes species of duck, goose, heron,

Open Space Resources Underlying the CTR Footprint

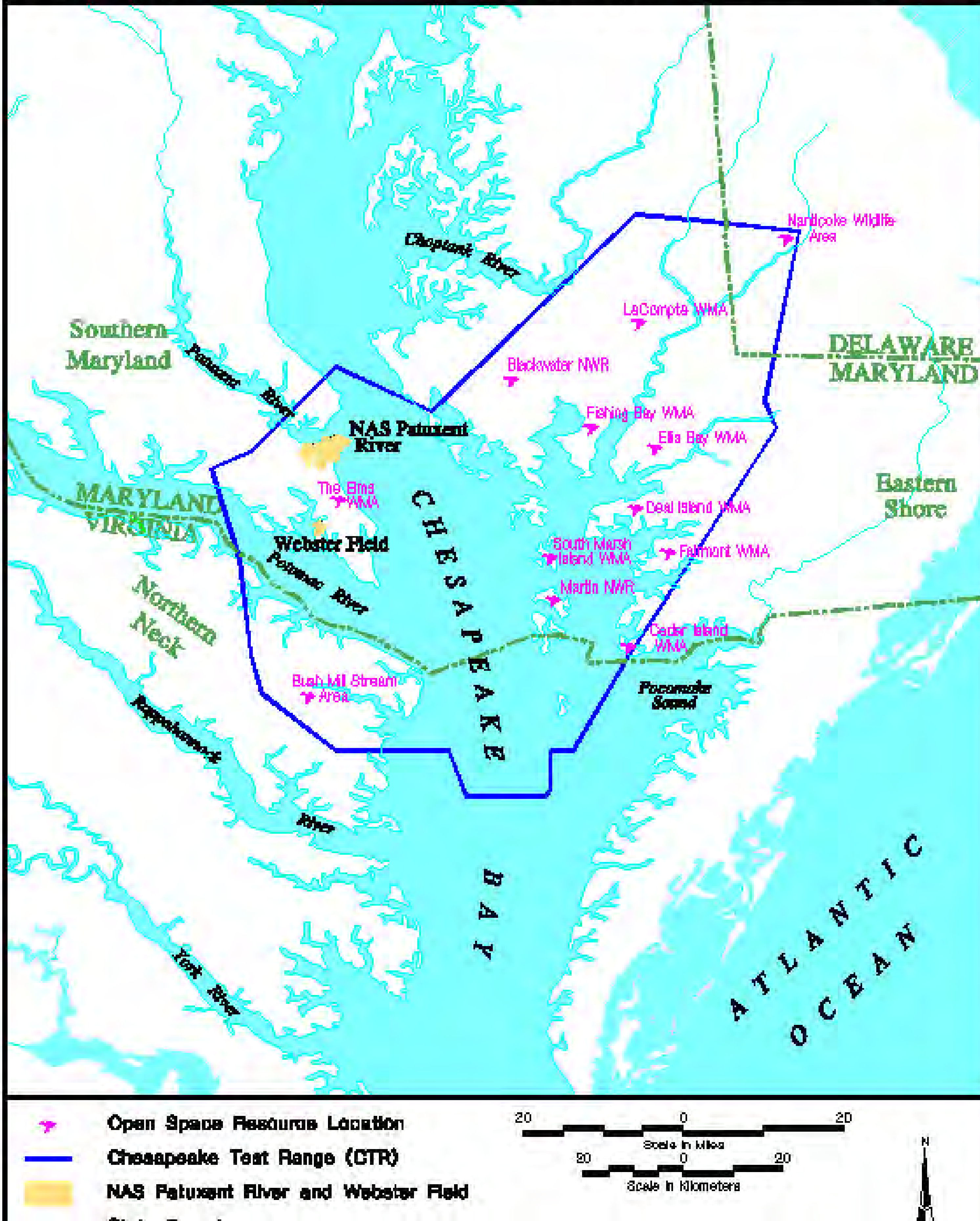


Figure 3.3-1

muskrat, otters, raccoon, and assorted reptiles and amphibians. Annually, more than 120,000 visitors participate in fishing, non-motorized boating, hunting, hiking, walking/driving tours, as well as the services of an interpretive visitor center (US Department of the Interior, USFWS, November 1991; Blackwater NWR Internet Website, Accessed October 14, 1997).

Martin NWR (established December 20, 1954), encompassing about 1,840 hectares (4,548 acres), is situated amidst one of the largest feeding areas for waterfowl on the entire Chesapeake Bay. It consists of the main refuge on the northern portion of Smith Island and 50-hectare (125-acre) Watts Island, approximately 24 km (15 mi) south in the Bay's Virginia waters. Donated to the Martin NWR in 1995, Watts Island alone maintains one of the largest mixed species rookeries in Virginia. The Refuge is occupied by bald eagles, osprey, peregrine falcons, and waterbirds during their breeding seasons. Thousands of ducks, Canada geese, and tundra swans migrate to the refuge's salt marshes, creeks, and surrounding waters for the winter months. Although visitors are permitted on Smith Island, the refuge itself is closed to the public since it is situated on marshlands (Martin NWR Internet Website, Accessed October 14, 1997; US Department of the Interior, January 1996; Morris, October 15, 1997).

State Wildlife Management/Conservation Areas

In the Delaware portion of the CTR is the state-managed Nanticoke Wildlife Area. This area provides access to the Nanticoke River, a river that drains an ecologically diverse watershed. Recreational activities available at the facility include boating, public docking, and nature trails.

The Maryland Department of Natural Resources (MDNR) operates a total of 37 public wildlife facilities known as Wildlife Management Areas (WMAs), nine of which are located within the bounds of the CTR. The mission of WMAs is "to preserve, protect, and/or enhance wildlife species and their respective habitats." Additional programs include research; development and evaluation of management techniques; public hunting and fishing; and non-consumptive recreation (State of Maryland [LeCompte Wildlife Management Area pamphlet], undated). Table 3.3-1 identifies the NWRs and WMAs within the boundaries of the CTR, as well as the types of recreational activities available at each.

In the Virginia portion of the CTR, there is one conservation area established by the Virginia Department of Conservation and Recreation -- Bush Mill Stream Natural Area near Howland, Virginia. This 41-hectare (103-acre) resource is near a heron rookery and has scenic hiking trails and an observation deck.

State Parks

There are no Delaware state parks located within the CTR footprint. Maryland, however, maintains more than one dozen state parks in the Chesapeake Bay region alone. One such facility within the CTR is Point Lookout State Park, located in Scotland, Maryland at the confluence of the Potomac

Table 3.3-1

Wildlife Refuges and Management Areas in the CTR

Name	Location	Recreational Activities
National Wildlife Refuges[1]		
Blackwater	Cambridge	Fishing/boating; walking trails; bicycling; wildlife drive; nature study
Martin	Smith Is. (MD) Watts Is. (VA)	Closed to the public
Delaware Wildlife Areas		
Nanticoke	Seaford	Fishing; boating; nature trails
Maryland Wildlife Management Areas		
Cedar Island	Cedar Island	Crabbing; fishing; hunting; trapping; hiking; bird watching; nature photography
Deal Island	Dames Quarter	Crabbing; fishing; boating; hunting; trapping; bicycling; hiking; camping; bird watching; nature photography
Ellis Bay	Nanticoke	Crabbing; fishing; boating; hunting; trapping; bird watching; nature photography
The Elms	St. Mary's City	Crabbing; fishing; hiking; environmental education center
Fairmont	Rumbley	Crabbing; fishing; boating; hunting; trapping; bicycling; hiking; bird watching; nature photography
Fishing Bay	Dorchester Co.	Crabbing; fishing; boating; hunting; trapping; bird watching; nature photography
LeCompte	Vienna	Hunting; trapping; hiking; bird watching; and nature photography
South Marsh Island	South Marsh Is.	Crabbing; fishing; boating; hunting; trapping; bird watching; nature photography
Virginia Natural Areas		
Bush Mill Creek	Howland	Scenic trails with interpretive signs; observation deck; heron rookery

Notes: 1. No National Wildlife Refuges are located in the portions of Delaware underlying the CTR.

Sources:

US Department of the Interior, USFWS, November 1991.

Virginia Council on the Environment, 1989.

Maryland Department of Business and Economic Development and Maryland Department of Housing and Community Development, undated.

MDNR, undated.

Shrader, October 22, 1997.

River and the Chesapeake Bay. Established in 1964, the park contains nearly 423 hectares (1,046 acres).

During the Civil War, the grounds of the park were occupied by an army hospital and a prison camp for Confederate soldiers. Recreational activities include fishing, boating, camping, beach facilities, a Civil War museum, and various events sponsored by the Park's visitor center (State of Maryland [Point Lookout State Park informational leaflet], undated). Additional major Maryland state parks within the CTR footprint include:

- Calvert Cliffs State Park (vicinity of Bertha, Maryland);
- Janes Island State Park (Crisfield, Maryland); and
- St. Mary's River State Park (vicinity of Great Mills, Maryland).

Of the 31 state parks within the Commonwealth of Virginia, none are located within the boundaries of the CTR (Virginia Department of Conservation and Recreation, undated).

Local Parks

Many local parks are found within the boundaries of the CTR. One such facility is Flag Ponds Nature Park near Calvert Cliffs, Maryland, which offers fishing, hiking, and nature study. Within the footprint of the CTR are also historical parks, such as Pemberton Historical Park in Salisbury, Maryland, and St. Mary's City Historic Park in St. Mary's County, Maryland. The latter park, a 324-hectare (800-acre) outdoor living history museum and a National Historic Landmark depicting seventeenth century colonial culture, is a program of the Division of Historical and Cultural Programs in the Maryland Department of Housing and Community Development. Park highlights include walking and archaeological tours, costumed interpreters, and reconstructed exhibits illustrating both colonial farm and American Indian lifestyles (Maryland Department of Housing and Community Development, January 1997).

Recreational Facilities

Table 3.3-2 identifies select recreational facilities within the boundaries of the CTR.

Recreational Boating

Recreational boating is very popular in the Chesapeake Bay. Common types of vessels include personal watercraft (e.g., jet skis) and various sized sail, speed, fishing, or cigarette-type boats. All vessels owned by residents of Maryland and Virginia must be registered with the respective state. Boating is permitted in the aerial and surface firing range and other restricted areas when not in use

Table 3.3-2

Select Recreational Facilities in the CTR[1]

Facility	Location
Beaches	
Elms Beach	vicinity of St. Mary's City, MD
Kohk Island	vicinity of Smith Point, VA
Vir-Mar Beach	vicinity of Smith Point, VA
Harbors and Marinas	
Deal Island Harbor	Deal Island, MD
Webster's Cove Harbor	Mount Vernon, MD
Wenona Harbor	Wenona, MD
Federalsburg Marina Park	Federalsburg, MD
Calvert, Harbor Is., Spring Cove, Zahniser's	Solomons, MD
Somers Cove Marina	Crisfield, MD
Recreation Areas	
Cove Road Recreation Area	vicinity of Nanticoke, MD
Piney Point Recreation Area	Piney Point, MD
Raccoon Point Recreation Area	vicinity of Fairmount, MD
St. Inigoes Recreation Area	vicinity of St. Inigoes, MD
Tyaskin Recreation Area	Tyaskin, MD

Note:

1. This table is not intended to be a comprehensive list of all public recreational facilities within the CTR.

Sources:

Virginia Council on the Environment, 1989.

Maryland Department of Business and Economic Development and Maryland Department of Housing and Community Development, undated.

for training exercises (but never in the prohibited zones). Prior to commencing any exercises involving the firing or dropping of inert (nonexplosive) ordnance, the Navy conducts a series of range clearance procedures to evacuate the area (see Subchapter 3.14 for a detailed description of these procedures).

Dozens of harbors, marinas, landings, and boat ramps are scattered throughout the region (Virginia Council on the Environment, 1989). Several examples of such facilities and their locations in the CTR are:

- Solomons Island (Calvert County, Maryland);
- Deal Island, Webster's Cove, and Wenona harbors (Somerset County, Maryland);
- Somers Cove Marina (Somerset County, Maryland);
- Cranes Creek and Glebe Point landings (Northumberland County, Virginia); and
- McCready Cove, Muddy Hook Cove, and New Bridge boat ramps (Dorchester County, Maryland).

3.3.2.2 NAS Patuxent River

NAS Patuxent River contains more than 1,500 hectares (3,700 acres) identified as dedicated primary use recreation areas, administered through both the air station's Natural Resources Office (Public Works Department) and the Morale, Welfare, and Recreation Department. Activities offered at these areas include fishing, boating, hunting, trapping, bicycling, hiking, camping, and picnicking. The air station also has a golf course, ball fields, tennis courts, lawns, parks, and a marina.

Freshwater fishing is authorized for military, federal civilian employees, and their guests in five of NAS Patuxent River's six freshwater ponds (Gardiner, Sewall, Holton, Calvert, and Sacawaxhit). The sixth pond (Richneck Pond) is currently a brood pond. Saltwater fishing, shellfishing, and crabbing occur in Goose, Harper, and Pearson creeks, Pine Hill Run, as well as along the 11.2 km (seven mi) of shoreline on the Chesapeake Bay and the Patuxent River. A fishing pier is located in the Bay near the mouth of Goose Creek.

More than 1,000 hectares (2,500 acres) on the air station are open for hunting. Approximately 300 hunting permits are issued annually. Both a state license and a NAS Patuxent River permit are required prior to fishing or hunting. Species hunted include deer, dove, gray squirrel, quail, rails, snipe, rabbit, raccoon, waterfowl, and woodcock. Those animals allowed to be trapped include beaver, fox, mink, muskrat, opossum, raccoon, and skunk.

Non-motorized boating opportunities, consisting of the use of access ramps and rental equipment (canoes, paddle boats, row boats, and sail boats), are available at both the Harper Creek Recreation Area and the West Basin Area. Additionally, such boating may occur in Goose and Pearson creeks, as well as Gardiner, Holton, Sacawaxhit, and Sewall ponds. A marina located near the West Basin is available for use by both non-motorized and motorized boats.

Bicycling is limited to air station roads since few bike paths exist. A 0.4-km (0.25-mi) hiking trail in the Paradise Grove area along Harper Creek overlooks the confluence of the Patuxent River and the Chesapeake Bay. Firewood cutting is allowed, with a permit, year-round in designated areas.

Motorized boating is permitted on all air station tidal waters (except ponds), creeks (Goose, Harper, and Pearson), the Patuxent River, and the Chesapeake Bay. Water skiing, however, is allowed only in the Patuxent River or the Bay. Cedar Point Beach, extending 457 m (1,500 ft), is the only beach at NAS Patuxent River where swimming in the Chesapeake Bay is allowed.

Camping opportunities (with both trailer and tent sites) are available at Goose Creek and the West Basin Area. While a summer day camp for children is situated adjacent to Sewall Pond, a Boy Scout camp occupies the northeast bank of Gardiner Pond. Picnic facilities, which may consist of tables, grills, and playground equipment, are located at the Harper Creek Beach House, Cedar Point Beach, Marina Pavilion, Mattapany Rod and Gun Club near Holton Pond, and Paradise Grove.

A 3.9-km (2.4-mi) fitness trail with 20 stations is located along Tate Road. In addition, there are informal running routes of various distances around the base that depart from/return to the gymnasium. Target shooting facilities are housed in the Skeet and Trap Club, also on Tate Road.

The Environmental Education Center sponsors various nature study, outdoor education, and interpretative activities. The Center itself houses a large classroom, as well as numerous exhibits and displays ranging from terrariums and live reptiles to more than 50 mounts of local wildlife species. Programming highlights include field trips, films, lectures, safety courses, and community outreach ventures (Draft INRMP, Undated).

3.3.2.3 OLF Webster Field

Although access to the recreational activities at Webster Field is more limited than at NAS Patuxent River, the facilities share many of the same types of recreation. Available opportunities include crabbing, fishing, boating, hunting, trapping, bicycling, hiking, and picnicking. While about 288 hectares (710 acres) of property are designated for hunting, about five km (three mi) of shore and 4.5 hectares (11 acres) of water are available for fishing. Additionally, a state license and a permit issued by Webster Field are necessary to either hunt or fish. Freshwater fishing is authorized for military, federal civilian employees, and their guests in both of Webster Field's ponds (one is natural, one is manmade). Saltwater fishing opportunities include Molls Cove, St. Inigoes Creek, St. Mary's River, and the Potomac River. Crabbing is allowed from one of Webster Field's piers.

Non-motorized boating is permitted at Langley Hollow and Fort Point Cove, and ramp access is also provided near the US Coast Guard facility. Motorized boating, however, is permitted only along the shore (such as at Molls Cove, St. Inigoes Creek, or the Potomac and St. Mary's rivers).

Personnel use the southwest portion of Perimeter Road for walking and jogging. Picnic tables are scattered throughout the Webster Field property, with a grill facility located at Priest's Point (Draft INRMP, Undated).

3.3.2.4 Localized Target Areas

Although there are no recreational facilities available at the targets, fishing and boating are permitted in the Chesapeake Bay, the aerial and surface firing range, and other restricted areas and danger zones when not in use (but outside the established boundaries of the prohibited areas).

Transportation Routes

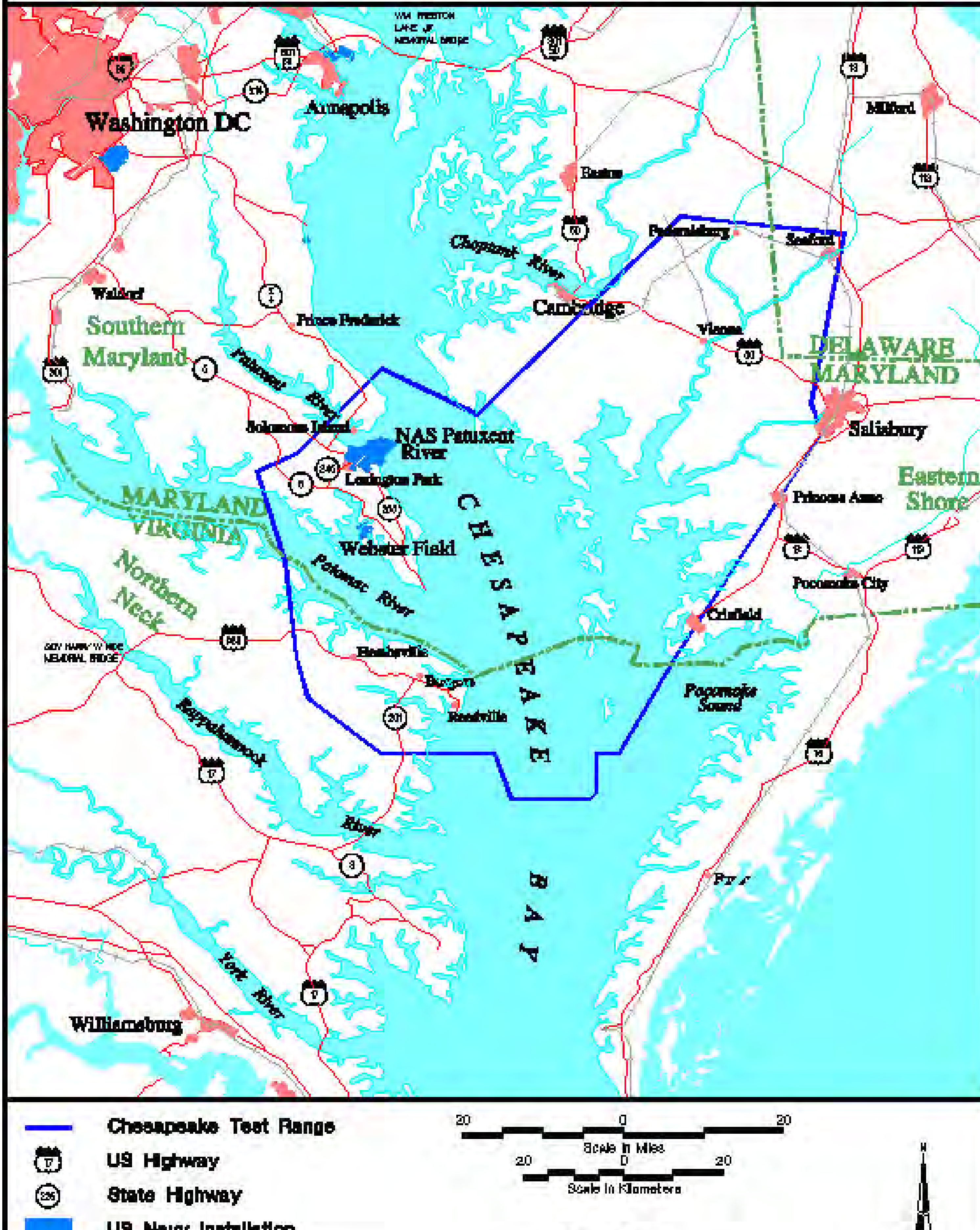


Figure 3.4-1

3.4 Transportation

3.4.1 Vehicular Network

3.4.1.1 Chesapeake Test Range

The existing regional roadway network in the Chesapeake Bay region is shown in Figure 3.4-1 (Transportation Routes). Major highways are US 50, US 301, US 13, MD 5, MD 2/4, and MD 235. US Route 50, which joins US Route 301 between Washington, DC and Annapolis, Maryland, is a major east-west regional highway linking I-495 (the Washington Beltway) with the Eastern Shore. The highway terminates at Ocean City, Maryland. Route 50/301 crosses the Chesapeake Bay at the William Preston Lane, Jr. Memorial Bridge, or Bay Bridge. Vehicles headed east-bound only must pay a toll upon crossing the bridge. US Route 13 traverses the Delmarva Peninsula.

On the west side of the Chesapeake Bay, the major north-south highway is US 301, which connects Baltimore, Maryland to Richmond, Virginia, parallels I-95, and provides access to the Northern Neck of Virginia. It is also known as the Blue Star Memorial Highway and the Crain Highway. US 301 crosses the Potomac River south of La Plata, Maryland, via the Governor Harry W. Nice Memorial Bridge, a two-lane toll bridge. US 301 intersects with US 17 and Virginia Route 3 in the Northern Neck. Virginia Route 3, extending northwest to southeast, serves as the main route for much of the length of the peninsula. US Route 360, coming from Richmond, Virginia is the main east-west route, intersecting Route 3 at Warsaw. On the eastern end of the peninsula, Virginia Routes 200 and 201, also intersecting US Route 360, provide north-south access.

Routes on the western shore of the Chesapeake Bay in Southern Maryland include MD 5, which follows US 301 until reaching Waldorf, Maryland, where it becomes four-lane Leonardtown Road. Southeast of New Market, Maryland, MD 5 turns southeast and is known as Point Lookout Road. At that fork, Three Notch Road (MD 235) continues southeast to Lexington Park and Point Lookout. Additionally, MD 2/4 (Solomons Island Road) extends southeast and then west, connecting with MD 5 in Leonardtown, Maryland.

The primary north-south transportation route on the Eastern Shore is four-lane US 13, also known as Dupont Highway South in Delaware and Ocean Highway in Maryland. This highway connects Norfolk, Virginia with Wilmington, Delaware via the Chesapeake Bay Bridge-Tunnel. Communities along the eastern shoreline of the Chesapeake Bay are reached via US 13 and smaller two-lane connectors.

3.4.1.2 NAS Patuxent River

Primary access to NAS Patuxent River, located approximately 95 km (60 mi) southeast of Washington, DC, is via MD 235, a four-lane, north-south route also known as Three Notch Road. This highway creates the western boundary of NAS Patuxent River in Lexington Park and parallels MD 5. In recent years, traffic congestion has occurred along MD 235 in the Lexington Park area during the early morning and afternoon rush hours as a result of the increased post-BRAC employment base at NAS Patuxent River. In response to this traffic situation, the Maryland Highway Administration has strengthen the shoulders of MD 235 for use as additional travel lanes and are finalizing plans to widen MD 235.

Other major transportation routes in the vicinity of NAS Patuxent River include MD 246, which connects MD 5 and MD 235 between Great Mills and Lexington Park. Numerous other state routes and county roads interconnect to serve the remainder of St. Mary's County.

3.4.1.3 OLF Webster Field

Webster Field, located in St. Inigoes, Maryland, is approximately 13 km (seven mi) south of NAS Patuxent River. Primary access to Webster Field is via MD 5 (Point Lookout Road) through Leonardtown and St. Mary's City. Situated off Beachville Road, Webster Field is positioned along the banks of the St. Mary's River. Southbound MD 235 provides an alternate route through the Lexington Park area until its intersection with MD 5 in Ridge, Maryland. At this junction, MD 5 South leads to Point Lookout, while northbound traffic connects with Beachville Road south of St. Mary's City.

3.4.1.4 Localized Target Areas

There are no vehicular transportation routes on the target areas. The neighboring island communities of Smith and Tangier are dependent on ferries for access to the mainland from locations along the Maryland's Eastern Shore and on the Northern Neck of Virginia. Ferries depart Monday through Saturday in season from Reedville, Virginia, and Crisfield, Maryland, to both Smith and Tangier islands. Additionally, Tangier Island is serviced by a route via Onancock, Virginia. Ferry routes avoid entering the boundaries of the prohibited and restricted areas surrounding the targets.

Shipping Lanes in the Chesapeake Bay

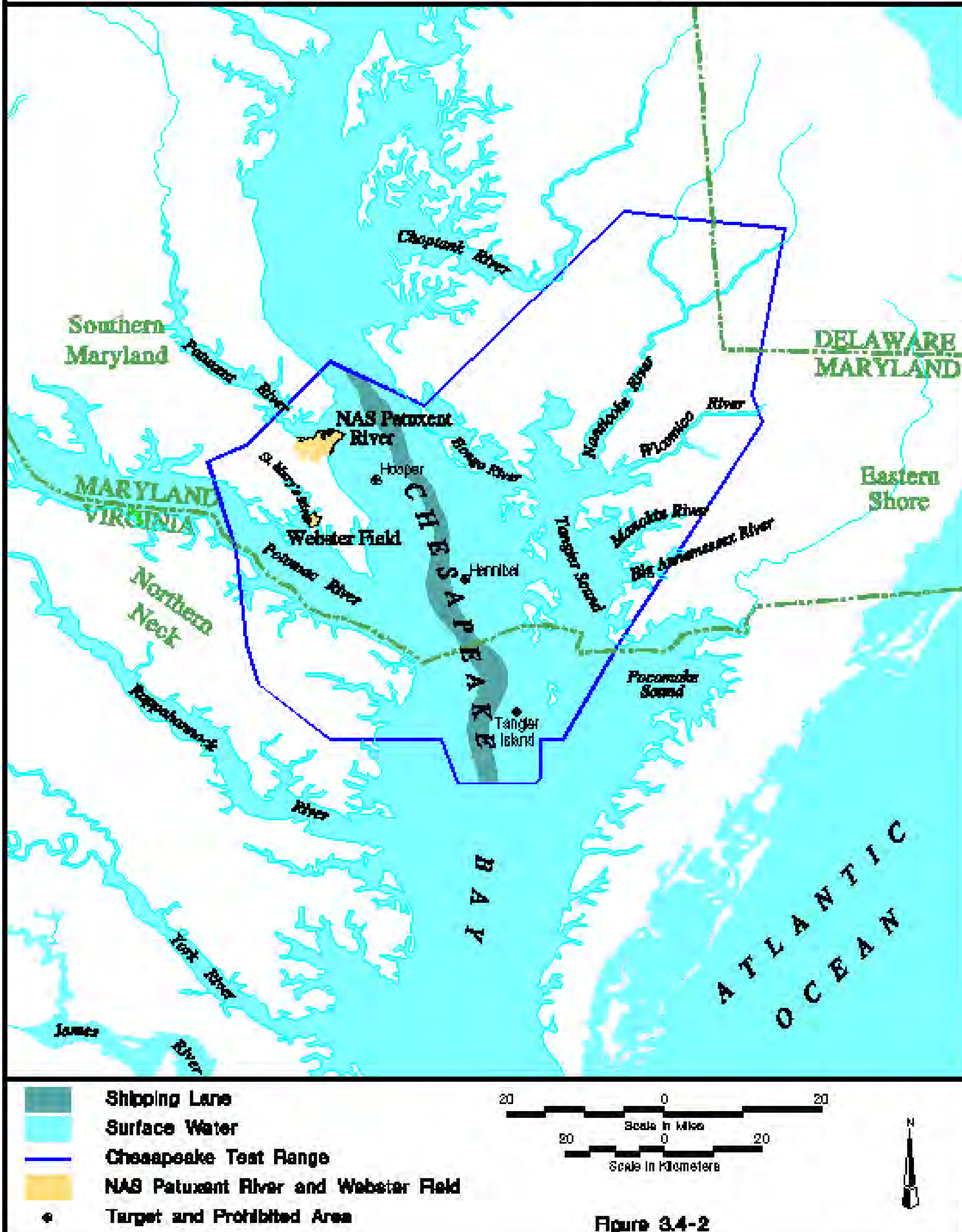


Figure 3.4-2

3.4.2 Commercial Shipping

3.4.2.1 Chesapeake Test Range

The Chesapeake Bay has two outlets into the Atlantic Ocean: north through the Chesapeake and Delaware (C & D) Canal through Delaware Bay and south between Capes Henry and Charles in Virginia directly to the ocean. Commercial vessels traverse the troughs of the deepest waters of the Chesapeake Bay, which span the length of its center at depths of 15 m (50 ft) or greater (Figure 3.4-2, Shipping Lanes in the Chesapeake Bay). Commercial shipping traffic arriving and departing the Port of Baltimore via the Chesapeake Bay averages approximately ten ships per day or about 3,600 vessels per year. According to statistics provided by the Maryland Pilot's Association, 99 percent of these vessels are foreign ships (Bourgeois, September 5, 1997). The types of vessels traversing the Bay include cargo ships, tankers, cargo and tanker barges, and tug boats (US Army Corps of Engineers, 1997).

3.4.2.2 Localized Target Areas

Each of the target areas in the Bay is surrounded by a prohibited area of 915 m (1,000 yards) in radius. According to 33 CFR 334.200b(3), these prohibited areas are delineated on navigation charts and vessels are prohibited from entering these areas at all times unless authorized to do so by NAS Patuxent River. In addition, Hooper and Hannibal targets and their prohibited areas are surrounded by the aerial and surface firing range (shown in Figure 2-1). The aerial and surface firing range is open to navigation except during Navy exercises.

Similarly, the prohibited area at Tangier Island target is surrounded by a restricted danger zone that may be closed to navigation during Navy exercises. This target and/or the danger zone is presently not utilized on a frequent basis due to the target's distance from NAS Patuxent River and the associated costs of sending and stationing a range clearance boat at the target during its use.

On average, the targets are cleared for about 12 operations per month and the duration of each closure averages two to three hours (Graham, January 1998). About 75 percent of these operations occur at or around Hooper target and the remaining 25 percent occur at or around Hannibal target. Furthermore, about 85 percent of those operations at Hooper target occur within the bounds of the prohibited area (Draft IMP, March 1997).

The targets are well-removed from the commercial shipping lanes, about 4.8 km (2.6 nm) for Hooper target, 4.1 km (2.2 nm) for Hannibal target, and 10.6 km (5.7 nm) for the Tangier Island target. The targets are also located in relatively shallow waters -- depths of 11 m (38 ft), 5.1 m (17 ft), 3.6 m (12 ft) for Hooper, Hannibal, and Tangier Island targets, respectively. The aerial and surface firing range overlies the main shipping channel. While larger commercial vessels cannot sail near the targets, smaller vessels such as fishing boats, tugboats, and recreational craft are able to maneuver up to the limits of the prohibited areas and within most of the restricted area comprising the aerial and surface firing range.

Target areas are cleared prior to use. Specific procedures depend on the ntype of testing and the season of the year, and include visual sweeps of the area using surface craft, chase aircraft, and/or radar sweeps. Recreational boaters, fishermen, or watermen are requested to exit the restricted areas via radio transmission, written signs, hand signals, or other appropriate methods. Helicopters equipped with loudspeakers are sometimes used. As an additional safety measure, the test pilot flies over a target to perform a visual check to make sure the target is clear prior to release. Range safety personnel at NAS Patuxent River report that commercial fishermen and recreational boaters are cooperative with range clearance procedures (Graham, November 1997).

If the Navy will be, or soon will be, initiating an exercise, commercial vessels traversing the aerial and surface firing range, when in "established steamer lanes," are not required to halt and wait for the exercise to be completed. Instead, they are to "proceed on their normal course through the area with all practicable speed" as noted in 33 CFR 334.210(6). The Navy may also contact commercial vessels to advise them of an imminent exercise.

3.4.3 Commercial and General Aviation in the CTR

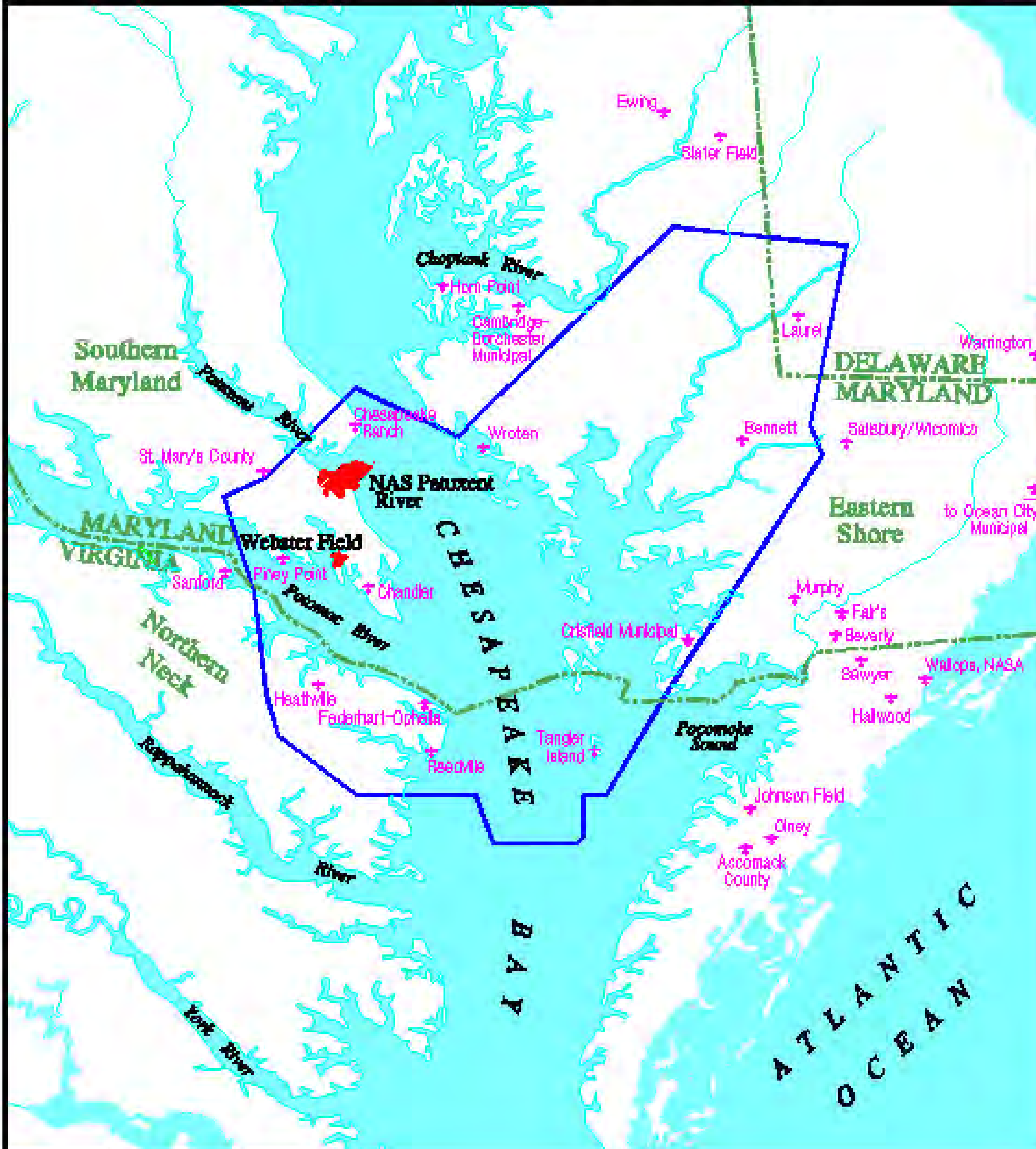
The area included in the CTR is served by a number of commercial/general aviation airports. During the hours that the Navy activates the special use airspace of the CTR (normally from 7:00 am to 11:00 pm), NAS Patuxent River Air Operations Division (hereinafter Air Operations) provides radar air traffic control services for both military and civilian operations occurring there, as defined by a letter of agreement with the FAA.

Air Operations also provides approach control services to NAS Patuxent River, Webster Field, and the 29 local civil airports located within and in the vicinity of the CTR. These airports are listed in Table 3.4-1 and shown in Figure 3.4-3 (Airports Within the CTR Vicinity). Most of the 29 airports in this region are for commercial use and privately-owned. As identified in the table, only nine of the 29 airports are open to the public and owned by county or local governments. The Wallops Flight Facility Airport on Wallops Island, Virginia, is owned by NASA and used extensively for research, development, and testing. Importantly, the level of commercial air traffic using St. Mary's County Airport is scheduled to increase in 1999.

In addition to providing air traffic control service, Air Operations at NAS Patuxent River provides traffic advisory service to aircraft operating in the CTR, including but not limited to:

- Traffic advisories to aircraft operating within restricted airspace;

Airports Within the CTR Vicinity



Airport Location

Chesapeake Test Range (CTR)

NAS Patuxent River and Webster Field

State Boundary

Figure 3.4-3

Table 3.4-1

Airports Within the CTR Vicinity

Airport	Type/Access	City/County
Accomack County	General Aviation/Public	Melfa, VA
Bennet	General Aviation/Public	Hebron, MD
Beverly	Commercial/Private	Pocomoke City, MD
Cambridge-Dorchester Municipal	General Aviation/Public	Cambridge, MD
Chandler	Commercial/Private	Ridge, MD
Chesapeake Ranch	Commercial/Private	Lusby, MD
Crisfield Municipal	General Aviation/Public	Crisfield, MD
Ewing	Commercial/Private	Easton, MD
Fair's	Commercial/Private	Pocomoke City, MD
Federhart-Ophelia	Commercial/Private	Reedville, VA
Hallwood	Commercial/Private	Hallwood, VA
Heathville	Commercial/Private	Heathville, MD
Horn Point	Commercial/Private	Cambridge, MD
Johnson Field	Commercial/Private	Onancock, VA
Laurel	General Aviation/Public	Laurel, DE
Murphy	Commercial/Private	Pocomoke City, MD
Ocean City Municipal	General Aviation/Public	Ocean City, MD
Onley	Commercial/Private	Onley, VA
Piney Point	Commercial/Private	Piney Point, MD
Reedville	Commercial/Private	Reedville, VA
St. Mary's County	General Aviation/Public	Hollywood, MD
Salisbury/Wicomico	General Aviation/Public	Salisbury, MD
Sanford	Commercial/Private	Coles Point, VA
Sawyer	Commercial/Private	New Church, VA
Slater Field	Commercial/Private	Federalsburg, MD
Tangier Island	General Aviation/Public	Tangier, VA
Wallops, NASA	General Aviation/Private	Wallops Island, VA
Warrington	Commercial/Private	Selbyville, DE
Wroten	Commercial/Private	Fishing Creek, MD

- Instrument flight rules (IFR) services to aircraft operating within restricted airspace; and

- Exclusive-use airspace monitoring and containment for participating aircraft.

Other entities with air traffic control responsibilities close to the CTR include the FAA's Washington Air Route Traffic Control Center, the Navy's Fleet Area Control and Surveillance Facility, Virginia Capes (FACSFAC VACAPES); Norfolk Approach Control; Dover Radar Approach Control; Richmond Approach Control; Washington Approach Control; and Baltimore Approach Control.

Military air operations in the CTR peak during mid-morning and mid-afternoon periods, with approximately 97 percent of the operations occurring between 7:00 am and 10:00 pm. Occasionally, special operations may also be scheduled for late nights. Generally, after 11:00 pm the airspace is not required for Navy activities, and control reverts to the FAA.

3.5 Air Quality

This subchapter provides an overview of the regulatory framework governing air quality. Specifically, Subchapters 3.5.1 and 3.5.2 describe air quality regulations and conditions that are pertinent to the entire Patuxent River Complex, including the CTR, NAS Patuxent River, Webster Field, and the target areas. Subchapters 3.5.4.3, 3.5.4.4, and 3.5.4.5 focus on air emissions from NAS Patuxent River, Webster Field, and the targets. Subchapter 3.5.4.6 provides a summary of total air emissions levels in the complex.

3.5.1 National Ambient Air Quality Standards

The US Environmental Protection Agency (USEPA), under the requirements of the 1970 Clean Air Act (CAA) as amended in 1977 and 1990, has established National Ambient Air Quality Standards (NAAQS) for six contaminants, referred to as criteria pollutants (40 CFR 50). These are: carbon monoxide, nitrogen dioxide, ozone, particulate matter, lead, and sulfur dioxide.

- **Carbon monoxide (CO)** is a colorless, odorless gas. The major source of CO is the incomplete combustion of fuels used to power vehicles, heat buildings, process raw materials; the burning of refuse is another source. Carbon monoxide is a site-specific pollutant; major concentrations are found near the source, such as at heavily-congested intersections. Carbon monoxide is the most commonly-occurring air pollutant. The health effect associated with CO-contaminated air is reduced transport of oxygen by the bloodstream, a consequence of CO displacing oxygen in hemoglobin. Exposures to very high levels of CO are lethal and exposures to high levels for a short duration can cause headaches, drowsiness, or loss of equilibrium.

- **Nitrogen dioxide (NO_2)** is a yellowish-brown, highly reactive gas that is present in urban environments. The major source of nitric oxide and nitrogen oxide emissions is fuel combustion in boilers associated with electric utilities and industrial facilities. Nitric oxides react in the atmosphere to form nitrogen dioxide. Nitrogen oxides cause irritation of the lungs, bronchitis, and pneumonia, as well as lowered resistance to respiratory infections.

- **Ozone (O_3)** is a photochemical oxidant and a major constituent of smog. Hydrocarbons and nitrogen oxides are precursor pollutants to the formation of ozone. Hydrocarbons and nitrogen oxides react in the presence of sunlight to form ozone. This reaction is time-dependent and usually takes place far downwind from the site where the contaminants were originally emitted. Thus, hydrocarbons and nitrogen oxides are reactive contaminants whose impact generally occurs well beyond the areas immediate to the source. High concentrations of ozone are a major health and environmental concern. For example, ozone is a principal cause of lung and eye irritation in urban environments.

- **Particulate matter** in an urban environment typically occurs as a result of incomplete fuel combustion. Particulate matter includes dust, dirt, soot, smoke, and liquid droplets directly emitted into the air by sources such as factories, power plants, cars, construction activity, and fires. Diesel fuel contributes more particulates to the atmosphere than does gasoline. An inhalable particulate is defined as a particulate that is less than ten microns (PM10) in diameter. The major health effect caused by the inhalation of PM10 is damage to the respiratory organs.

- **Lead (Pb)** is a bluish-gray metal, usually found in small quantities within the earth's crust. The most significant contributors of lead emissions to the atmosphere are gasoline additives, iron and steel production, and alkyl lead manufacturing. Other sources of lead include combustion of solid waste and windblown dust from weathering of lead-based paint. The use of lead-free gasoline has considerably reduced lead levels in the urban environment. Exposure to lead is dangerous for the fetus and results in pre-term birth. Other health effects are decreased intelligence quotient (IQ) for infants and small children, increased blood pressure in middle-aged men, and brain and kidney damage in adults and children.

- **Sulfur dioxide (SO_2)** is emitted into the atmosphere from the combustion of sulfur-bearing fuels for space heating and motor vehicles. The use of low sulfur fuels for space heating has reduced the amount of sulfur dioxide emitted from these sources. Industrial sources are the major contributors of the total sulfur dioxides emitted with the combustion of gasoline and diesel fuels in motor vehicles accounting for a very small percentage. Respiratory illness and damage to the respiratory tract are the health effects associated with inhalation of sulfur dioxide emissions.

The NAAQS include primary and secondary standards. The primary standards were established at levels to protect public health with an adequate margin of safety. The secondary standards were established to protect the public welfare from the adverse effects associated with pollutants in the ambient air. These standards are presented in Table 3.5-1.

The CAA requires that the USEPA review scientific data every five years to ensure that the NAAQS effectively protect the public health. The USEPA has recently enacted a more stringent standard for ozone, which became effective on September 16, 1997. The final standard has been updated from 0.12 parts per million (ppm) of ozone measured over one hour to a standard of 0.08 ppm measured over eight hours. The average fourth-highest concentration over a three-year period determines whether an area is in compliance. Following the promulgation of this revised NAAQS, the CAA provides up to three years for state governors to recommend, and the USEPA to designate, areas according to their most recent air quality data. In addition, states will have up to three years from

Table 3.5-1

Ambient Air Quality Standards

Pollutant and Averaging Time	Primary Standard[1]	Secondary Standard[1]
National and Delaware, Maryland, and Virginia Basic Standards		
Carbon Monoxide		
8-Hour Maximum	10,000[2]	10,000
1-Hour Maximum	40,000[2]	40,000
Nitrogen Dioxide		
Annual Arithmetic Mean	100	100
Ozone		
1-Hour Maximum	0.12 ppm[3]	0.12 ppm[3]
8-Hour Maximum	0.08 ppm[4]	0.08 ppm[4]
Particulate Matter[8]		
PM10		50
Annual Arithmetic Mean	50	150
24-Hour Maximum	150[5]	
PM2.5		
Annual Arithmetic Mean	15	15
24-Hour Maximum	65[6]	65
Lead		
Quarterly Arithmetic Mean	1.5[7]	1.5[7]
Sulfur Dioxide		
Annual Arithmetic Mean	80	---
24-Hour Maximum	365[1]	---
3-Hour Maximum	---	1300[2]
Additional Delaware Standards		
Hydrocarbons	--	160
Hydrogen Sulfide		
1-Hour Maximum	0.06 ppm	0.06 ppm
3-Minute Maximum	0.03 ppm	0.03 ppm
Additional Virginia Standards		
Particulate Matter (TSP)[9]		
Annual Geometric Mean	75	60
24-Hour Maximum	260	150

Notes:
1. All concentrations in micrograms per cubic meter of air (µg/m^3) or parts per million (ppm), where noted.
2. Not to be exceeded during any calendar year (yr).
3. Expected number of exceedences shall not be more than once per year (3-yr average).
4. Standard attained when 3-yr average of annual 4th-highest daily maximum 8-hour concentration is below 0.08 ppm.
5. Standard attained when annual highest 99th percentile of 24-hour concentrations over 3 yrs is below 150 µg/m^3.
6. Standard attained when the annual highest 99th percentile of 24-hour concentration over 3 yrs is below 65 µg/m^3.
7. The quarterly lead standard is not to be exceeded during any calendar quarter.
8. PM10 - particulate matter diameter of 10 microns or less; PM2.5 - particulate matter diameter of 2.5 microns or less.
9. Standard for TSP (total suspended particulate matter) is established by VDEQ.

Sources: 40 CFR 50, Title 7, Delaware Code, Chapter 60; Maryland COMAR 26.1104; and 9 VAC 5-30-10.

designation to develop and submit State Implementation Plans (SIPs) to provide for attainment of the new standard. Therefore, the proposed action's impact on the new ozone standard cannot be determined until these preliminary steps are completed.

Additionally, a new standard for particulate matter was issued on July 18, 1997 by the USEPA. The standard for PM10 remains essentially unchanged, while the new standard for fine particles (PM2.5: diameter # 2.5 micrometers) is now set at an annual average limit of 15 micrograms per cubic meter (Fg/m^3), with a 24-hour limit of 65 Fg/m^3. Because this new standard would regulate fine particulates for the first time, the USEPA will allow five years to build a nationwide monitoring network and to collect and analyze the data needed to designate areas and develop implementation plans. Therefore, this standard cannot yet be implemented.

The Delaware Department of Environment (DDE) has adopted the USEPA's NAAQS for the six criteria pollutants. Besides these contaminants, the DDE has also established criteria for hydrocarbons and hydrogen sulfide. Therefore, the Delaware ambient air quality standards include all of the NAAQS, plus a standard for hydrocarbons and hydrogen sulfide. These standards are presented in Table 3.5-1.

The Maryland Department of Environment (MDE) has adopted the USEPA's NAAQS, without any exceptions. These standards are shown in Table 3.5-1.

The Virginia Department of Environmental Quality (VDEQ) has adopted the USEPA's NAAQS (codified as 9 VAC 5-30-10) with one exception. When the USEPA amended the standard for particulate matter, changing the regulated pollutant from total suspended particulate matter (TSP) to PM10, the VDEQ adopted the PM10 standard and maintained the TSP standard as well. Therefore, the Virginia ambient air quality standards include all of the NAAQS, plus a standard for TSP. These standards are also presented in Table 3.5-1.

3.5.2 Ambient Air Quality Standard Attainment Status

Areas that meet the NAAQS standard for a criteria pollutant are designated as "attainment." Areas where the criteria pollutant level exceeds the NAAQS are designated as "nonattainment." Nonattainment areas are subcategorized based on the severity of their pollution problem (marginal, moderate, serious, severe, and extreme). When insufficient data exist to determine an area's attainment status, it is considered in attainment (and may be designated unclassifiable). Attainment status in the study area can be summarized as follows:

- **CTR -** The boundaries of the restricted airspace of the CTR were previously shown in Figure 2-1. All the counties lying within the footprint of the CTR, except Calvert County in Maryland and Sussex County in Delaware, are classified as attainment or

Nonattainment Areas Within the Chesapeake Test Range

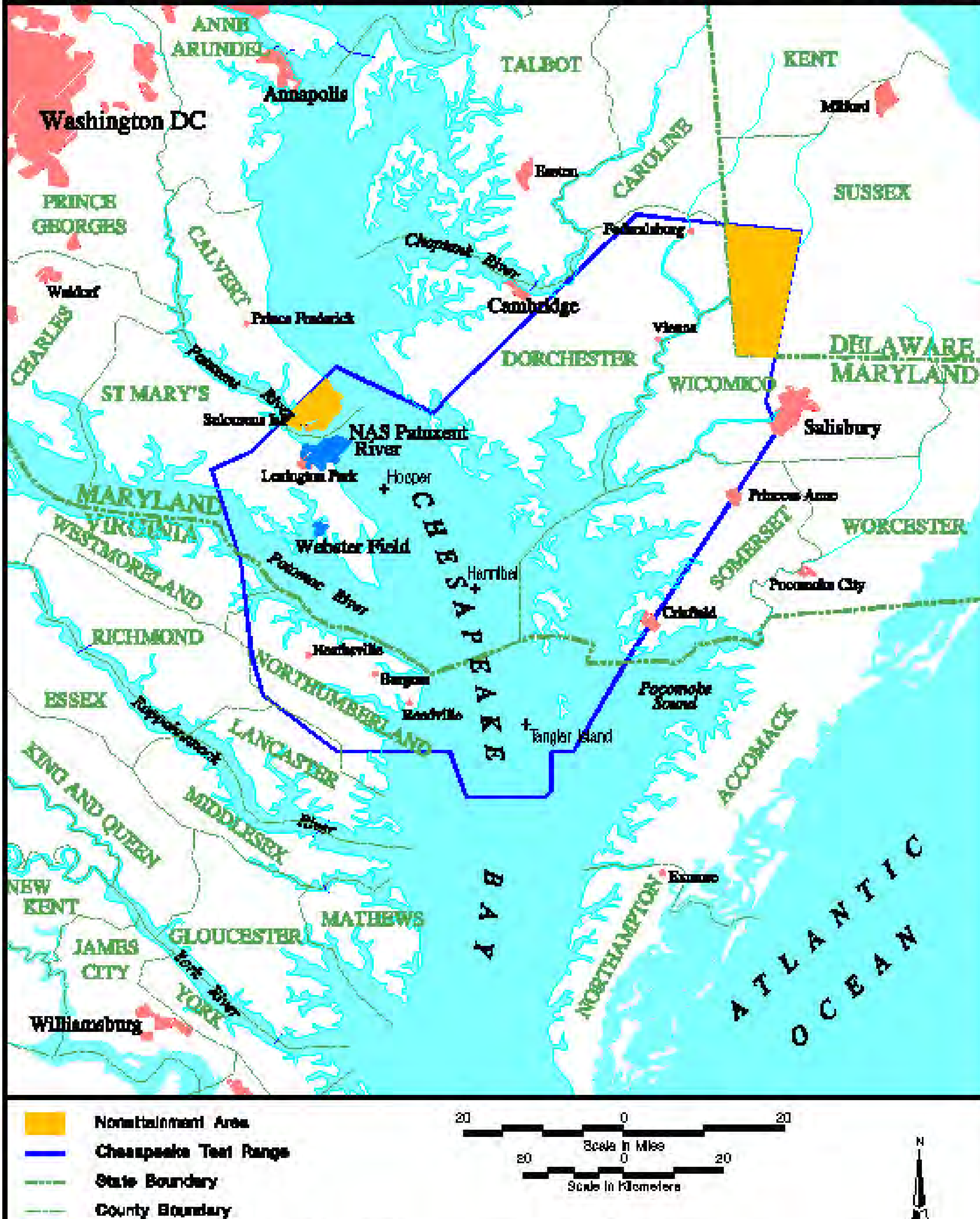


Figure 3.5-1

unclassifiable/attainment for all six criteria pollutants. For ozone, Calvert County is classified as serious nonattainment and Sussex County is designated as marginal nonattainment (Figure 3.5-1, Nonattainment Areas within the Chesapeake Test Range).

- **NAS Patuxent River** - NAS Patuxent River is located adjacent to Lexington Park in St. Mary's County, Maryland, which is classified as attainment or unclassifiable/attainment for all six criteria pollutants.

- **Webster Field** - Webster Field at St. Inigoes, Maryland is also in St. Mary's County, Maryland, which is classified as attainment or unclassifiable/attainment for all the six criteria pollutants.

- **Localized Target Areas** - The exclusive-use target areas within the CTR include the Hooper, Hannibal, and Tangier Island target areas. These target areas are located in areas classified as unclassifiable/attainment for all six criteria pollutants.

3.5.3 General Conformity

The Clean Air Act Amendments (CAAA) of 1990 expand the scope and content of the CAA's conformity provisions by providing a more specific definition of conformity. As stipulated in CAAA Section 176(c), conformity is defined as "conformity to the State Implementation Program's (SIP) purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards." Conformity further requires that such activities will not:

(1) Cause or contribute to any new violations of any standards in any area;

(2) Increase the frequency or severity of any existing violation of any standards in any area; or

(3) Delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

The USEPA published final rules on general conformity that apply to federal actions in areas designated nonattainment for any of the criteria pollutants under the CAA (40 CFR Parts 51 and 93) in the November 30, 1993 *Federal Register*. The rules provide specific de minimis (insignificant) emission levels by pollutant to determine the applicability of general conformity requirements for a proposed action. In other words, from a regulatory perspective, an analysis of construction and operational period emissions related to the proposed action is conducted to see if the de minimis emission levels are exceeded. If levels are determined to be below de minimis, no further analyses are necessary and a Record of Non-Applicability (RONA) is prepared. If de minimis levels are exceeded, a more detailed general conformity analysis is required.

Since ozone is principally formed from nitrogen oxides (NO_x) and volatile organic compounds (VOCs) through a series of complex chemical reactions in the atmosphere, for those nonattainment areas in which the NAS Patuxent River Complex aircraft operations would occur, the following de minimis criteria would apply:

- 91 metric tons (100 tons) per year of VOCs or NO_x for Sussex County, Delaware, a marginal ozone nonattainment area;

- 45 metric tons (50 tons) per year of VOCs or NO_x for Calvert County, Maryland, a serious ozone nonattainment area.

Because pollutants emitted above a 915-m (3,000-ft) mixing zone altitude would be carried away by wind currents and would not mix with or impact the ground level air quality (USEPA, 1992), only pollutants emitted from activities occurring below 915 m (3,000 ft) are considered in a conformity determination. In Sussex County, Delaware, the sole source of emissions related to the proposed action would be aircraft operating at flight altitudes above 915 m (3,000 ft); therefore, a conformity analysis for this nonattainment area is not necessary. In the nonattainment area of Calvert County, Maryland, some aircraft flight operations within R-4007A would be below 915 m (3,000 ft) and would, therefore, be subject to conformity applicability determination.

Based on the general conformity rule, any direct and indirect emissions resulting from the proposed federal action within nonattainment areas must be included in the general conformity applicability analysis. The emission sources include area, mobile, and stationary sources as well as construction activities. However, any stationary source subject to a new source review program is presumed to conform to the SIP and is not included in the analysis.

Mobile and stationary source emissions changes would result from the proposed changes in aircraft operations. Comparison of these emissions changes to both the applicable de minimis levels and SIP emissions target levels is, therefore, necessary. If implementation of the project results in an exceedance of the threshold values for either VOCs or NO_x, a formal conformity determination is required.

For conformity purposes, the SIP applicable to the Calvert nonattainment area is the *Final State Implementation Plan Revision, Phase I Attainment Plan* (Metropolitan Washington Council of Governments, October 1997). This SIP targets the reduction of VOCs and NO_x in order to achieve attainment of the ozone NAAQS in the whole region.

3.5.4 NAS Patuxent River

3.5.4.1 Aircraft

Operational records for 1996 for the Patuxent River Complex show that:

- There are about 60 types of aircraft stationed at NAS Patuxent River;
- About 18,200 flight hours per year occur in the Patuxent River Complex; and
- Pattern flight operations account for about 4,100 of these annual flight hours.

Aircraft emit the following NAAQS criteria pollutants: VOCs, NO_x, CO, SO_2, and PM10. Aircraft emissions based on 1996 operations data were determined pursuant to the methodology set forth in *Procedures of Emission Inventory Preparation Volume IV: Mobile Sources* (USEPA, 1992), in combination with the emission factors and recommendations provided by the Navy Aircraft Environmental Support Office (AESO) (Coffer, 1997). Presented in detail in Appendix E are emissions calculations that incorporate time-in-mode for military aircraft, aircraft engine/mode combinations, aircraft operations, and aircraft engine emission factors. Aircraft operation data detailing the number of annual aircraft operations per aircraft at NAS Patuxent River were obtained from an analysis prepared by Eagan, McAllister Associates, Inc. (January 1998), which is included in the EIS as Appendix C. Annual aircraft emissions are presented in Table 3.5-2 in metric tons per year (metric tpy) or tons per year (tpy).

3.5.4.2 Other Mobile Sources

Sources in this category include ground support equipment (GSE), auxiliary power units (APUs), and maintenance and pre-flight runups. GSE includes various vehicles and equipment used to support aircraft operations (e.g., tow tractors, service vehicles). An APU, part of the aircraft power units, operates when a ground-based power and air source is unavailable. These units are essentially small jet engines that burn jet fuel and generate exhaust emissions like larger engines. Emission factors for GSE and APU units were obtained from *Procedures of Emission Inventory Preparation Volume IV: Mobile Sources* (USEPA, 1992). GSE and APU baseline operations fuel usage data were provided by NAS Patuxent River (Bock, 1998). The annual emissions are presented in Table 3.5-2.

During maintenance runups or in-aircraft (in-frame) engine testing, engine power settings corresponding to aircraft operating modes (i.e., idle, approach) are tested. Emission rates were determined in the same manner as those for aircraft emission rates. The baseline level of engine maintenance and pre-flight runups was obtained from Wyle Research (January 1998). The annual emissions are presented in Table 3.5-2.

Table 3.5-2

Existing NAS Patuxent River and Webster Field Total Emission Levels

Source Type	Criteria Pollutant Emissions (tpy)				
	VOCs	NO_x	CO	SO_2	PM10
I. NAS Patuxent River					
Mobile Sources					
Aircraft Flight Operation					
-- attainment areas	81.7	214.0	405.6	9.0	115.7
-- nonattainment areas	0.2	2.4	2.3	0.1	1.1
GSE/APU	0.4	5.0	1.8	0.3	0.3
Maintenance Pre-flight Runups	44.6	49.7	287.0	2.1	27.9
Subtotal	126.9	271.1	696.7	11.5	145.0
Stationary Sources[1]					
Fuel Burning Equipment	1.4	36.6	8.3	33.9	4.0
Test Cells	2.9	34.3	10.7	0.7	3.2
Degreasers	10.9	-	-	-	-
Others	10.0	4.7	1.3	0.2	0.4
Subtotal	25.2	75.6	20.3	34.8	7.6
II. Webster Field					
Webster Field Sources	1.4	1.9	0.5	3.0	0.2
III. Total Emissions					
Total Emissions (mtpy)	139.5	316.2	650.9	44.7	138.6
Total Emissions (tpy)	153.5	348.6	717.5	49.3	152.8

Notes: 1. Actual emission levels.
2. tpy = tons per year; mtpy = metric tons per year

3.5.4.3 Stationary Sources

The air emission data presented in this section were obtained from *Criteria and Hazardous Air Pollutant Emissions Inventory, NAS Patuxent River* (October 2, 1997). At NAS Patuxent River, criteria pollutants are emitted from a total of 14 types of point sources (Table 3.5-3).

Based on the emission levels from the sources described in Table 3.5-3, the actual and potential emissions of the criteria pollutants were determined. All six of the criteria pollutants were emitted from various facility-wide sources (Table 3.5-4). The potential emissions are based on all facility-wide sources operating at maximum capacity for a year, while the actual emissions reflect real source usage. The actual pollutant emissions represent no more than 23 percent of the potential emissions for that pollutant. In total, combined actual criteria pollutant emissions are approximately three percent of the total potential emissions (i.e., the maximum air pollutant emissions that the installation could potentially emit if all sources were operated at 100 percent capacity).

A total of 22 hazardous air pollutants (HAPs) were identified as being emitted from NAS Patuxent River stationary sources. The HAPs emission levels were determined from emission factors obtained from the USEPA AP-42 (USEPA, January 1995) and from material safety data sheets. Actual and potential HAPs emissions are presented in Table 3.5-5. The actual emissions of each pollutant represent about 35 percent of the corresponding total potential emission level. Total combined actual emissions are approximately 10 percent of the total potential emissions.

Based on the type of pollutants emitted (criteria pollutants or HAPs), the CAAA sets forth permit rules and emission standards for sources of certain sizes. New Source Performance Standards (NSPS) apply to sources emitting criteria pollutants, while the National Emission Standards for Hazardous Air Pollutants (NESHAPs) apply to sources emitting certain hazardous compounds. The USEPA oversees programs for operating permits (Title V) and for new or modified stationary source construction (New Source Review). A Title V operational permit prepared for NAS Patuxent River was submitted to the Maryland Department of the Environment (MDE) for approval on July 30, 1997 (Johnson, January 29, 1998).

3.5.4.4 Webster Field Air Emissions Sources

The types of air emissions sources at Webster Field include boilers, emergency generators, paint booths, and degreasers. Facility-wide criteria pollutants and HAPs emission data (Johnson, January 29, 1998) are summarized in Table 3.5-6 and Table 3.5-7, respectively. Given the amount of emissions being released from the facility, a Title V permit is not required for Webster Field operations.

Table 3.5-3

Summary of NAS Patuxent River Emission Sources

Emission Source	Description
Fuel Burning Equipment	The facility has a total of 84 boilers, 12 furnaces, and 4 water heaters. Seventy of the boilers have heat input ratings of at least 1,000,000 British Thermal Units (BTU)/hour and are permitted or registered.
Stationary Internal Combustion Engines	There are a total of 74 stationary combustion engines. All of them use diesel fuel only. Only one engine has greater than 1,000 brake horse power (bhp) and is registered.
Spray Coating Operation	There are 11 paint spray booths, each operating eight hours per day.
Jet Engine Test Cells	There are a total of 13 operational jet engine test cells used to test a variety of helicopter and jet engines (excludes the Bldg 2360 test cell still under construction).
Degreasers	There are 33 degreasers used to clean equipment coated with grease and oil.
Underground Storage Tanks[1]	There are underground storage tanks in use that store various petroleum products including No. 2 fuel oil, diesel fuel, unleaded gasoline, and JP-4/5 jet fuels.
Aboveground Storage Tanks	Dual-walled aboveground storage tanks are in use.
Paper Shredder	One large paper shredder is used to destroy classified documents. The resulting particulate emissions are controlled by a cyclone and baghouse.
Groundwater Remediation System	A remediation system is used to treat groundwater contaminated with aviation fuel leakage from former underground storage tank releases. The remediation consists of two processes, a controlled biological system and air stripping. The vapors released during the biological system are treated through carbon adsorption.
Air Stripper	An air stripper is used to treat approximately 61 million liters (16 million gal) of contaminated groundwater annually. The VOCs stripped from the groundwater are controlled by a carbon absorption unit.
Paint Stripper	A dry paint stripper is operated approximately 2 hours per day for 250 days annually. Since the dry paint is removed by abrasive action, only particulate matter is emitted from the paint stripper.
Candle Flare	A utility candle flare is operated on an inactive municipal solid waste landfill to destroy landfill gas. Due to its size and annual non-methane emissions, the landfill is not subject to guideline for municipal solid waste landfills (40 CFR Part 60, Subpart C[c]).
Lead Smelter	A smelter is used to process lead to cast ballast weights for aircraft. Since the smelter uses electric heat, lead is the only criteria pollutant emitted.
Stationary Welder	A stationary welder is operated for miscellaneous parts welding.

Note: 1. A number of underground storage tanks are in the process of being removed.

Source: *Criteria and Hazardous Air Pollutant Emissions Inventory, NAS Patuxent River*, October 2, 1997.

Table 3.5-4
NAS Patuxent River Stationary Source Criteria Air Pollutant Emissions Summary

Pollutant	Total Emissions			
	Actual (metric tpy)	Actual (tpy)	Potential (metric tpy)	Potential (tpy)
Particulates	6.9	7.6	505.9	557.8
NO_x	68.7	75.6	3,170.8	3,492.0
CO	18.4	20.3	1,285.5	1,415.8
Non-methane VOCs	22.9	25.2	343.1	377.9
SO_x	31.6	34.8	660.5	727.4
Lead	0.1	0.1	0.2	0.3
Total Combined	148.6	163.6	5,966.0	6,571.2
Source: *Criteria and Hazardous Air Pollutant Emissions Inventory, NAS Patuxent River,* October 2, 1997.				

Table 3.5-5
NAS Patuxent River Stationary Source Hazardous Air Pollutants Emissions Summary

Pollutant	Chemical Abstract Service #	Actual (metric tpy)	Actual (tpy)	Potential (metric tpy)	Potential (tpy)
Acetaldehyde	75-07-0	0.0000	0.0000	0.0074	0.0081
Acrolein	107-02-8	0.0000	0.0000	0.0009	0.0010
Arsenic	7440-38-2	0.0005	0.0006	0.1360	0.0150
Benzene	71-43-2	0.0012	0.0013	0.0151	0.0166
Beryllium	7440-41-7	0.0003	0.0003	0.0080	0.0088
1,3-Butadiene	106-99-0	0.0000	0.0000	0.0004	0.0004
Cadmium	7440-43-9	0.0013	0.0014	0.0353	0.0389
Chromium	7440-47-3	0.0065	0.0072	0.1860	0.2048
Ethyl benzene	100-41-4	0.0354	0.0390	0.3088	0.3401
Formaldehyde	50-00-0	0.5657	0.0623	0.8382	0.9231
Glycol Ethers	0	0.4357	0.4799	4.3571	4.7986
Lead	7439-92-1	0.0542	0.0597	0.2613	0.2878
Manganese	7439-96-5	0.0017	0.0019	0.0451	0.0497
Mercury	7439-97-6	0.0004	0.0004	0.0096	0.0106
Methyl Ethyl Ketone	78-93-3	0.7750	0.8536	7.7509	8.5362
Methyl Isobutyl Ketone	108-10-1	0.2994	0.3297	2.9935	3.2968
Napthalene	91-20-3	0.0047	0.0052	0.0296	0.0326
Nickel	7440-02-0	0.0028	0.0031	0.0594	0.0654
Propylene	75-56-9	0.0006	0.0007	0.0263	0.0290
Toluene	108-88-3	0.4343	0.4783	4.4218	4.8698
1,1,1,-Trichloroethane	71-55-6	0.0015	0.0016	0.0054	0.0060
o-Xylene	95-47-6	0.3247	0.3576	3.1870	3.5099
Total Combined		2.5	2.7	24.5	27.0
Source: *Criteria and Hazardous Air Pollutant Emissions Inventory, NAS Patuxent River*, October 2, 1997.					

Table 3.5-6
Webster Field Stationary Source Criteria Air Pollutant Emissions Summary

Pollutant	Total Emissions			
	Actual (metric tpy)	Actual (tpy)	Potential (metric tpy)	Potential (tpy)
Particulates	0.2	0.2	0.8	0.9
NO_x	1.7	1.9	11.1	12.2
CO	0.4	0.5	2.7	3.0
Non-methane VOCs	1.3	1.4	8.5	9.3
SO_x	2.7	3.0	13.7	15.1
Total Combined	6.3	7.0	36.8	40.5
Source: Johnson, January 29,1998.				

Table 3.5-7
Webster Field Stationary Source Hazardous Air Pollutants Emissions Summary

Pollutant	Chemical Abstract Service #	Actual (metric tpy)	Actual (tpy)	Potential (metric tpy)	Potential (Tpy)
Acetaldehyde	75-07-0	0.0001	0.0001	0.0001	0.0001
Acrolein	107-02-8	0.0000	0.0000	0.0005	0.0006
Arsenic	7440-38-2	0.0000	0.0000	0.0002	0.0002
Benzene	71-43-2	0.0001	0.0001	0.0001	0.0001
Beryllium	7440-41-7	0.0000	0.0000	0.0001	0.0001
1,3-Butadiene	106-99-0	0.0000	0.0000	0.0013	0.0014
Cadmium	7440-43-9	0.0001	0.0001	0.0005	0.0005
Chromium	7440-47-3	0.0033	0.0036	0.0148	0.0163
Ethyl benzene	100-41-4	0.0015	0.0017	0.0153	0.0169
Formaldehyde	50-00-0	0.0021	0.0024	0.0117	0.0129
Hexane	110-54-3	0.0003	0.0003	0.0031	0.0034
Hydrofluoric Acid	7664-39-3	0.0350	0.0390	0.1500	0.1700
Lead	7439-92-1	0.0001	0.0001	0.0004	0.0004
Manganese	7439-96-5	0.0001	0.0001	0.0006	0.0007
Mercury	7439-97-6	0.0000	0.0000	0.0001	0.0001
Methyl Ethyl Ketone	78-93-3	0.1020	0.1120	1.0200	1.1200
Napthalene	91-20-3	0.0001	0.0001	0.0007	0.0008
Nickel	7440-02-0	0.0001	0.0001	0.0008	0.0009
Toluene	108-88-3	0.1230	0.1360	1.2300	1.3600
1,1,1,-Trichloroethane	71-55-6	0.0000	0.0000	0.0001	0.0001
o-Xylene	95-47-6	0.0047	0.0052	0.0470	0.0518
	Total Combined	0.3	0.3	2.5	2.8
Source: Johnson, January 29, 1998.					

3.5.4.5 Localized Target Areas Emissions Sources

Air emissions, typically CO and NO_x emissions, can also be released into the atmosphere when ordnance stores (including inert missiles and bombs and flares and chaff) as well as various types of gun ammunition are fired. However, very limited studies are currently available for evaluating weapons firing-related air emissions. Based on the available emission rates developed for the F/A-18E/F program for weapons/stores separation tests and for each round of 5.56 mm, 7.62 mm, and 0.50 caliber firing (National Guard Bureau and Massachusetts National Guard, November 1996), emissions due to ordnance release and gunfire around the target areas are negligible.

3.5.4.6 Total Emissions Levels for the Patuxent River Complex

Total emissions from NAS Patuxent River and Webster Field operations under the existing conditions are presented in Table 3.5-2. In summary, these emissions are approximately:

- 140 metric tpy (154 tpy) of VOCs;
- 316 metric tpy (349 tpy) of NO_X;
- 651 metric tpy (718 tpy) of CO;
- 45 metric tpy (49 tpy) of SO_2; and
- 139 metric tpy (153 tpy) of PM10.

Included in the above total emissions are the following amounts of emissions that occur in the Calvert County nonattainment area due to aircraft flight operations:

- 0.2 metric tpy (0.2 tpy) of VOCs;
- 2.2 metric tpy (2.4 tpy) of NO_X;
- 2.1 metric tpy (2.3 tpy) of CO;
- 0.1 metric tpy (0.1 tpy) of SO_2; and
- 1.0 metric tpy (1.1 tpy) of PM10.

3.6 Noise

Noise, often defined as unwanted sound, is one of the most common environmental issues associated with aircraft operations. Aircraft are not the only sources of noise in an urban or suburban environment, where interstate and local roadway traffic, rail, industrial, and neighborhood sources also intrude on the everyday quality of life. Nevertheless, aircraft are readily identified by their noise and are typically singled out for special attention and criticism. Consequently, aircraft noise problems often dominate analyses of environmental impacts.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Whether that sound is interpreted as pleasant (music, for example) or unpleasant (aircraft noise, for example) depends largely on the listener's current activity, experience, and attitude toward the source of that sound. It is often true that one person's music is another person's noise.

The loudest sounds the human ear can hear comfortably have one trillion (1,000,000,000,000) times the acoustic energy of sounds the ear can barely detect. Because of this vast range, any attempt to represent the intensity of sound using a linear scale becomes unwieldy. As a result, a logarithmic unit called the decibel (dB) is used to represent the intensity of sound. This representation is called a sound level.

A sound level of less than 10 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal conversational speech has a sound level of approximately 60 dB. Sound levels above 120 dB begin to be felt inside the human ear as discomfort and eventually pain at still higher levels. Because of the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically (see box).

Decibel Addition

Some simple rules of thumb are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. Thus, for example:

60 dB + 60 dB = 63 dB, and
80 dB + 80 dB = 83 dB.

On the other hand, the total sound level produced by two sounds of different levels is usually only slightly more than the higher of the two. For example:

60.0 dB + 70.0 dB = 70.4 dB.

The minimum change in sound level that an average human ear can detect is about 3 dB. A change in sound level of 10 dB is usually perceived by the average person as a doubling (or halving) of the sound's loudness, and this relationship holds true for loud sounds and for quieter sounds (Table 3.6-1).

The "A" Scale

Not all sounds are heard equally well by the human ear. Thus, in measuring community noise, frequency dependence is taken into account by adjusting the very high and very low frequencies to approximate the human ear's reduced sensitivity to those frequencies. This adjustment is called "A-weighting" and is commonly used in measurements of environmental noise. In this document all sound levels are A-weighted sound levels (unless otherwise noted) and the adjective "A-weighted" has been omitted.

The inherent variability in the responses of different individuals to noise makes it impossible to predict accurately how any one individual will react to a noise event. Nevertheless, when a community is considered as a whole, its overall reaction to noise can be represented with a high degree of confidence.

3.6.1 Noise Metrics and Modeling

As used in environmental noise analyses, a metric refers to the unit or quantity that measures the effect of noise on the environment. Federal agencies involved in environmental noise mitigation have agreed on common metrics for environmental impact analysis documents. Different metrics (based on the intensity and frequency of the sound) are used to characterize different kinds of sound events. The DoD and the Federal Aviation Administration (FAA) have specified the metrics that should be used for federal aviation noise assessments (Table 3.6-2).

There are two broad categories of noise analyses that are conducted to address the impacts of aircraft related noise: total sound exposure over a period of time (e.g., 24 hours) and single events. Thus, there are two broad types of related noise metrics. The principal metric used in this report is the day-night average sound level (DNL) and two variations of the DNL called the onset-rate adjusted day-night sound level (L_{dnmr}) and the C-weighted average day-night sound level (L_{Cdn}). The DNL does not represent the sound level perceived at any specific time but does represent the total sound exposure over a period of time. In order to characterize noise levels related to a single event (e.g., an aircraft overflight), the maximum sound level (L_{Amax}) and the sound exposure level (SEL) are used.

Table 3.6-1

Decibel Changes and Loudness

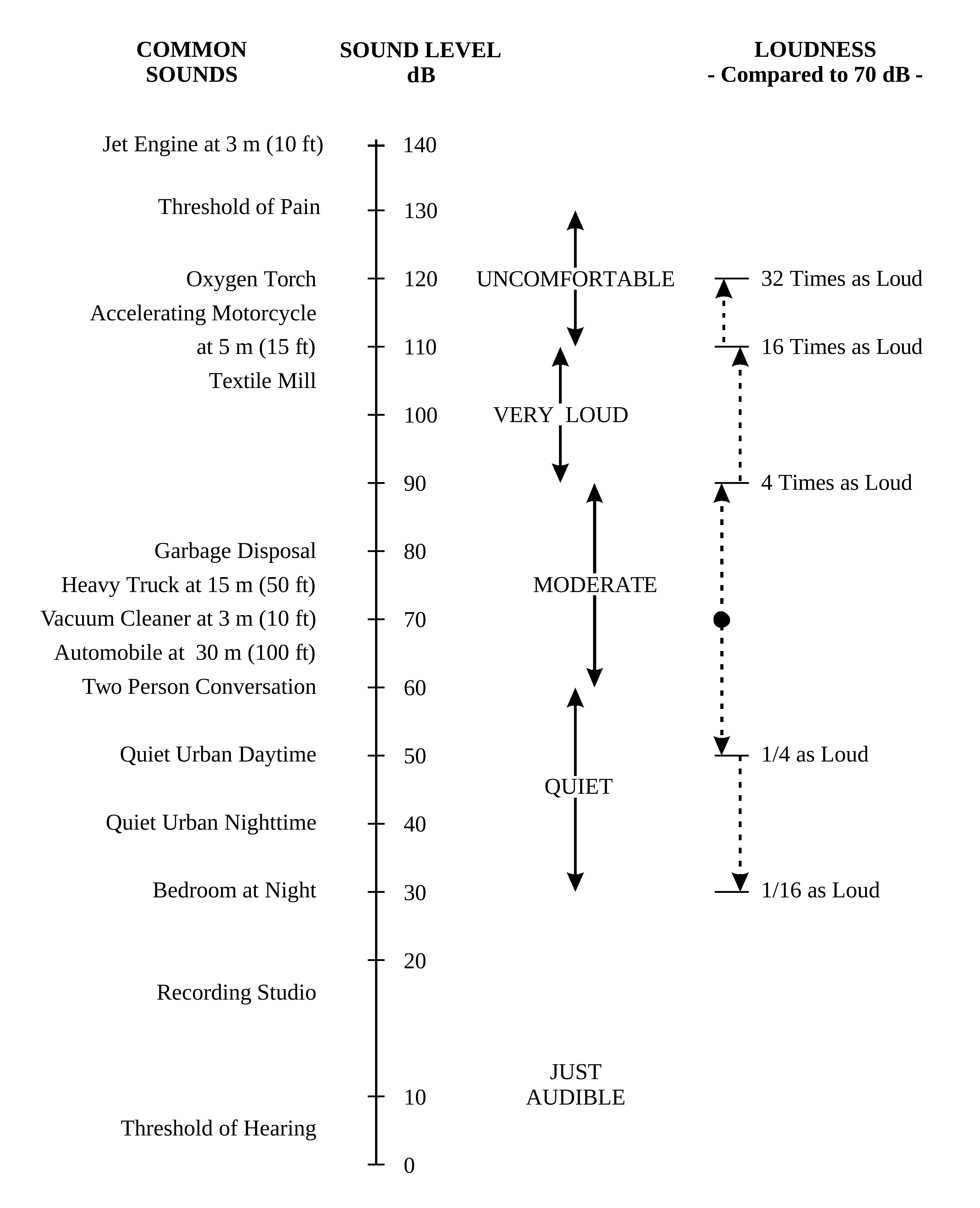
Change (dBA)	Relative Loudness
0	Reference
3	Barely perceptible change
5	Readily perceptible change
10	Half or twice as loud
20	1/4 or four times as loud
30	1/8 or eight times as loud
Source: Based on FHWA, June 1995.	

Table 3.6-2

Common Noise Metrics

Metric	Description
L_{Amax}	Maximum Sound Level - The highest A-weighted sound level measured during a single event (e.g., an aircraft overflight), in which the sound level changes value over time, is called the maximum A-weighted sound level or maximum sound level, for short. The maximum sound levels of typical events are shown in Figure 3.6-1 (Typical A-Weighted Sound Levels). The maximum sound level is important in judging the interference caused by a noise event with conversation, TV or radio listening, sleep, or other activities.
SEL	Sound Exposure Level - Although the maximum sound level described above provides some measure of the intrusiveness (sound level) of a sound event, it does not completely describe the total event, since the total amount of time the sound is heard is also significant. The Sound Exposure Level (SEL) combines both characteristics into a single metric. It has been well established in the scientific community that SEL measures this impact much more reliably than just the maximum sound level.
DNL	Day-Night Average Sound Level - For the evaluation of community noise effects, and particularly aircraft noise effects, the Day-Night Average Sound Level (DNL) is used. DNL averages aircraft sound levels at a given location over a 24-hour period, with a 10-decibel adjustment added to those noise events that occur between 10:00 pm and 7:00 am. This 10-decibel "penalty" represents the increased intrusiveness of sounds that occur during normal sleeping hours, both because of the increased sensitivity to noise during those hours and because ambient sound levels during nighttime are typically 10 dB lower than during day-time hours.
L_{dnmr}	Onset-Rate Adjusted Day-Night Average Sound Level - Aircraft operations along low-altitude Military Training Routes (MTRs) and in Military Operating Areas (MOAs) and Restricted Areas/Ranges generate a noise environment different from other community noise environments. Overflights can be highly sporadic, ranging from many (e.g., ten per hour) to few (less than one per week). This situation differs from most community noise environments in which noise tends to be continuous or patterned. Furthermore, individual military overflight events also differ from typical community noise events because of the low altitude and high airspeed characteristics of military aircraft. Thus, the DNL metric is adjusted to reflect these special characteristics and is based on the number of average daily operations in the month with the highest number of operations.
L_{Cdn}	C-Weighted Average Day-Night Sound Level - Sonic booms produce high-energy impulsive sounds that are different in nature from the non-impulsive sounds that are characterized by the A-scale. Thus, the L_{Cdn} metric is used, which is based on the C-weighted scale, which accounts for the large, low-frequency nature of high-energy impulsive sounds.

Typical A-Weighted Sound Levels



Source: Based on Harris, 1979 and Pierce, 1989.

Figure 3.6-1

3.6.1.1 The Day-Night Average Sound Level

The key noise metric used in this report is the DNL; thus, some background information as to how it has evolved is useful. In June 1980, an ad hoc Federal Interagency Committee on Urban Noise published guidelines relating DNL to compatible land uses. This committee was composed of representatives from the US departments of Defense, Transportation, and Housing and Urban Development; the Environmental Protection Agency (USEPA); and the Veterans Administration. Federal agencies have adopted the guidelines for their noise analyses.

Although these guidelines are not mandatory, they provide the best means for determining noise impact in airport communities. In general, residential land uses are normally not compatible with outdoor DNLs above 65 dB, so that the best means of assessing noise impacts is to focus on the land area and population exposed to DNLs of 65 dB and higher.

In 1990, the Federal Interagency Committee on Noise (FICON) reviewed how aviation noise effects are assessed and presented. This group reaffirmed the DNL as the best metric for assessing aircraft noise impacts on the environment (FICON, August 1992).

Some of the public has criticized the use of DNL as not accurately representing community annoyance and land use compatibility with aircraft noise. Much of that criticism stems from a lack of understanding of the measurement or calculation of DNL. One frequent criticism is based on the feeling that people react more to single noise events than to "meaningless" time-average sound levels. In fact, DNL takes into account both the noise levels of all individual events occurring during a 24-hour period and the number of times those events occur. As described above, the logarithmic nature of the decibel unit causes noise levels of the loudest events to control the 24-hour average (see box).

DNL Illustration

The averaging of noise over a 24-hour period does not ignore the louder single events and, in fact, tends to emphasize both the higher sound levels and the number of those events. This is the basic concept of a time-average sound metric, and specifically the DNL. Consider these two examples:

A single aircraft overflight occurs during the daytime of a 24-hour period and creates a sound level of 100 dB for 30 seconds. During the remaining 23 hours, 59 minutes, and 30 seconds of the day, the ambient sound level is 50 dB. The DNL for this 24-hour period is 65.5 dB.

Ten 30-second overflights occur during the daytime of the next 24-hour period with the same ambient sound level of 50 dB during the remaining 23 hours and 55 minutes of the day. The DNL for this 24-hour period is 75.4 dB.

The results of attitude surveys, conducted to determine the percentages of people who express various degrees of annoyance when exposed to different levels of DNL, are very consistent. The most useful metric for assessing people's responses to noise impacts is the percentage of the exposed population expected to be "highly annoyed." A wide variety of responses has been used to determine intrusiveness of noise and disturbances of speech, sleep, television or radio listening, and outdoor living. The concept of "percent highly annoyed" has provided the most consistent response of a community to a particular noise environment. Annoyance is definable as any negative subjective reaction to noise on the part of an individual or group. The response is remarkably complex, and when considered on an individual basis, varies widely for any given noise level (FICON, August 1992) (see box).

Factors Affecting Annoyance Response of an Individual

A number of acoustic factors have been identified that may influence the annoyance response of an individual. Newman and Beattie (1985) divided these factors into emotional and physical variables:

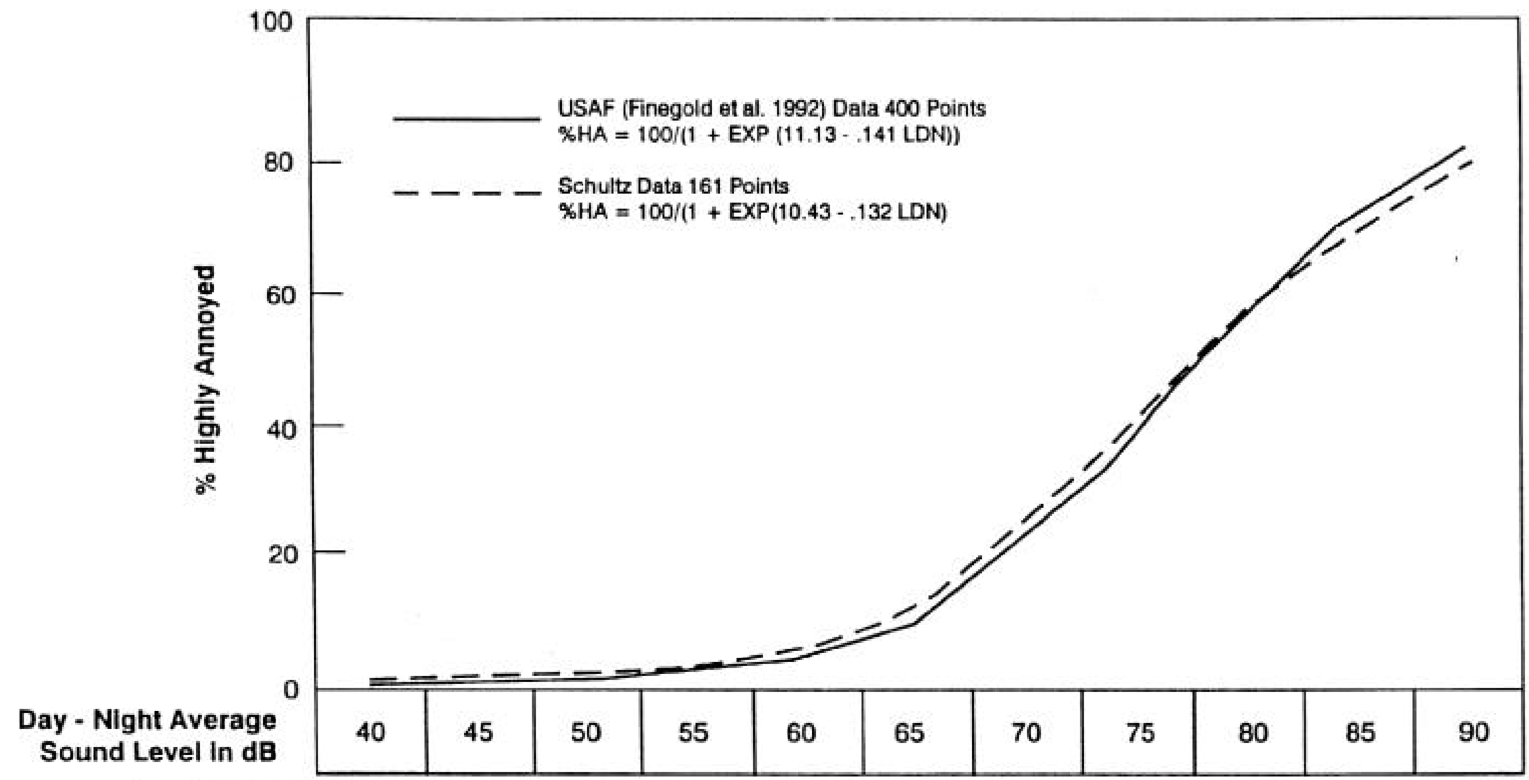
Emotional	Physical
Feelings about the necessity or preventability of noise.	Type of neighborhood.
Judgment of the importance and value of the activity that is producing the noise.	Time of day.
	Season.
Activity at the time an individual hears the noise.	Predictability of noise.
Attitude about the environment.	Control over the noise source.
General sensitivity to noise.	Length of time an individual is exposed to noise.
Belief about the effect of noise on health.	
Feeling of fear associated with noise.	

Findings substantiate that community annoyance is reliably represented by DNL. Several studies have indicated an 85 to 95 percent correlation between DNL levels and groups reporting that they are highly annoyed by noise sources (USEPA, 1978; Schultz, 1978; and Fidell, et al., 1991, in Wyle Research, January 1998). The "updated Schultz curve" cites the relationship between noise and annoyance (Figure 3.6-2, DNL and Annoyance). This curve, which was originally developed in the 1970s and has been updated over the past 10 years, remains the best available method to estimate community response to transportation noise, including aircraft noise (FICON, August 1992). Community noise studies conducted in the US since 1972 have indicated that adverse effects resulting from aircraft operations, such as annoyance and interference with sleep and conversation, are generally associated with exposures to sound levels exceeding a DNL of 65 dB.

3.6.1.2 Noise Modeling

A detailed noise analysis was conducted for the Patuxent River Complex using a series of computer noise models (see Appendix G for model details). These analyses are documented in the *Aircraft Noise Study for NAS Patuxent River, OLF Webster Field, and Associated Airspace within the Chesapeake Test Range* (Wyle Research, January 1998). The material presented here and in Subchapter 4.6 draws heavily from that report.

DNL and Annoyance



Calculated %HA Points	40	45	50	55	60	65	70	75	80	85	90
USAF	0.41	0.831	1.66	3.31	6.48	12.29	22.1	36.47	53.74	70.16	82.64
SCHULTZ	0.576	1.11	2.12	4.03	7.52	13.59	23.32	37.05	53.25	68.78	81

Figure 3.6-2

Source: FICON, 1992.

Analyses of aircraft noise impacts and compatible land uses around DoD facilities and airspaces are normally made using the NOISEMAP and/or ROUTEMAP computer models. These computer-based simulation programs calculate DNLs at points on the ground around an airfield or along a military training route and draw contours of equal noise level for overlay onto land use maps. Each program mathematically calculates the noise levels for all aircraft operations over an average 24-hour period, taking into consideration the number and types of aircraft, their flight paths and engine thrust settings, the time of day (daytime or nighttime) that each operation occurs, and other parameters, as appropriate.

A supersonic maneuvering acoustical computer program (BOOMAP3) was used for the analysis of supersonic aircraft operations (Plotkin, et al., November 1993, in Wyle Research, January 1998). BOOMAP3 calculates and plots L_{Cdn} contours representing the cumulative impact of sonic booms due to supersonic activity in military training areas.

3.6.2 Chesapeake Test Range and Localized Target Areas

The number of subsonic and supersonic operations in the airspace of CTR and at the target areas were provided by the Naval Aviation Simulation Model (NASMOD) study (ATAC Corporation, October 1997) as refined by Eagan, McAllister Associates, Inc. (January 1998) (see Appendix C). The basis for the NASMOD study (and by extension, the noise analysis) is a flight operation. Importantly, a single flight may involve multiple operations. For example, an airfield touch-and-go consists of two operations -- an arrival (touch) and a departure (go). Flights in the CTR may be similiarly subdivided into their component operations. The NASMOD also identified the CTR airspace, or combinations thereof, where flight operations are conducted.

3.6.2.1 Subsonic Operations

The results of the noise analysis found all noise levels for subsonic flight operations under existing conditions to have an L_{dnmr} value of less than 50 dB. The contours developed for this analysis of subsonic flight operations are shown in Figure 3.6-3 (L_{dnmr} Contours Within Affected Airspace Components for Existing Flight Operations).

3.6.2.2 Supersonic Operations

The log of supersonic flight operations within the CTR airspace was obtained from NAS Patuxent River Air Traffic Control (ATC) for FY 1996. The information available in this log contains aircraft type, beginning and ending locations of supersonic runs, maximum Mach number, and altitude. A total of 245 sorties, representing one calendar year, were analyzed.

Ldnmr Contours Within Affected Airspace Components for Existing Flight Operations

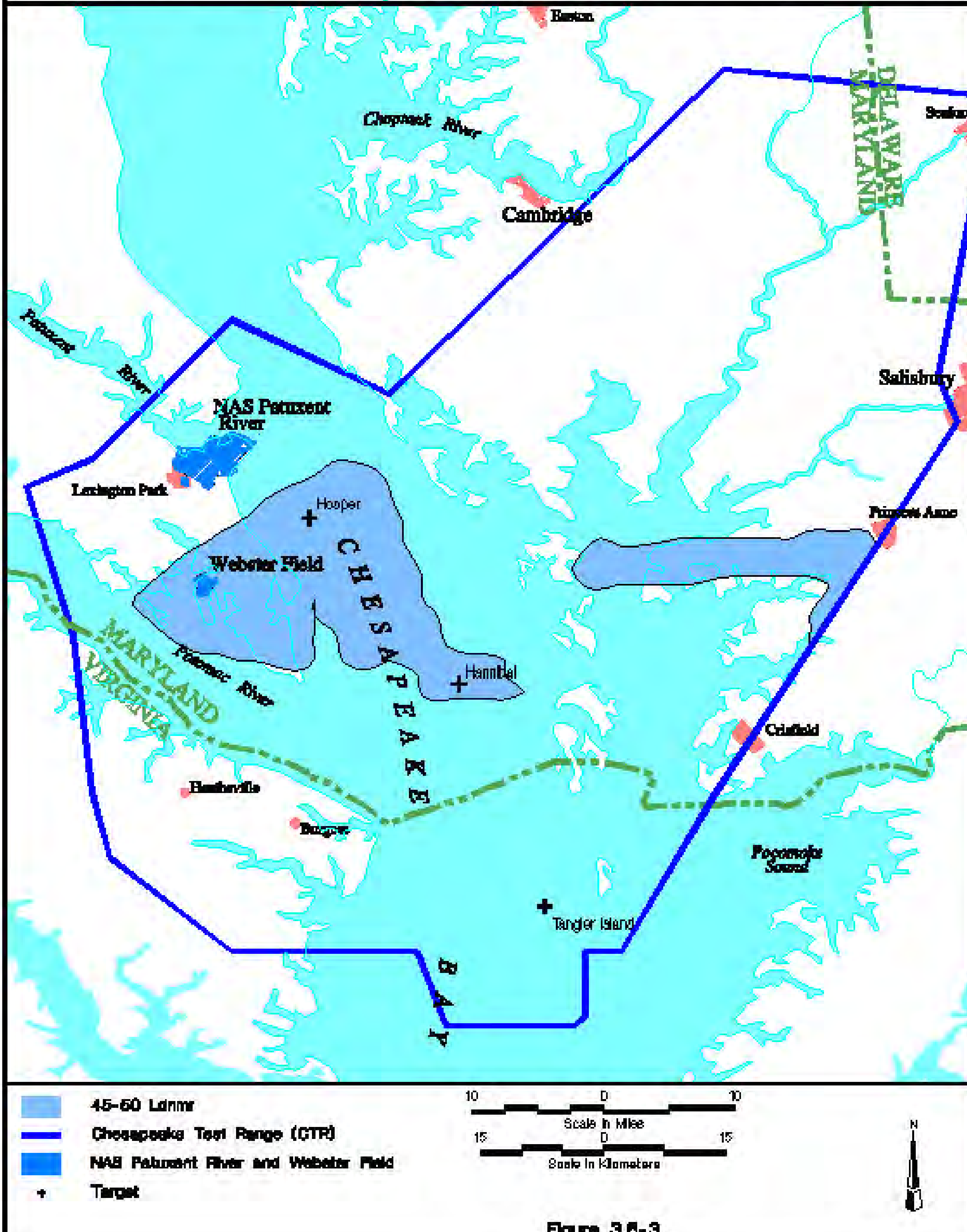


Figure 3.6-3

The L_{Cdn} contours were plotted for all supersonic operations (Figure 3.6-4, L_{Cdn} Contours for Existing Supersonic Flight Operations). Due to the extremely small number of supersonic operations conducted in the CTR, only a single L_{Cdn} 40 dB contour (which corresponds to a DNL 42 dB contour based on equal annoyance percentages) is shown in the figure. The impact at ground level is negligible, and if these noise contours were located over a populated land area (which they are not), less than one percent of the affected population would be expected to be highly annoyed.

Impacts at ground level can also be expressed in pounds per square foot (psf) of overpressure of a single event. Of all the supersonic events modeled for the CTR, the one exhibiting the largest overpressure would be created by an F-14 flying at 6,000 m (20,000 ft) at Mach 1.4. This would create an overpressure of 3.15 psf. For purposes of comparison, professional fireworks displays using ground-launching mortars have been measured to have peak overpressures of up to 12 psf -- almost four times as large as the F-14 event (Maglieri, 1973 in Wyle Research, January 1998).

3.6.3 NAS Patuxent River and OLF Webster Field

Existing noise levels from airfield operations at NAS Patuxent River were determined through a computer modeling study that considered both aircraft operations in the air as well as pre-flight and maintenance runups by aircraft on the ground. The following factors were considered in the noise analysis:

- **Airfield Flight Operations** - The NASMOD study (ATAC Corporation, October 1997) as refined by Eagan, McAllister Associates, Inc. (January 1998) (see Appendix C) provided the annual number of flight operations at NAS Patuxent River by aircraft type and operation type by temporal period for existing conditions. The types of aircraft operations that occur at NAS Patuxent River are fixed-wing aircraft and helicopter arrivals and departures at the airfield, flight patterns in the vicinity of the airfield, and aircraft engine runups associated with pre-flight and maintenance checks.

- **Runway and Flight Track Utilization** - Runway and flight track utilization for each modeled aircraft type were derived from previous noise studies and from interviews with air traffic control personnel at NAS Patuxent River. A “flight track” refers to the three-dimensional path that an aircraft takes as it approaches and departs an airfield or passes through an airspace. Sample flight tracks are presented in Figure 3.6-5 (NAS Patuxent River VFR Departure Flight Tracks). Complete flight tracks for all aircraft operations modeled can be found in Wyle Research (January 1998).

- **Aircraft Flight Profiles** - Aircraft flight profiles for modeled operations at NAS Patuxent River were obtained from Wyle Research (1995) through interviews with pilots of the modeled aircraft types and from the default transient flight profiles in the

LCdn Contours for Existing Supersonic Flight Operations

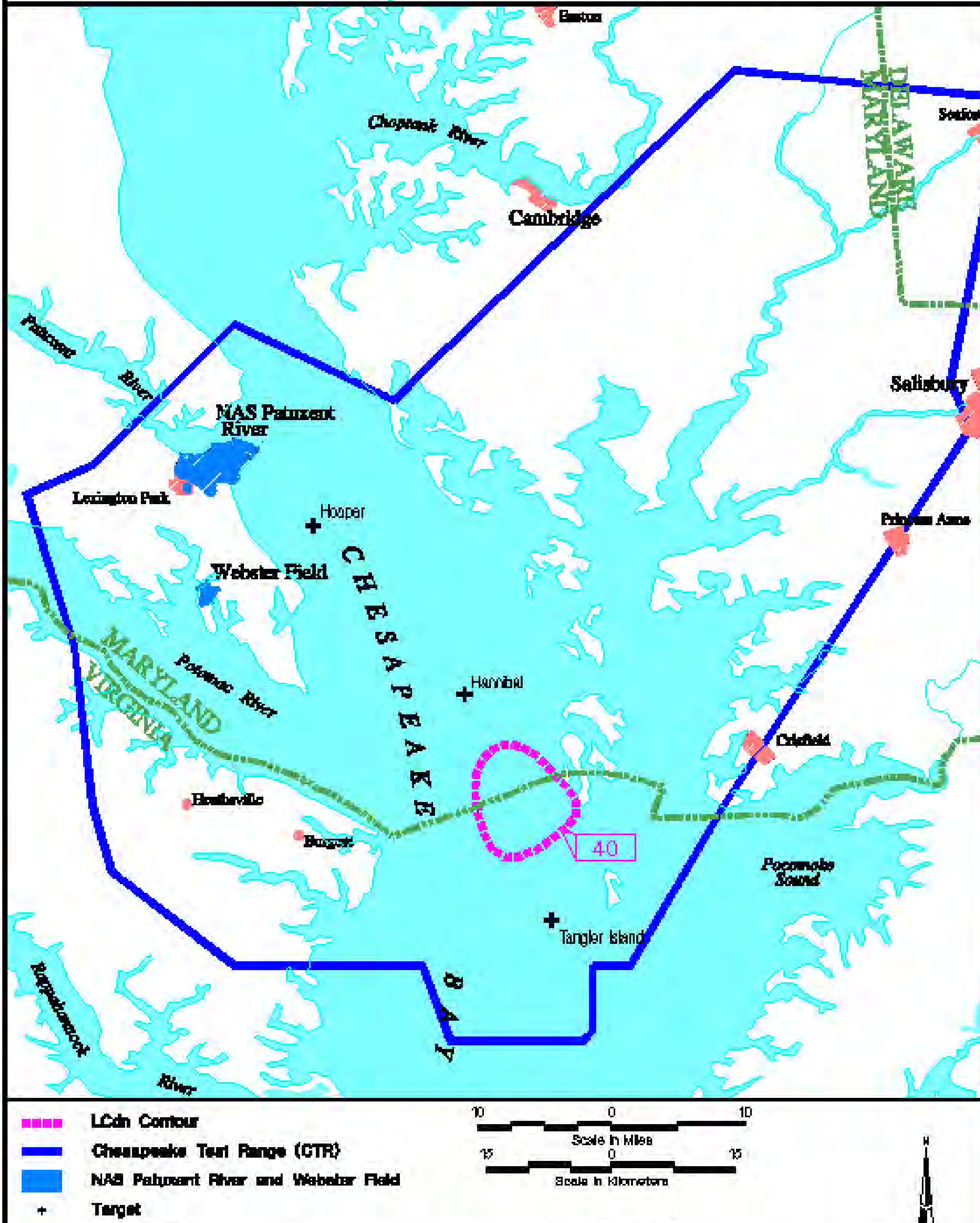


Figure 3.6-4

NAS Patuxent River VFR Departure Flight Tracks

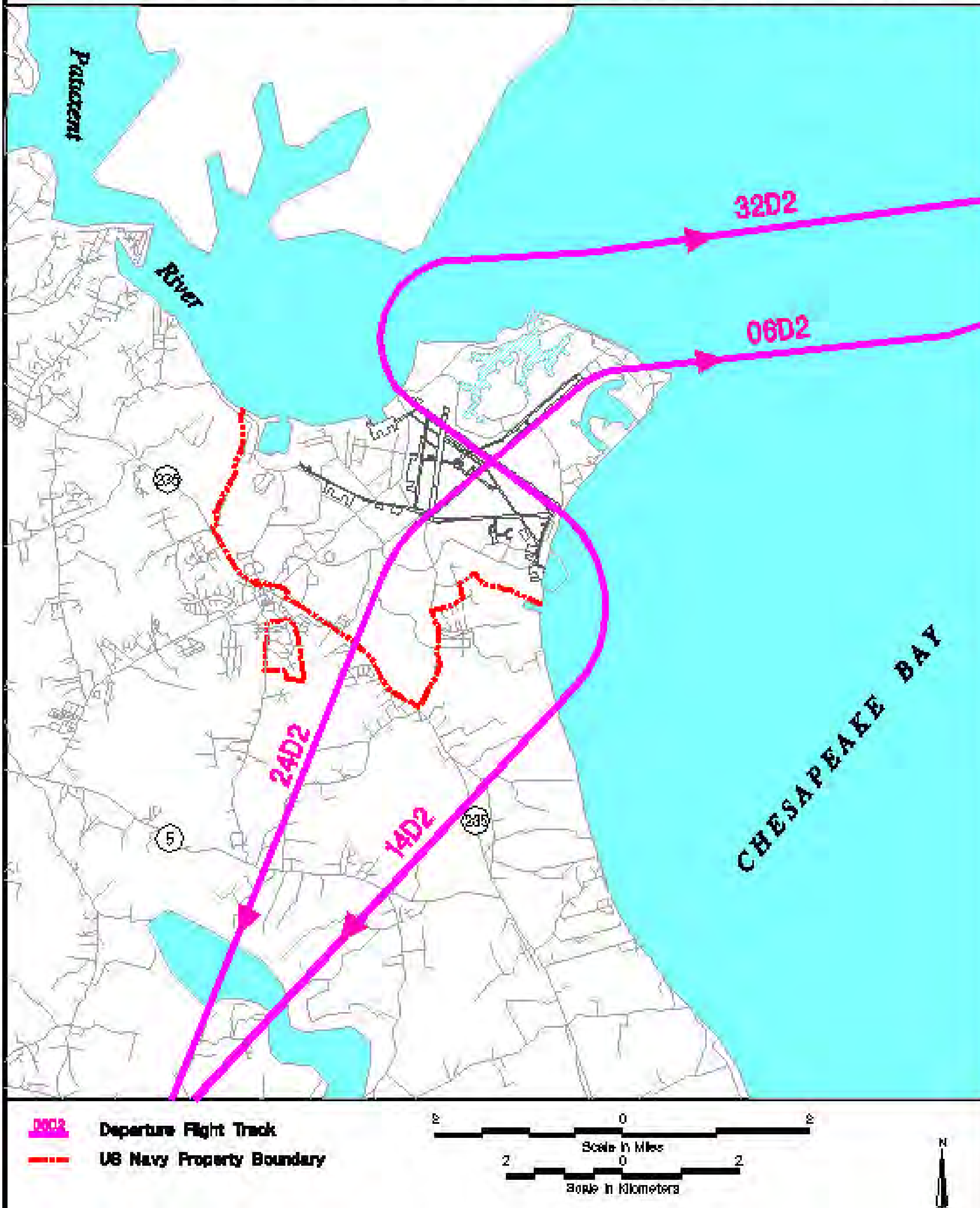


Figure 3.6-6

noise model. A flight profile describes the ways that a given flight or mission is performed, including distances flown and changes in power, airspeed, or altitude along specific flight tracks.

- **Climatological Data** - NAS Patuxent River personnel provided climatological information for the airfield. Since weather is an important factor in the propagation of noise, the NOISEMAP model requires the daily average temperature and relative humidity for each month to determine the appropriate values to acoustically represent a given year.

- **Pre-Flight and Maintenance Runup Operations** - Information on pre-flight runups conducted on the active runway prior to brake release was gathered through pilot interviews of modeled aircraft. Maintenance runup data was provided by NAS Patuxent River personnel. Installed and uninstalled engine and hush house engine maintenance runups, as well as pre-flight runup operations conducted on the ramp, were analyzed.

Using the data described above, the NOISEMAP computer model was used to calculate and plot the 60 dB through 85 dB DNL contours for the average day (Figure 3.6-6, DNL Contours for Existing Operations at NAS Patuxent River). Table 3.6-3 shows the impacts in terms of area, dwellings, and estimated population within contour bands at 5 dB increments for existing aircraft operations. The computed contour areas, dwelling units, and population estimates exclude NAS Patuxent River itself and bodies of water. The results of the analysis are:

- The total area within the 60 dB DNL contour is 970 hectares (2,397 acres);

- The estimated off-base population within the 60 dB contour is 3,138; and

- The 85+ dB DNL contour area does not extend beyond the NAS Patuxent River property line.

Existing noise levels at Webster Field were modeled in a similar manner. The following analysis input factors were considered:

- **Airfield Flight Operations** - Airfield flight operations at Webster Field were obtained from the Air Traffic Activity Reports (ATAR) for 1996. Approximately 75 percent of the annual flight operations at Webster Field are conducted by rotary-wing aircraft. The remaining 25 percent is made up of fixed-wing aircraft and unmanned aerial vehicle (UAV) operations.

- **Runway and Flight Track Utilization** - Runway and flight track utilization for each modeled aircraft type were provided by ATC personnel at NAS Patuxent River.

DNL Contours for Existing Operations at NAS Patuxent River

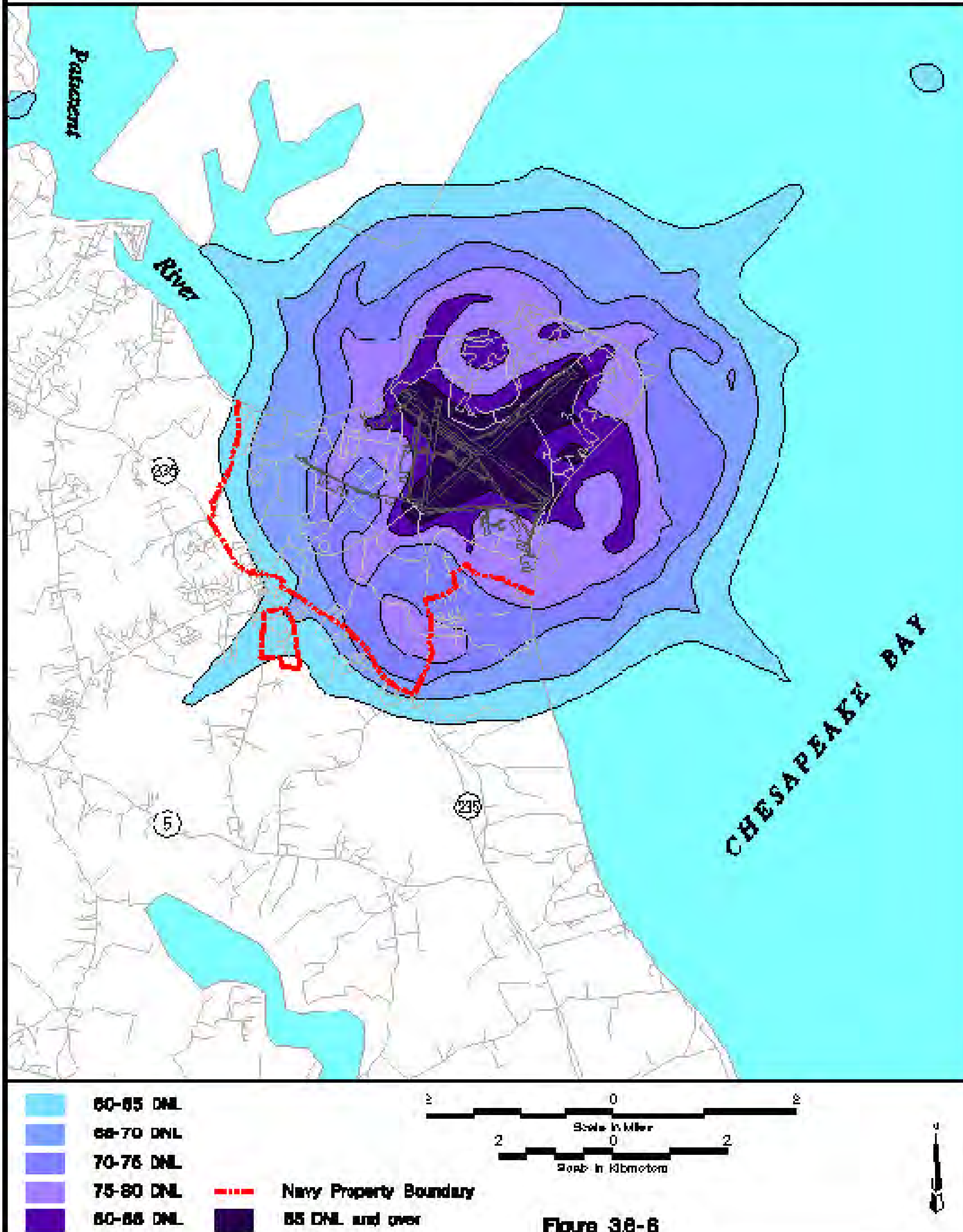


Figure 3.6-6

Table 3.6-3

Existing Land Areas, Dwellings, and Population Within DNL Contours at NAS Patuxent River

DNL Contour Bands	Area		Estimated[1]	
	Hectares	Acres	Dwellings	Population
60–65 dB	513	1,267	850	2,102
65–70 dB	223	550	273	663
70–75 dB	204	504	131	325
75–80 dB	31	76	19	48
80+ dB	0	0	0	0
Total	970	2,397	1,273	3,138

Notes:
1. Estimates based on 1990 US Census using population density methodology.
2. All areas are off-base.
3. NAS Patuxent River and bodies of water not included.
Source: Wyle Research, January 1998.

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Table 3.6-4

Existing Land Areas, Dwellings, and Population Within DNL Contours at Webster Field

DNL Contour Bands	Area		Estimated[1]	
	Hectares	Acres	Dwellings	Population
60–65 dB	19	47	2	6
65–70 dB	2	4	0	0
70+ dB	0	0	0	0
Total	21	51	2	6

Notes:
1. Estimates based on 1990 US Census using population density methodology.
2. All areas are off-base.
3. Webster Field and bodies of water not included.
Source: Wyle Research, January 1998.

- **Aircraft Flight Profiles -** Aircraft flight profiles for modeled operations at Webster Field were based on the default transient flight profiles found in the noise model.

- **Climatological Data -** Due to its proximity to NAS Patuxent River, climatological data obtained for conditions at NAS Patuxent River were also used in the analysis for Webster Field.

- **Pre-Flight and Maintenance Runup Operations** - Since pre-flight and maintenance runup operations are not typically conducted at Webster Field, none were modeled.

The NOISEMAP model was used to calculate and plot the 60 dB through 85 dB DNL contours for the average day (Figure 3.6-7, DNL Contours for Existing Operations at OLF Webster Field). Table 3.6-4 shows the impacts in terms of area, dwellings, and estimated population within contour bands at 5 dB increments for existing aircraft operations. The computed contour areas, dwelling units, and population estimates exclude Webster Field itself and bodies of water. The results of the analysis are:

- The total area within the 60 dB DNL contour is 21 hectares (51 acres);

- The estimated off-base population within the 60 dB contour is 6; and

- The 70+ dB DNL contour area does not extend beyond the OLF Webster Field property line.

3.6.4 Noise Exposure at Sensitive Receptor Locations

In addition to the noise analyses described above, an analysis of noise exposure at specific locations in the CTR was performed. These specific locations are called sensitive receptor locations, which are chosen to reflect those places where populations would be particularly sensitive to noise (e.g., residences, schools, hospitals, etc.). Table 3.6-5 presents the cumulative DNL noise levels of each of the 22 sensitive receptors shown in Figure 3.6-8 (Sensitive Receptor Locations). The sensitive receptor sites were chosen for this analysis in order to:

- Provide diverse coverage of the CTR;

- Examine existing and future noise levels in locations where aircraft noise complaints directed to NAS Patuxent River have originated in the past; and

- Assess aircraft noise impacts in the vicinity of the NAS Patuxent River and Webster Field airfields.

DNL Contours for Existing Operations at OLF Webster Field

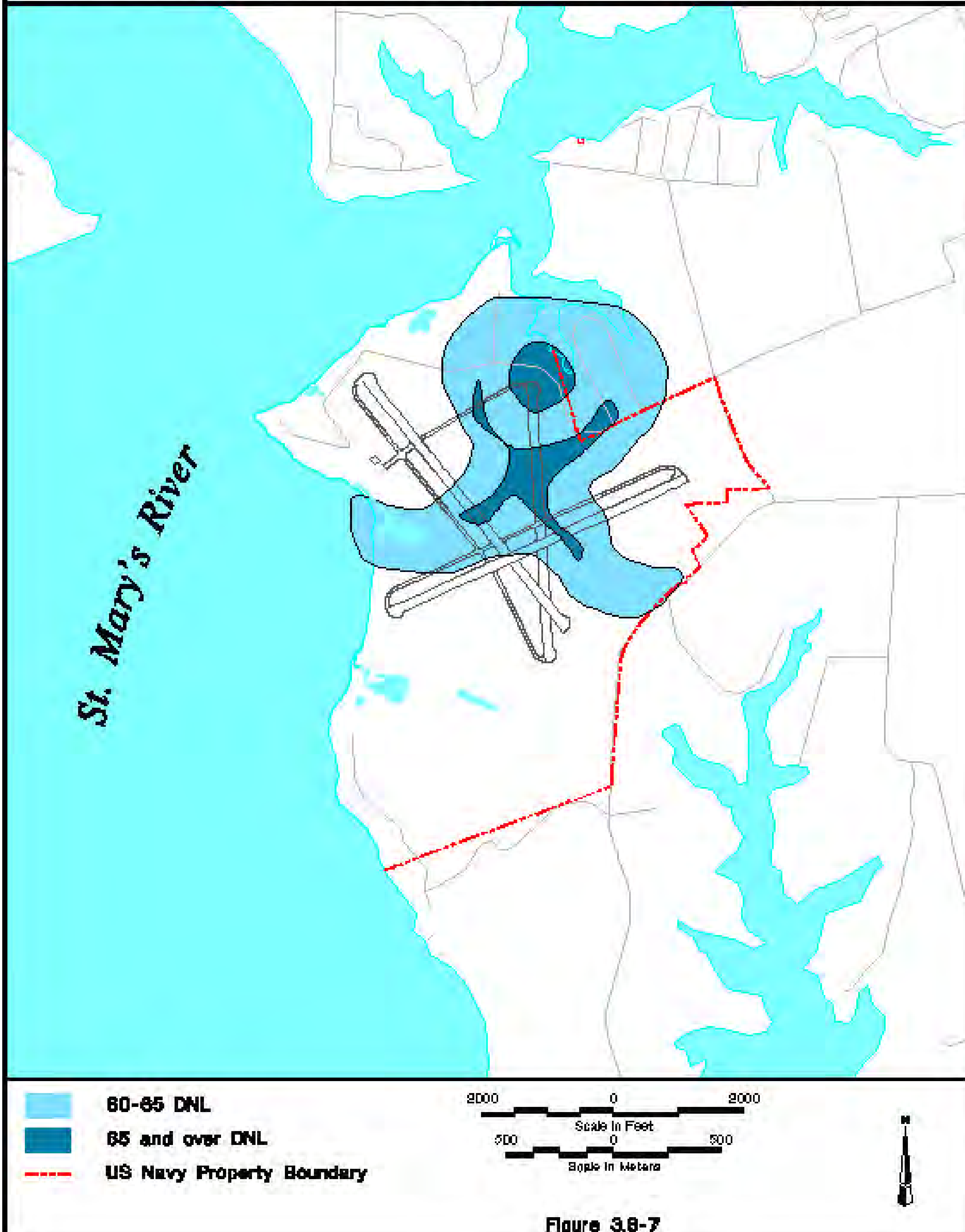


Figure 3.8-7

Sensitive Receptor Locations

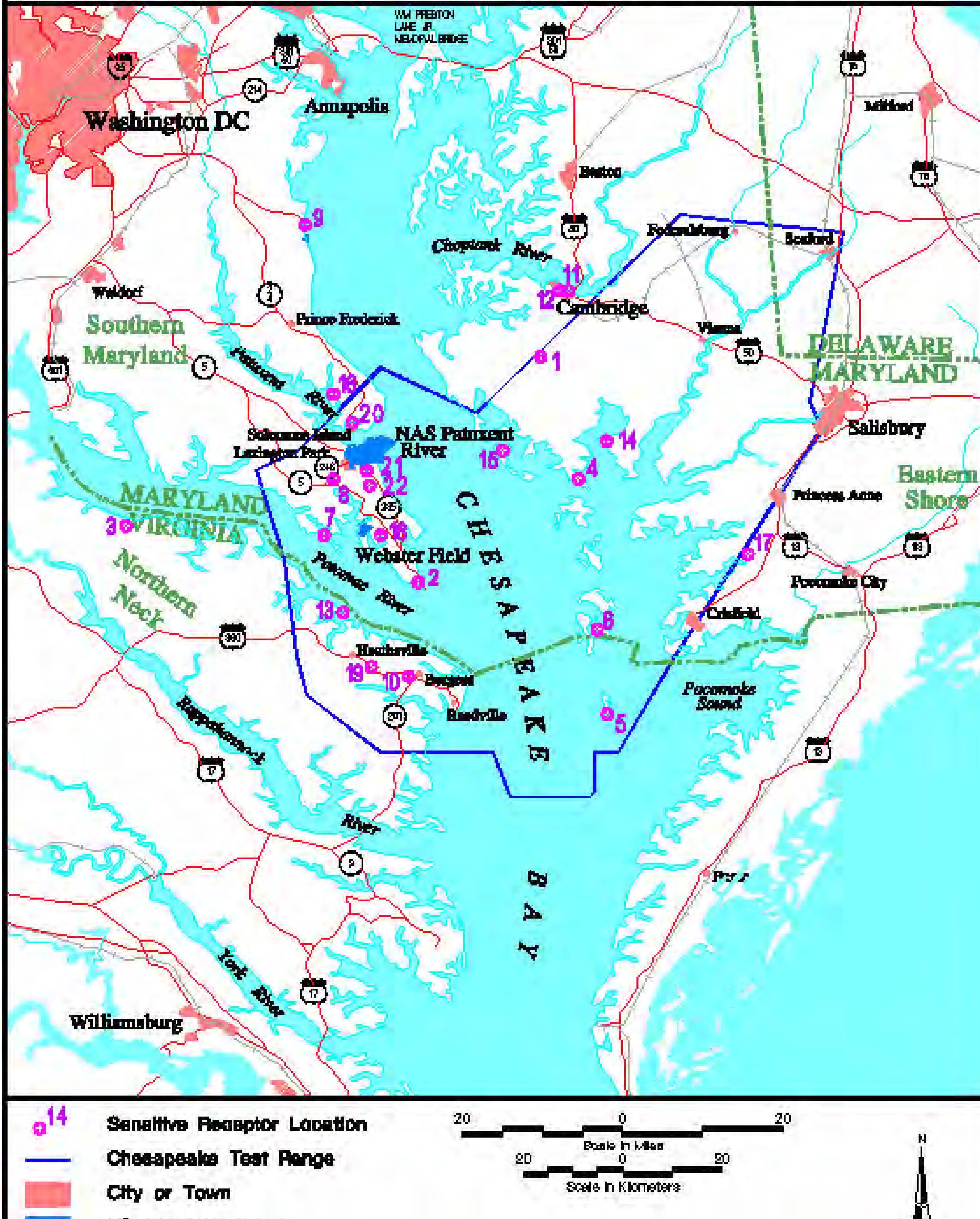


Figure 3.6-8

Table 3.6-5
Noise Levels at Sensitive Receptor Locations

Receptor ID	Type	Name	Total Noise Exposure DNL (dB) [1]	% Sentence Intelligibility			Maximum % Awakenings		
				Average Outdoor Single Event Max A-Weighted Noise Level (dB)[2]	% for Windows		Average Outdoor Nighttime Single Event Sound Exposure Level (dB)[3]	% for Windows	
			Existing (1996)		Open	Closed		Open	Closed
1	Open Space	Blackwater National Wildlife Refuge	<45	53	100	100	58	1	0
2		Point Lookout State Park	<45	<50	100	100	<50	0	0
3		Westmoreland State Park	<45	<50	100	100	<50	0	0
4	Education	Chesapeake Bay Foundation	<45	<50	100	100	57	1	0
5		Tangier Combined School	<45	<50	100	100	<50	0	0
6		Tylerton School	<45	73	99	100	81	5	2
7		Piney Point Elementary School	50	78	96	100	86	7	3
8		Great Mills High School	57	77	96	100	82	6	2
9		Calvert Library	<45	<50	100	100	<50	0	0
21		Lexington Park Elementary School[4]	57	--	--	--	--	--	--
22		Carver Elementary School[4]	66	--	--	--	--	--	--
10	Civic	Fairfields Baptist Church	<45	<50	100	100	<50	0	0
11		Dorchester General Hospital	<45	<50	100	100	<50	0	0
12		Glasgow Nursing Home	<45	52	100	100	60	1	0
13	Other	Lewisetta Marina	<45	<50	100	100	58	0	0
14	Residential	Elliott Island, MD	<45	52	100	100	61	1	0
15		Fishing Creek, MD	50	67	100	100	87	6	4
16		Lusby, MD	<45	59	100	100	64	1	0
17		Westover, MD	45	<50	100	100	<50	0	0
18		St. Inigoes, MD	48	54	100	100	n/a	0	0
19		Heathsville, VA	<45	<50	100	100	<50	0	0
20		Solomons, MD	51	74	99	100	82	5	3

Notes: 1. Total noise exposure is based on airfield and airspace operations. Sentence intelligibility and percent awakenings based on airfield operations only.
2. Based on weighted (by the number of average daily daytime flights) average SEL of the top ten contributors to the total DNL.
3. Based on weighted (based on the number of average daily nighttime flights) average SEL of the top ten contributors to the total DNL.
4. These sensitive receptors (21 and 22) were added at a later date after noise study had been developed.
n/a = not applicable; no nighttime contributors. -- = no analysis done

As seen in Table 3.6-5, noise levels at all but eight of the 22 locations are below 45 dB DNL. Levels at the remaining locations range from 45 to 66 dB DNL. All levels are below the 65 dB DNL guideline used by DoD and the FAA as the measure for assessing noise impacts, except for Location 22 (Carver Elementary School), which has a 66 dB DNL.

A discussion of the potential for speech interference and sleep disturbance to occur due to existing operations at the Patuxent River Complex is presented below. A broader discussion of these topics and other noise effects is presented in Subchapter 4.6.

3.6.4.1 Potential for Indoor Speech Interference

Due to the statistical nature of the airspace noise model (MR_NMAP), which predicts noise levels based on distributed flight operations, the potential for speech interference was examined separately for airfield-based and airspace-based aircraft noise sources. Because of the insignificant contribution to the overall noise environment from aircraft operating at Webster Field, its potential for speech interference and sleep disturbance is not considered further. Furthermore, since sonic booms have an impulsive character and the analysis of sentence intelligibility is based on a steady (interfering) sound level, sonic booms are not considered further.

Airfield Sources of Indoor Speech Interference

Since the total noise environment at each of the sensitive receptor locations is made up of noise from a number of individual aircraft events (each potentially having a unique aircraft type and flight profile), the degree of speech interference varies from flight to flight. Thus, for the purposes of this study, an average SEL weighted by the number of daytime operations was determined from the top ten aircraft type/flight profile contributors to the DNL at each location. The model-derived SEL values were adjusted to obtain the A-weighted sound levels needed to determine percentage sentence intelligibility, which is used as the measure of indoor speech interference.

As sentence intelligibility is determined based on indoor sound levels, it was necessary to transform the outdoor L_{Amax} values derived from the computer model runs to indoor values. This was done through the use of typical noise level reductions, which are functions of the type of structures involved (e.g., a residence vs a school) and whether the windows in the structure are open or closed (Table 3.6-6). A closed-window condition offers a greater amount of noise reduction. For example, the average cold climate residence with its windows closed would have a noise level reduction of 27 dB as opposed to 17 dB with the windows open. That means that the indoor noise levels in the residence would be 27 or 17 dB lower inside than outside due to the shielding effect of the structure and the closed or open position of the windows.

Noise model runs indicate that, as a result of airfield operations, outdoor single-event L_{Amax} values at 20 sensitive receptor locations range from less than 50 dB to 78 dB (Table 3.6-5). Using the noise

Table 3.6-6

Noise Level Reduction Factors

Receptor ID	Type	Name	Noise Level Reduction for Windows	
			Open	Closed
1	Open Space	Blackwater National Wildlife Refuge	17	27
2		Point Lookout State Park	17	27
3		Westmoreland State Park	17	27
4	Education	Chesapeake Bay Foundation	15	29
5		Tangier Combined School	15	29
6		Tylerton School	15	29
7		Piney Point Elementary School	15	29
8		Great Mills High School	15	29
9		Calvert Library	15	29
21		Lexington Park Elementary School	15	29
22		Carver Elementary School	15	29
10	Civic	Fairfields Baptist Church	14	24
11		Dorchester General Hospital	17	27
12		Glasgow Nursing Home	17	27
13	Other	Lewisetta Marina	17	27
14	Residential	Elliott Island, MD	17	27
15		Fishing Creek, MD	17	27
16		Lusby, MD	17	27
17		Westover, MD	17	27
18		St. Inigoes, MD	17	27
19		Heathsville, VA	17	27
20		Solomons, MD	17	27

Source: Developed from Wyle Research, January 1998.

level reduction procedure described above, it was determined that sentence intelligibility at four of the 20 sensitive receptor locations is reduced to below 100 percent. The sentence intelligibility for these four locations -- Residential Location 20 in Solomons, Maryland and Education Locations 6, 7 and 8 (Tylerton, Piney Point Elementary and Great Mills High Schools) -- ranges from 96 to 99 percent.

Airspace Sources of Speech Interference

Assuming that the least-acceptable indoor sentence intelligibility is 90 percent (see Subchapter 4.6 for more details), and with an average windows-open noise level reduction of 16 dB for the sensitive receptor locations, the minimum acceptable outdoor L_{Amax} (for daytime-only events) would be 82 dB for subsonic operations in the CTR. The noise model results indicate that for existing average monthly airspace operations, only three of the 24 modeled airspaces have any daytime events producing an L_{Amax} above 82 dB beneath the airspace:

- For R-4007A (overlying the NAS Patuxent River airfield) and Hooper target, one daytime event every ten days, on average, is above 82 dB and no events are above 84 dB (which corresponds to an indoor sentence intelligibility of 83 percent). The term “no events” as used in this context (throughout this report) actually corresponds to a frequency of less than five events every 100 days on average, as the computer model does not deal with a frequency of zero events. Locations 8 and 20 are within R-4007A (the airspace under which the air station is located) and Locations 1 and 2 are in the vicinity of Hooper target.

- For VR-1711/12 (MTRs accessing the CTR from Maryland’s Eastern Shore), two daytime events every ten days, on average, have an L_{Amax} of 82 dB or above and no daytime events are above 95 dB (which corresponds to an indoor sentence intelligibility of less than 10 percent). Locations 9 (Calvert Library) and 17 (residential in Westover, Maryland) are closest to the centerline of this route.

3.6.4.2 Potential for Indoor Sleep Disturbance

Indoor sleep disturbance can be expressed as the maximum percentage of the exposed population to be awakened or the maximum percentage of adults awakened in a typical residential bedroom by a subsonic aircraft event. The maximum percentage of awakenings is a non-linear function of the event’s SEL.

Since the total noise environment at each of the sensitive receptor locations is made up of noise from a number of individual aircraft events (with each potentially involving a unique aircraft type and flight profile), the degree of sleep disturbance varies from flight to flight. For the purposes of this study, the weighted average SEL was again used and outdoor SEL values were transformed to indoor

SEL values via the typical noise level reductions for the types of structures involved (as discussed above under speech interference).

Airfield Sources of Indoor Sleep Disturbance

The analysis indicates that individuals at 10 of the 20 sensitive receptor locations potentially experience some sleep disturbance under windows-open conditions due to airfield sources (Table 3.6-5). This is expressed by "maximum percentage awakenings," which is an estimate of that proportion of the total number of individuals in the affected area whose sleep may be disrupted; as shown in the table, for these locations, this estimate does not exceed seven percent.

In five of these 10 locations, the sleep disturbance measure is not relevant, since four are education locations and the other is an open space (Blackwater NWR); all are places where people would not ordinarily be sleeping. Of the other five, four are residential locations and the fifth is a nursing home. The remaining 10 locations are estimated to have no awakenings due to flights associated with the NAS Patuxent River airfield for the windows-open condition. For the windows-closed condition, only two residential locations -- Fishing Creek, Maryland and Solomons, Maryland -- show non-zero maximum percentage awakenings.

Airspace Sources of Indoor Sleep Disturbance

For existing average monthly airspace subsonic operations, none of the modeled airspaces have any nighttime events with SELs higher than 58 dB. This means that the maximum percentage awakenings are less than one percent.

Regarding supersonic operations, the maximum overpressure of the nighttime supersonic events would be 1.7 psf. Only two events out of the 245 logged supersonic operations (less than one percent) occurred during the nighttime period. Overall, the literature on the effect of sonic booms on sleep disturbance or awakening is sparse and inconclusive, but according to the National Research Council, National Academy of Sciences (1977), sonic booms with overpressures in excess of 1.0 psf can disturb rapid-eye-movement (REM) sleep. Since nighttime sonic booms in the airspace around the air station occur very infrequently and are of low overpressures, their potential for sleep disturbance is minimal.

3.6.4.3 Potential Impacts on Children

Research on the impacts of aircraft noise, and noise in general, on the cognitive abilities of school-age children has received more attention in recent years. Several studies suggest that aircraft noise can impact performance in schools. As reported by Evans and Maxwell (1997), chronic exposure to aircraft noise can result in reading deficits and impacted speech perception (i.e., able to hear common, low-frequency [vowel] sounds but not high frequencies [consonants] in speech [Clayton, 1978]). Specifically, the Evans study found that chronic exposure to aircraft noise resulted in reading deficits and impaired speech perception for first and second grade children. Similar studies have found that children residing near the Los Angeles International Airport had more difficulty solving cognitive problems (Bronzaft, 1997), and elementary school children attending schools near New York City's two airports demonstrated lower reading scores than children living farther away from the flight paths (Green, 1982). Although many factors could contribute to learning deficits in school-age children (e.g., socioeconomic level, home environment, etc.), a growing body of evidence suggests that chronic exposure to high aircraft noise levels can impair learning.

Schools are considered compatible with exterior noise levels between 65 and 75 dB Ldn with incorporation of appropriate sound attenuation. Only one school (Carver Elementary) is exposed to aircraft noise at these levels, and then only at 66 dB Ldn. It is understood that St. Mary's County Schools intends to close Carver Elementary in the future and relocate students to a renovated Lexington Park Elementary nearby.

3.6.5 Aircraft Disturbance Reports

Since 1995, more than 100 aircraft disturbance reports have been received by NAS Patuxent River. These reports are filed with the Air Operations Duty Officer, who determines whether the aircraft disturbance was caused by an aircraft from NAS Patuxent River. The majority of aircraft disturbance reports received have concerned low-flying aircraft. Generally, these reports originate in localities along the eastern shore of the Bay from Lusby to Point Lookout, Maryland. Aircraft disturbance reports concerning UAV activity have been concentrated in the St. Inigoes area and Northumberland County, Virginia. Reports on sonic booms have mainly been from Smith Island, Maryland and Smith Point, Virginia.

3.7 Infrastructure

The focus of this subchapter is on NAS Patuxent River and Webster Field and existing (FY 1996) consumption of utilities, including electricity, heating fuel, natural gas, and potable water, as well as the discharge of sanitary sewage. Neither the CTR nor the targets directly consume utilities. Consequently, existing utility use is associated with ground-based operations in the Patuxent River Complex.

Utility consumption data for FY 1996 do not include several facilities that were under construction during 1996, but were fully occupied by 1998. These facilities are Integrated Project Team Building (NAVAIR headquarters) and the Propulsion Systems Evaluation Facility (PSEF). Where appropriate, the FY 1996 utility consumption rates have been adjusted to account for these facilities.

3.7.1 Electrical Power

The Patuxent River Complex is served by Southern Maryland Electrical Cooperative (SMECO), a member-owned cooperative that serves St. Mary's County, the southern portion of Prince George's and Charles counties, and all but the northern portions of Calvert County. The service area comprises 3,900 sq km (1,500 sq mi). In fiscal 1997, the total consumption of electrical power by the Patuxent River Complex was about 159,200 megawatt-hours (Mwh) (Shizak, January 16, 1998).

During 1997, construction was completed on the Integrated Project Team (IPT) building and personnel moved in, primarily during May through July. Partial year (1997) electrical power consumption for the IPT building was 6,670 Mwh. Electrical power consumption during a full year of operation of the IPT building was been projected at approximately 9,600 Mwh. The PSEF commenced operations in 1998. It was been projected to consume 1,500 to 2,000 Mwh annually and with a peak demand of approximately three megawatts (MW) (Reardon, January 23, 1998). During 1998 total demand for electrical power in the complex is estimated at 165,000 MWh.

As required by Executive Order (EO) 12902 (Energy Efficiencies and Water Conservation at Federal Facilities), the IPT building and the PSEF have been equipped with high efficiency electrical systems that monitor lighting to reduce energy requirements. In addition, the facilities have been provided with energy efficient computers, monitors, and printers to the maximum extent possible, as required by EO 12845 (Requiring Agencies to Purchase Energy Efficient Computer Equipment).

3.7.2 Heating Oil

In 1996, over 6.7 million liters (1.76 million gallons) of No. 2 fuel oil were consumed at the Patuxent River Complex (Johnson, October 11, 1997). Some oil-burning boilers are dual-fired units using fuel oil and natural gas. The IPT and PSEF are also heated using natural gas. In addition, NAS Patuxent River is committed to reducing air emissions by converting its oil-burning heating systems to natural gas. Over eight km (five mi) of gas pipeline have been installed at the air station, and more than 30 buildings have been converted to natural gas. In addition, heating units at several hundred housing units have been successfully converted to heat pumps and geothermal units. However, for the purposes of this EIS, it is assumed that the FY 1996 baseline for heating oil consumption would require no adjustment for 1998.

There is approximately 6.1 million liters (1.6 million gallons) of heating oil stored at NAS Patuxent River (including remote above ground storage tanks located at buildings for heating). According to the *Comprehensive Fuel System Study* (1997) for NAS Patuxent River, the recommended storage volume of heating oil is 4.9 million liters (1.29 million gallons). However, planned changes for 2002 will decrease this capacity.

3.7.3 Natural Gas

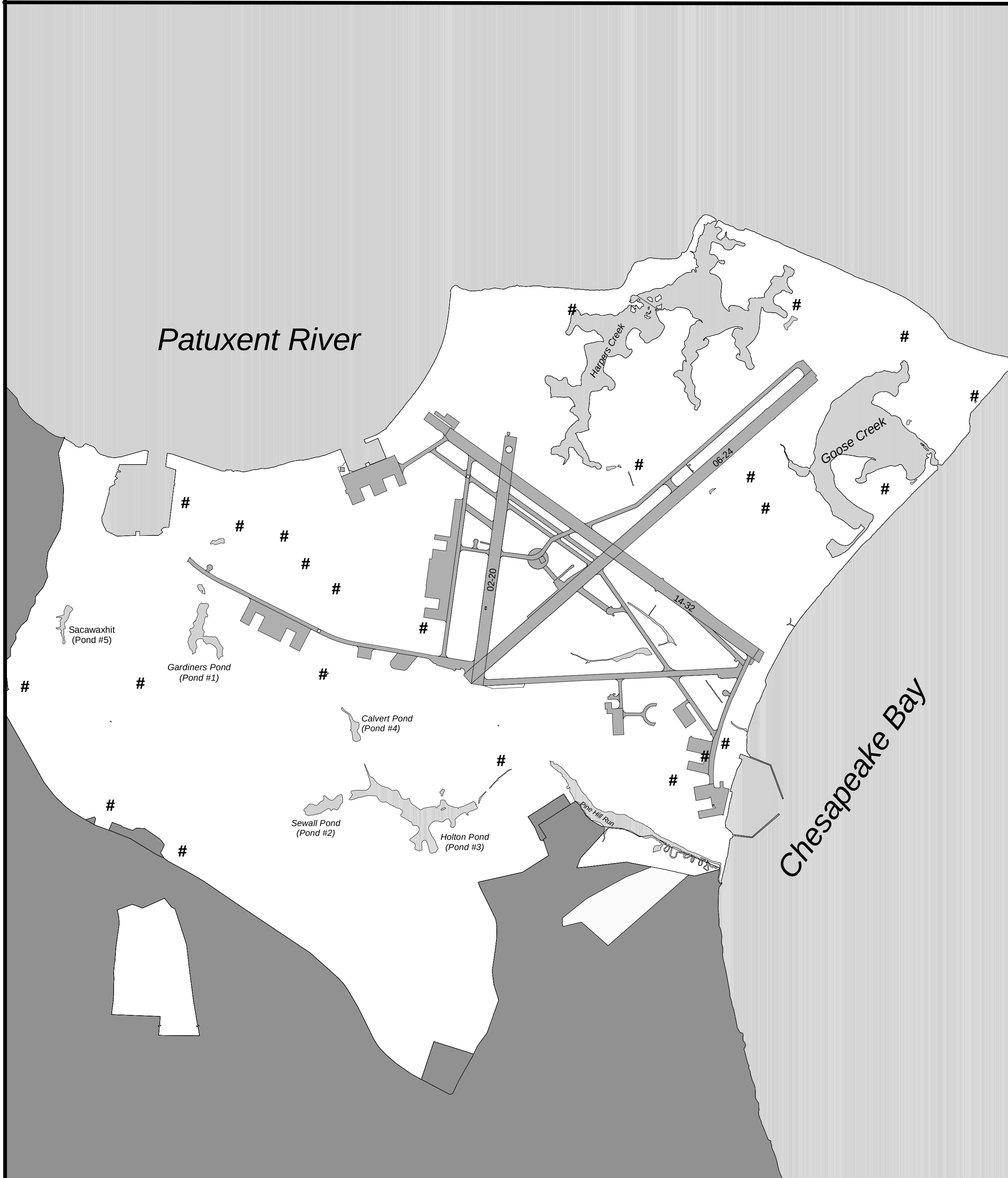
Natural gas consumed by the Patuxent River Complex in 1996 was 10.76 million cubic meters (cu m) (379.7 million cubic feet [cu ft]) (Shizak, September 25, 1997). This natural gas is supplied by Washington Gas, which began service to the complex in 1992. Since that time, the highest recorded use of natural gas at NAS Patuxent River has been 4,960 cu m (175,000 cu ft) per hour.

The PSEF and the IPT building are heated with natural gas. Estimates of natural gas consumption for these buildings are 823 and 92 cubic m (10,000 and 1,500 cu ft) per hour, respectively, during peak demand (US Department of the Navy, August 1994). The estimated 1998 annual average consumption of natural gas by the Patuxent Complex, based on the PSEF operating for the full year, is 12.8 million cu m (451.7 million cu ft).

3.7.4 Potable Water

The potable water supply system consists of 24 deep wells at NAS Patuxent River (Figure 3.7-1, Potable Water Wells at NAS Patuxent River) and two deep wells at Webster Field with an emergency connection to the St. Mary’s Metropolitan Commission (METCOM) water distribution system. The 24 deep wells at NAS Patuxent River draw on the Aquia and Piney Point/Nanjemoy aquifers (aquifers described in Subchapter 3.11). The two wells at Webster Field draw from the

Potable Water Wells at NAS Patuxent River



Potable Water Well Location (may include more than one wellhead)

NAS Patuxent River

Airfield Surface

Restrictive Easement

2000 0 2000 4000 Feet

N

Figure 3.7-1

Aquia Aquifer. Withdrawal of water from any of these wells is regulated by the Maryland Department of the Environment (MDE).

Drinking water supplies at NAS Patuxent River and Webster Field are separate from the firefighting water supply. Both systems at each location are equipped with backflow preventers at sensitive areas to maintain high quality drinking water and to protect the system from contamination.

The water supply is monitored for a number of contaminants, including bacteriologicals and radionuclides, lead, copper, synthetic organic compounds, inorganic contaminants and metals, and volatile organic compounds. The drinking water supply continues to meet regulatory standards.

In 1996, the Patuxent River Complex used about 1,100 million liters (288.2 million gallons) of potable water (Shizak, September 25, 1997). This equates to an annual average use rate of about three million liters (800,000 gallons) per day. Water consumption rates estimated for the IPT building and the PSEF are 304,000 and 13,300 liters (80,000 and 3,500 gallons) per day, respectively (Turner, Collie, & Braden, Inc., August 1994). These facilities are equipped with such water-efficient features as low-flow toilets and sensor water fountains and sinks in compliance with EO 12902.

By the end of 1998, it is estimated that peak potable water demand will be approximately 4.2 million liters (1.1 million gallons) per day (RMC, Inc., September 1997), with the same annual average use as identified for 1996 (3 million liters [800,000 gallons] per day). The current capacity of the potable water system is 21.3 million liters (5.6 million gallons) per day.

NAS Patuxent River is planning for future water conservation efforts for both the air station and Webster Field in its *Water Conservation Plan.* The focus of this plan is the potable water system and the installation of water conserving fixtures. In 1995, the air station prepared an *Emergency Drinking Water Plan* that provides for the needs of the Navy in case of a catastrophic event that impairs or damages the Patuxent River Complex potable water system. The air station is updating the plan in 1998. A draft version of the updated plan was sent to MDE for comments in January 1998. The air station expects to finalize the updated plan in May 1998 (Johnson, January 29, 1998).

3.7.5 Sanitary Sewage

Sanitary sewage generated at NAS Patuxent River and Webster Field is managed differently, reflecting the 13-km (seven-mi) distance between the two facilities. NAS Patuxent River has approximately 40,500 linear m (135,000 linear ft) of sanitary sewer lines, 25 lift stations, and 16 septic tanks with drain fields (RMC, Inc., September 1997). Except for the septic tanks, all sanitary sewage generated at the air station is treated at St. Mary's Metropolitan Commission's (METCOM) Pine Hill Run Wastewater Treatment Plant located adjacent to NAS Patuxent River on the south side of Pine Hill Run along East Patrol Road. The capacity of this facility is currently being increased. Once the upgrade is completed, anticipated in 1998, the capacity of the Pine Hill Run Wastewater Treatment Plant will be just over 19 million liters (five million gallons) per day. On October 1, 1997, METCOM published a new sewer use regulation and will establish new local limits for its major customers, including NAS Patuxent River, by April 1998. The air station is developing and implementing a new sewer use permitting program to meet the new limits.

In 1996, the air station generated an average sanitary sewage flow of 2.5 to 3 million liters (0.65 to 0.8 million gallons) per day. Estimates for sanitary sewage generation for the IPT and PSEF buildings are 304,000 and 13,300 liters (80,000 and 3,500) gallons per day, respectively (US Department of the Navy, 1994). By the end of 1998, when all construction associated with BRAC is complete and all personnel have been relocated to the complex, the total sanitary sewage generated by the air station that will require treatment at METCOM's Pine Hill Run will be 2.7 to 3.4 million liters (0.7 to 0.9 million gallons) per day for an average of 3 million liters (800,000 gallons) per day.

Sanitary sewage generated at Webster Field is treated at an on-site Navy-Owned Treatment Works (NOTW), the discharge from which is subject to National Pollutant Discharge Elimination System (NPDES) permit 93-DP-2523, MD0020095. The expiration date for this permit is November 30, 1999. The NOTW discharges into the St. Mary's River at Outfall 001. The capacity of this facility is 171,000 to 228,000 liters (45,000 to 60,000 gallons) per day.

3.7.6 Solid Waste

In fiscal year 1996, the Patuxent River Complex generated about 5,009 metric tons (5,523 tons) of municipal solid waste (MSW) as determined by a statistical analysis based on a per capita generation rate of 0.36 metric ton (0.4 ton) per person per year. The predominant component of the solid waste stream was paper, which accounted for 55 percent of the 1996 total. Organic matter, such as yard waste and food scraps, comprised 18 percent of the total. Plastics represented 17 percent of the MSW. Glass and metals contributed six and four percent, respectively, to the waste stream (*Solid Waste Annual Report for Fiscal Year 1996,* in NAS Patuxent River Pollution Prevention Control Plan, September 1997).

The majority of the air station's MSW is transported by a contractor, St. Mary's Disposal, to the St. Andrew's Landfill operated by the St. Mary's County Public Works Department. The MSW portion of this landfill is scheduled to close in 1998, although construction debris, yard waste, and tires may continue to be accepted for a period of years thereafter. The Appeal Waste Management Facility in Calvert County, Maryland and the Brandywine Enterprises landfill in Fairmount, Maryland have also been used for the disposal of air station MSW and will probably continue to be used in the future.

NAS Patuxent River has developed a solid waste management plan in accordance with the guidelines of EO 12856 (Federal Compliance with Right-to-Know Laws and Pollution Prevention, DoD Directives, and OPNAVINST 5090.1B). In accordance with these requirements and those implemented by St. Mary's County and the state of Maryland (Annotated Code of Maryland, Environmental Article, Title 9, Water, Ice, and Sanitary Facilities, Subtitle 17, Office of Recycling), the air station has set a goal of reducing quantities of solid waste requiring disposal, using 1994 generation as a baseline, by 60 percent by January 1, 2000. Meeting the 60 percent reduction goal by this date will require a combination of source reduction, reuse, recycling, and composting. Included in the goal is an objective to increase recycling to 50 percent of waste quantities generated. Other strategies will be used to attain the rest of the disposal reduction.

These goals, to be reached by January 1, 2000, exceed the 15 percent recycling requirements imposed by St. Mary's County and the state of Maryland. To meet this challenge, NAS Patuxent River has established an Authorized Recycling Program under the Public Works' Environmental and Natural Resources Management Division.

In fiscal year 1996, NAS Patuxent River's overall recycling rate was estimated to be 30 percent of the solid waste stream, or 2,157 metric tons (2,378 tons), a slight decrease from 32 percent estimated for 1995. Metals were the substance comprising the greatest part of the recycling, with 1,663 metric tons (1,833 tons) of ferrous and non-ferrous metals recycled through DRMO, an increase of nearly 30 percent over the 1,282 metric tons (1,413 tons) collected in fiscal year 1995. Second in tonnage recycled was white paper, with 217 metric tons (239 tons) recycled. Other substances recycled included aluminum cans, cardboard, file stock, computer printout paper, non-reproducible carbon paper, shredded paper, newspapers/magazines, and toner cartridges. Also recycled when quantities warrant and markets are found are lead acid batteries, yard waste, and construction rubble and debris. Aircraft tires were retreaded in Norfolk, Virginia; ground support equipment tires were sold or discarded at Fort Meade.

Within the recycling goal, paper recycling will be targeted because of the large amount in the waste stream and the feasibility of achieving more recycling. Ways to compost organic matter are being explored. Procurement procedures being reviewed include purchasing more durable goods, reducing packaging and paper, and buying recycled paper products and toner cartridges. Equipment such as can and drum crushers and aerosol can puncturing devices to reduce bulk and encourage recycling have been purchased and all but the drum crusher have been installed.

The hospital facilities at NAS Patuxent River generated approximately 7,866 kg (17,480 lbs) of medical waste in fiscal year 1996. The majority of medical waste 5,111 kg (11,357 lbs) was incinerated by WMI Medical Waste, a licensed contractor. The remainder was incinerated by Capital Processing/Med Net Incendere, another contractor. With the closure of emergency room facilities, future waste generation rates should decrease.

3.8 Cultural Resources

3.8.1 Chesapeake Test Range

3.8.1.1 Prehistoric Overview

The prehistoric context described in this subchapter is applicable to the land area underlying the entire CTR, as well as the locales of NAS Patuxent River and Webster Field. The first documented human occupants of Maryland were the Paleo-Indians between 11500-10000 BP (Before Present). The prehistory of the study area is further characterized by cultural isolation that occurred during the Woodland Period (2700 BP-1600 AD) (Chaney, undated; Dames & Moore, January 1997).

3.8.1.2 Historic Overview

Captain John Smith, upon exploring the Chesapeake Bay in 1608, claimed "Heaven and earth never agreed better to frame a place for man's habitation" (Mears, 1936). The year 1634 marked the establishment of a fort at St. Mary's City, the first Anglo-European settlement in Maryland and capital of the state. It was not until 1637, however, that European settlers ventured into outlying areas in search of more farm land. Around 1641, Society of Jesus (Jesuit) missionaries secured from the Patuxent Indians a significant tract known as Mattapanient Hundred (later Mattapany-Sewall), the land on which NAS Patuxent River would be built nearly three centuries later.

The region's deep harbors and navigable rivers, as well as the success of tobacco as a cash crop, strengthened the colonial economy. In addition to providing transportation around the peninsula, the Patuxent River fostered settlement along its banks. However, as a result of decreasing tobacco prices in the early 18th-century, both settlers and former indentured laborers sought lands elsewhere. The relocation of the capital to Annapolis in 1694-95 led to the further decline of St. Mary's City and the Patuxent-Chesapeake area. By 1720, all traces of the first settlement had virtually vanished.

After the Revolutionary War, commerce in the Chesapeake Bay region thrived. Trading of agricultural products, combined with a new interest in grain and cattle, reinforced the region's prosperity, though during the War of 1812, trade was disrupted by British blockades in the Bay. Likewise, when war broke out again in 1861, the region was affected by forces vying for control of the Potomac River. The area continued to remain predominantly agricultural despite a drastic decline in tobacco production after the issuance of the Emancipation Proclamation (Watts, Jr., September 1992).

While the mainland's economy was dependent upon agriculture, the region's island communities of Tangier, Smith, and Deal prospered in the fishing industries. Local tradition contends that sometime between 1650 and 1666, two white men purchased Tangier Island from the Pocomoke Indians for two overcoats. John Crockett, along with his eight sons and their families, settled the island in 1686 (Mears, 1936). Even today, most of the island's population bears the surnames of the founding inhabitants.

Local lore claims Smith Island was likewise named by and for Captain Smith. Believed to have been settled in 1657 by a group of dissenters from the western shore, Smith Island, as well as others along the eastern edge of the Bay, were known in the seventeenth century as "Russell Isles," in honor of Walter Russell, the doctor aboard Smith's ship. Initially used as pasture land for livestock, the island is recognized today for its substantial contributions to the oyster, crab, and fishing industries (Horton, 1996). Similarly, neighboring Deal and Tangier islands harbor the remnants of the region's once thriving Chesapeake Bay Skipjack Fleet.

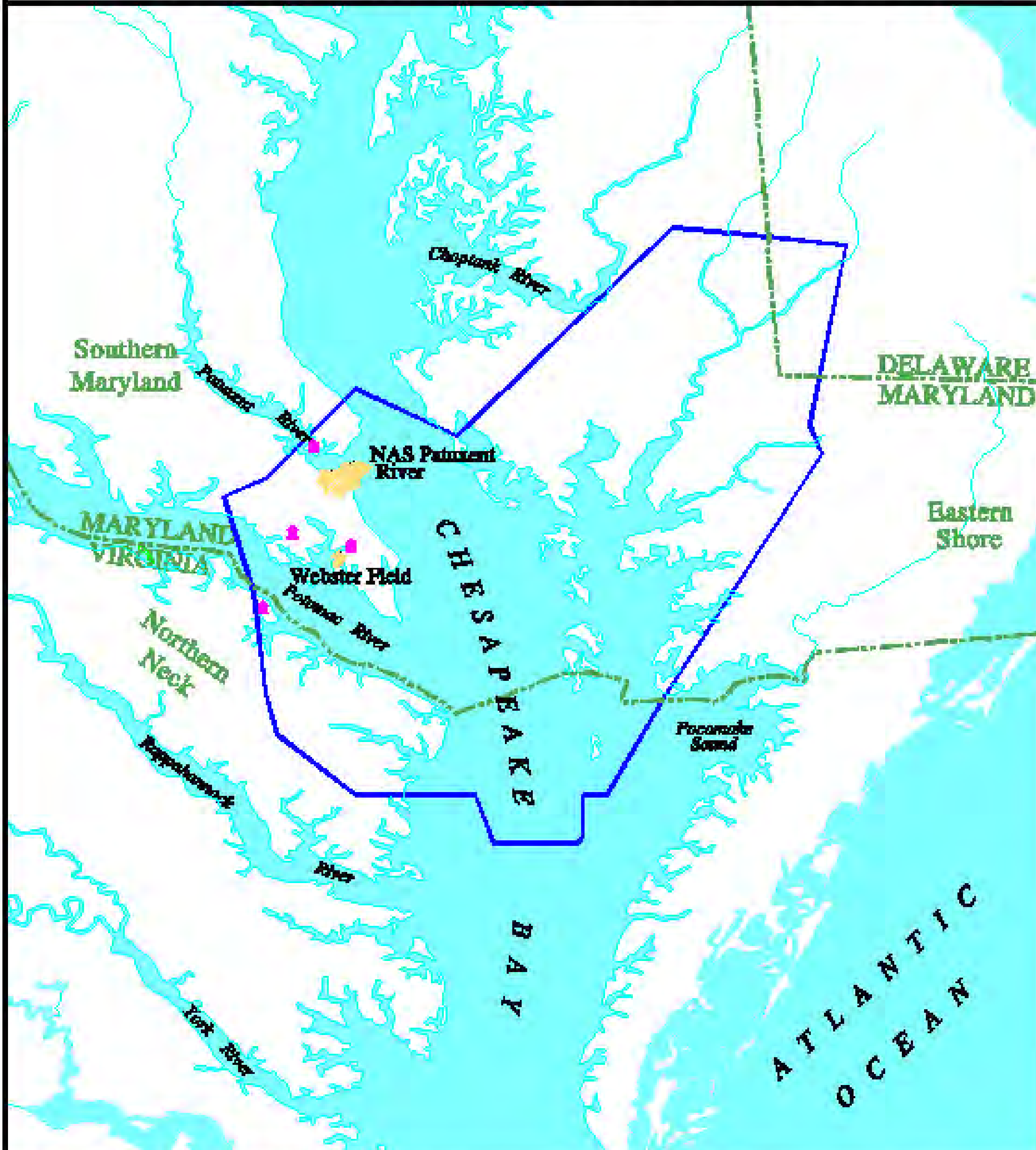
The oyster market has been an economic mainstay of the Chesapeake Bay region since the early-eighteenth century. With the creation of oyster dredges in New England in the 1840s came the need for larger sailing vessels. Subsequently, the log canoe was replaced by such craft as the "bugeye" and the "skipjack" (Somerset County, undated). The oystermen, better known as watermen, continue to make their living from the bounties of the Chesapeake Bay. In fact, in the 1970s, Maryland led the nation in oyster production (de Gast, 1970).

Between the Great Depression and World War II, a decline in the Eastern Shore's fisheries led to the birth and subsequent success of the crabbing industry. Tangier Island alone "is responsible for more crabs than any other single locality in the Chesapeake Bay region" (Warner, 1976). Smith Island boasts success as "the champion of the Chesapeake in soft crab production," and Deal Island is likewise considered one of Maryland's crabbing centers (Warner, 1976). Perhaps the newest industry among the islands is tourism. Numerous ferries embark from points along Maryland's Eastern Shore and Virginia's Northern Neck for brief visits to Tangier and Smith islands.

3.8.1.3 National Historic Landmarks

The Historic Sites Act of 1935 created "a national policy to preserve for public use historic sites, buildings and objects of national significance for the inspiration and benefit of the people of the United States." Section 2(b) states that one of the first duties of the Secretary of the Interior, in conjunction with the National Park Service, was to conduct a survey of such historic and archaeological resources in order to determine exceptional examples that commemorated the nation's "history, architecture, archaeology, engineering and culture." The National Historic Preservation Act of 1966 expanded the survey to include the initial landmarks in the newly established National Register of Historic Places (US Department of the Interior, 1993; US Department of the Interior, 1991). Today, National Historic Landmarks may also include districts and structures, in addition to sites, buildings, and objects. Within the boundaries of the CTR, there are four National Historic Landmarks (Table 3.8-1 and Figure 3.8-1, National Historic Landmarks Within the CTR).

National Historic Landmarks Within the CTR



National Historic Landmark Location
Chesapeake Test Range (CTR)
NAS Patuxent River and Webster Field
State Boundary

20 0 20
Scale in Miles
20 0 20
Scale in Kilometers

N

Figure 3.8-1

Table 3.8-1

National Historic Landmarks Within the Chesapeake Test Range

Name of Landmark	Location
Chesapeake Bay Bugeye, William B. Tennison	Solomons, Calvert County, Maryland
St. Mary's City Historic District	St. Mary's City, St. Mary's County, Maryland
Spence's Point	Westmoreland, Westmoreland County, Virginia
West St. Mary's Manor	Drayden vicinity, St. Mary's County, Maryland
Sources: US Department of the Interior, National Historic Landmark Index Internet Website, Accessed May 29, 1997.	

3.8.1.4 National Register of Historic Places

The Chesapeake Bay area is a region rich in cultural resources, as evidenced by the presence of 113 properties that are listed in the *National Register of Historic Places* within the footprint of the CTR (Figure 3.8-2, National Register Properties Within the CTR). According to National Park Service guidelines, nominated properties, which may consist of districts, sites, buildings, structures, or objects, "have significance to the prehistory or history of their community, State, or the Nation." Furthermore, in order to be nominated, the properties must possess historic significance, retain sufficient historic integrity, be at least 50 years of age, and meet at least one of the following selective criteria: "Association with historic events or activities; Association with important persons; Distinctive design or physical characteristics; or potential to provide important information about prehistory or history." States, federal agencies, or other individuals and citizens may nominate a property that meets the established criteria (US Department of the Interior, 1991). Resources within the footprint of the CTR that are listed in the *National Register of Historic Places* are identified in Appendix H by state and county.

In addition to those properties possessing national significance, the land area underlying the CTR abounds with cultural resources considered historic at the state and local levels. A list of these resources is available through the Delaware State Historic Preservation Office, the Maryland Historical Trust, or the Virginia Department of Historic Resources.

National Register Properties Within the CTR

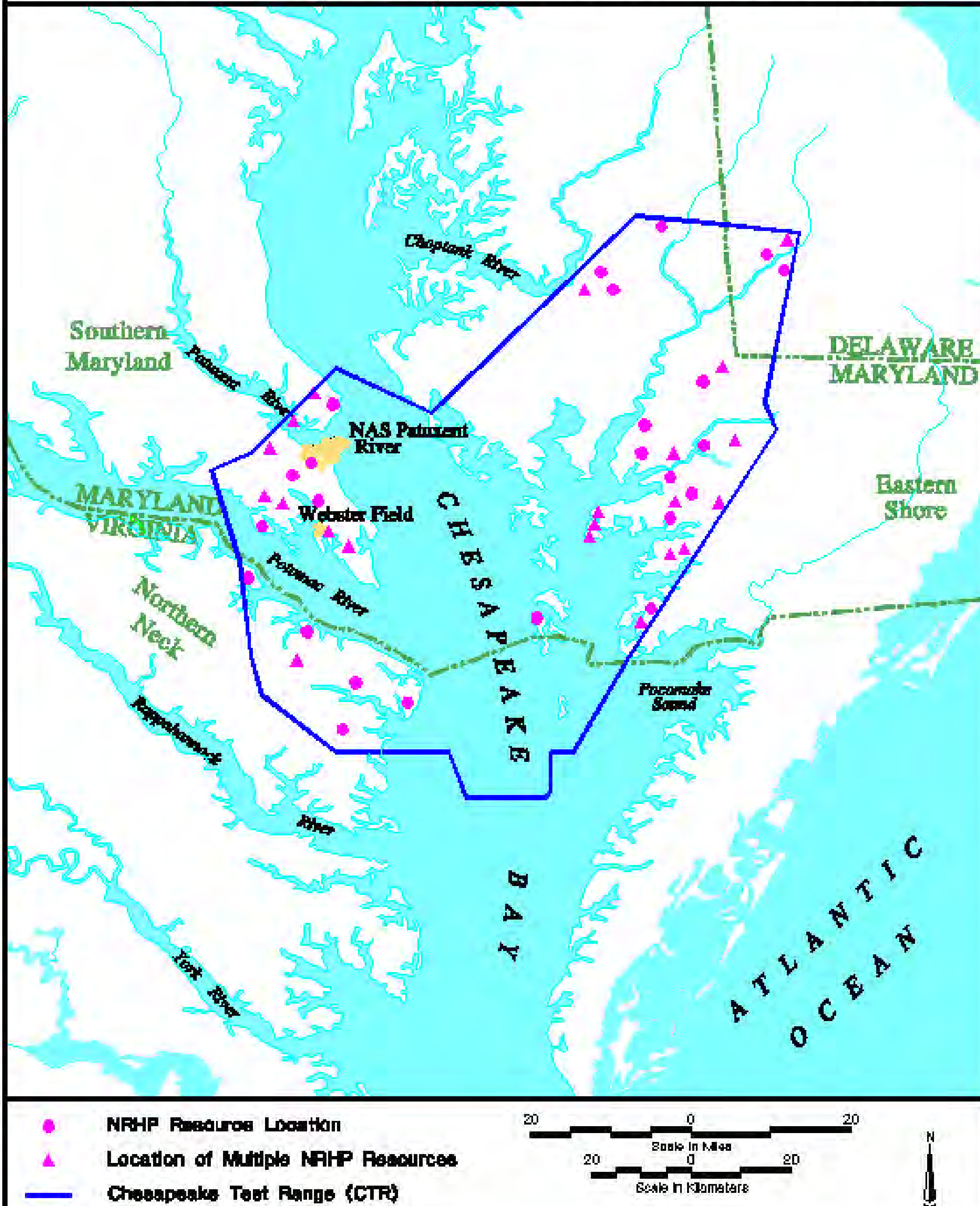


Figure 3.8-2

3.8.2 NAS Patuxent River

3.8.2.1 Historic Overview

The site of NAS Patuxent River was formerly occupied by several small communities, the most substantial of which was Pearson. In addition to the town of Pearson, three prosperous farms belonging to the Johnson, Young, and Weschler families occupied the area. Each included land belonging to the region's prominent 17th-century plantations: Eltonhead Manor (1648), Susquehanna (1649), and Mattapany-Sewall (1663).

In 1941, the Bureau of Aeronautics created a committee to choose a site for a facility where all required specialized Navy flight testing could be conducted. Previously, aircraft testing had occurred at several facilities: Anacostia in Washington, DC; Dahlgren and Hampton, Virginia; and the Naval Aircraft Factory in Philadelphia, Pennsylvania. By early November 1941, the Board expressed interest in acquiring about 971 hectares (2,400 acres) on Cedar Point, Maryland for a proposed "Navy Flight Test Center" (Wilson, 1992). By April of the following year, the new NAS Patuxent River facility, comprised of Flight, Service, Radio, Armament, and Tactical Test Divisions, was officially on active duty (Wilson, 1992; Watts, Jr., September 1992).

3.8.2.2 Archaeological Resources

Currently, there are at least 53 recorded archaeological sites within the boundaries of NAS Patuxent River (Lister, May 28, 1997). Due to its large size (2,653 hectares [6,555 acres]), and given that the whole air station has not yet been archaeologically tested, the potential exists for discovering additional sites in the future (Chaney, May 28, 1997). The further likelihood of unearthing historic remains can be attributed to the air station's "close proximity to the initial colony at St. Mary's, and the prolonged occupation of the area" (Watts, Jr., September 1992).

The following highlights a few of the noted archaeological resources at NAS Patuxent River (Lister, May 28, 1997):

- **Site 18ST390, Mattapany-Sewall Archaeological Site** - Recently identified as the home of Charles Calvert, Third Lord Baltimore, governor and proprietor of the Maryland colony. From 1666 to 1689, Mattapany-Sewall flourished as colonial Maryland's political center. In addition to Calvert's substantial house, archaeologists have also discovered evidence of an armory and palisade fence.

- **Site 18ST642** - Excavations conducted at the Integrated Program Team Building revealed slave quarters, possibly associated with the Mattapany-Sewall plantation.

This site is especially significant because no other slave quarters have been uncovered on NAS Patuxent River grounds to date.

3.8.2.3 Architectural Resources

According to National Park Service guidelines, “properties must be 50 years of age or more to be considered historic places.” Exceptions to this rule may be made, however, “if [a property] is of exceptional importance” (US Department of the Interior, 1991). NAS Patuxent River maintains between 240 and 300 buildings that are at least 50 years of age or older (Lister, May 28, 1997). A Section 110 Cultural Resources Survey of all structures at NAS Patuxent River is currently underway; however, this survey will not be completed for another two to three years. In the absence of a completed Section 110 Cultural Resources Survey, NAS Patuxent River conducts NHPA Section 106 consultations with the Maryland Historical Trust (SHPO) as required.

Although the Section 110 survey may recognize additional significant buildings (some of which may be eligible for inclusion in the National Register of Historic Places), the following highlights a few of the noted architectural resources at NAS Patuxent River (Lister, May 28, 1997; NAS Patuxent River, February 1997; and other sources where noted):

- **Frank Knox Elementary School** - Dating from 1943, the school, named for the Secretary of the Navy in command during World War II, was built to accommodate the arrival of Navy children in the Cedar Point area (Wilson, 1992). It is a fine example of World War II era design and construction.

- **Mattapany** - This dwelling was built circa 1740, perhaps using scavenged bricks from the 17th-century Mattapany-Sewall ruins that are located several hundred feet to the east. This site of the original Calvert dwelling is currently undergoing archaeological investigation.

- **Pearson Pavilion** - Photographs and historical accounts displayed in this open-air structure highlight the history of Pearson and other surrounding communities prior to their disappearance upon the arrival of the Navy in the Cedar Point area.

- **St. Nicholas Chapel** - Built circa 1920, the concrete block chapel replaced an earlier church dating to 1795. A cemetery occupies the grounds around the church.

- **Susquehanna -** Shortly following the Navy’s acquisition of the Cedar Point area, the dwelling known as Susquehanna was moved to Greenfield Village in Dearborn, Michigan. Results from a 1987 archaeological investigation suggest a construction date of circa 1840. The building was home to the Carroll family, the wealthiest antebellum planters in St. Mary’s County.

3.8.3 OLF Webster Field

3.8.3.1 Historic Overview

Constructed by the Navy in 1942, Webster Field serves as an outlying landing field for NAS Patuxent River. It was originally comprised of the northern 313 hectares (773 acres) of St. Inigoes Manor, the early 17th-century site of the first English Catholic mission organized by the Society of Jesus, or Jesuits. The Manor prospered as a residence, home farm, and tenant farm until the early decades of the 20th-century. Upon the Navy's acquisition of the Manor, all other remaining buildings associated with the Jesuits were removed (John Milner Associates, Inc., 1989).

Originally named NAS Beachville, Webster Field was first used as an emergency landing field to accommodate high volumes of air traffic at NAS Patuxent River during World War II. It also functioned as a dispersal field if threatened by an air invasion. Additionally, operations such as dive bombing, aerial gunnery exercises, target practice, and glider control experiments occurred at the facility. The outlying field later received its current name in honor of Captain Walter M. Webster, an early leader in naval aviation (Draft INRMP, Undated).

3.8.3.2 Archaeological Resources

In 1981, an extensive archaeological survey was conducted at Webster Field, revealing at least 40 sites of both prehistoric and historic significance. A follow-up project in the summer of 1996 focused upon the excavation of those areas not examined in the previous survey. Subsequently, new sites were identified. The total number of archaeological sites discovered at Webster Field to date is unknown since several sites are still currently under investigation. Most of Webster Field has undergone archaeological evaluation (Chaney, May 28, 1997).

The following highlights a few noted archaeological resources at Webster Field:

- **Site 18ST87, Priest's Point Manor House** - Originally dating to the 1750s, this residence of the Jesuit mission burned in 1872, and was later rebuilt with surviving structural features. Upon acquisition by the Navy in 1942, the dwelling was converted to Officers' Quarters. Due to severe deterioration, the building became uninhabitable. Currently, its ruins, as well as surrounding archaeological site 18ST87, comprise the sole National Register-listed resource at the Annex (Neuwirth, Undated).

- **Site 18ST330, Old Chapel Field Site** - This resource consists of a prehistoric Woodland period occupation, in addition to the Manor House site dating to 1705-1755. Although oral history suggested the presence of a cemetery as well, a subsequent investigation determined the site to be the location of the chapel and graveyard used by the Jesuits until 1704, when Maryland law restricted Catholic worship to private homes only. A manor house had been built at the site to replace the condemned Catholic chapels of St. Mary's City and St. Inigoes. It is presumed that the Old Chapel Field Manor House remained occupied through the 1750s, until the construction of a newer residence at Priest's Point (Neuwirth, Undated).

- **Sites ST233 and 234, Snake Site and Wash Site** - Both sites date from the Woodland period.
- **Sites ST328 and 329, Gun Site and Fly Site** - Both sites have prehistoric origins.
- **Site 18ST386, Fort Point Site** - This site dates from the late 17th-century to 18th-century (Maryland Archeological Site Survey forms).

3.8.3.3 Architectural Resources

The remains of the Priest's Point Manor House are considered to be the only notable architectural resource at Webster Field (Draft INRMP, Undated). The NAS Patuxent River Section 110 Cultural Resources Survey will include Webster Field.

3.8.3.4 Underwater Archaeological Resources

According to the Office of the Maryland State Underwater Archaeologist, several cannon were recovered in the 19th- and early 20th-centuries off the shore of Webster Field. Although some believe they are the remains of an eroded fort, it is more probable that the weapons came from a shipwreck that has yet to be discovered. Further underwater study may reveal the origins of the cannon (Langley, June 6, 1997).

3.8.4 Localized Target Areas

Despite the vast number of cultural resources found on the land areas underlying the CTR (as described above), no underwater cultural resources have been identified in the vicinity of the Hooper, Hannibal, and Tangier Island targets throughout their history of use in the Patuxent River Complex.

3.9 Ordnance, Hazardous Materials Management, and Radio Frequency Sources

This subchapter provides a discussion of the use and management of ordnance stores and hazardous materials, and radio frequency sources at the Patuxent River Complex.

3.9.1 Ordnance Stores

Activities associated with aircraft-related RDT&E and in support of military training in the Patuxent River Complex involve the release of ordnance stores (i.e., any item capable of being released or expended from aircraft) in the CTR. The principal type of RDT&E activity that would involve the release of ordnance stores (hereinafter, stores) in the CTR is weapons/stores separation testing. Weapons/stores separation tests are conducted to assess the ability of a store to safely and reliably separate (be released) from an aircraft. In addition, activities conducted in support of military training that would involve the release of stores in the CTR include firing at a target (Hannibal or Tangier Island targets), dropping practice bombs, and using decoys in conducting electronic warfare (EW) tests or exercises in the vicinity of Hooper target.

Released stores have included fuel tanks, pods, and other miscellaneous systems hardware, in addition to inert (nonexplosive) ordnance. Inert ordnance includes steel shapes or replicas containing concrete, vermiculite, and/or other nonexplosive materials similar in appearance, size, and weight to the explosive ordnance type that would be deployed during wartime (may also be referred to as an instrumented test vehicle or separation test vehicle).

Inert ordnance released into the Chesapeake Bay has included missiles, practice bombs, rockets, decoys (chaff, flares, and jammers), gun ammunition, and other items (fuel tanks and launchers). Each of these types of ordnance is described in detail in Appendix I. Some missile shapes, guided bombs, mines, and fuel tanks, launchers, and racks are recovered. Other stores would be unrecoverably remain in Bay sediments, mostly practice bombs, rockets, decoys, and gun ammunition.

Some of the stores (estimated at two percent), would include telemetry units, which have battery-powered electrical systems. In the past, nickel-cadmium (Ni-Cd) batteries were used in the telemetry units and some Ni-Cd batteries are still in the inventory. However, weapons/stores separation testing being performed in conjunction with the F/A-18E/F program is successfully using lithium iron disulfide batteries in the telemetry units as a substitute for the Ni-Cd battery. This type of battery is environmentally friendly.

3.9.1.1 Chesapeake Test Range and Localized Target Areas

Airspace within the CTR authorized for live fire or inert ordnance deployment under DoD regulations includes R-4002, R-4005, and R-6609. The impact area of the Bloodsworth Island Shore Bombardment and Bombing Range, which lies beneath R-4002, is owned and controlled by NAB Little Creek, Norfolk, Virginia. The aerial and surface firing range underlying R-4005 is owned and controlled by NAWCAD and encompasses Hooper and Hannibal targets. Hooper target is an instrumented billboard target that has been used since 1949. Hannibal target is a tactical target, the ex-American Mariner, that was scuttled in 1969. Ordnance permitted at these targets in the aerial and surface firing range includes inert bombs, rockets, torpedoes, mines, sonobuoys, flares, chaff, and aircraft gun ammunition.

The Tangier Island target underlies R-6609. The target consists of the two scuttled cargo ships that are in poor condition. Ordnance permitted at the Tangier Island target includes practice bombs and 2.75-in Folding Fin Aerial Rockets with inert heads. Strafing is not authorized.

Records of the quantity and type of ordnance stores released in the CTR since 1988 were reviewed. The ten-year total and the average annual utilization for missiles, bombs, rockets, mines, decoys (flares/jammers), and marine markers are shown in Table 3.9-1. Average annual utilization of gun ammunition and chaff is shown in Table 3.9-2.

Military Munitions Rule

On February 12, 1997, the USEPA published its *Final Military Munitions Rule* at 40 CFR Parts 260-266, 270 in the *Federal Register*. These rules were developed as required by Section 107 of the Federal Facility Compliance Act of 1992, which added subsection 3004(y) to the Resources Conservation and Recovery Act (RCRA) (42 USC Section 6924[y]). The rules identify when conventional and chemical military munitions become a hazardous waste under RCRA and provide for the safe storage and transport of such waste.

For the purposes of 40 CFR Part 260.10, military munitions include all ammunition products and components produced or used by or for DoD or the US Armed Services for national defense and security. These military munitions would encompass both chemical and conventional weapons:

- Confined gaseous, liquid, and solid propellants;
- Explosives;
- Pyrotechnics (e.g., items similar to fireworks);
- Chemical and riot control agents;

Table 3.9-1

Patuxent River Complex Existing Estimated Annual Ordnance Utilization

Store[1]	10 Year Total[2]	Estimated Average Annual Utilization[3]
Missiles[4]	50	5
Guided Bombs[4] (Walleye/JSOW)	25	3
Practice Bombs (BDU, MK-76/106, LGTR)	4,625	460
General Purpose Bomb (MK-80 Series)	2,230	225
Cluster Bombs (Rockeye, CBU-59/72)	595	60
Rockets (2.75 in and 5 in)	810	80
Mines[4]	95	10
Decoys		
Flares	7,035	705
Jammers	740	75
Marine Markers	875	90

Notes:
1. Representative store types shown for certain store categories.
2. Rounded to nearest 5, except for guided bombs.
3. 10-Year Average.
4. Some stores are recovered.

Source: NAWCAD, October 1997.
Shablack, November 19 and 20, 1997.

Table 3.9-2

Existing Estimated Annual Gun Ammunition/Chaff Utilization for the Patuxent River Complex[1]

Gun Ammunition Type	Existing Average Annual Utilization
Gun Ammunition (rounds)	
5.56 mm, 7.62 mm, .50 cal. [2]	46,010
20 mm, 25 mm, 30 mm, and 40 mm	14,400
Chaff (canisters)	575

Notes: 1. Based on average of 1996 and 1997 range utilization data.
2. Lead is a major component of 5.56 mm and 7.62 mm bullets; the major component of other bullets is steel.

Source: NAWCAD, October 1997.

- Smokes; and

- Incendiaries, including bulk explosive and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof.

The definition of military munitions, however, does not include wholly inert items. For example, the practice bombs released in the CTR would not meet the definition of military munitions as promulgated in 40 CFR Part 260.10, but a spotting charge used with such a practice bomb would meet the definition.

In any event, as stated in 40 CFR 266.202, when military munitions are used for their intended purpose, they are not considered a solid waste for regulatory purposes, even if the intended purpose results in the deposit of munitions on land. Furthermore, 40 CFR 266.202(a)(1)(I) clarifies that military munitions used in the following activities constitutes normal use of the product, rather than waste disposal:

- Training of military personnel or explosives and munitions emergency response specialists;

- RDT&E of military munitions, weapons, or weapon systems; or

- Recovery, collection, and on-range destruction of unexploded ordnance and munitions fragments during range clearance activities at active or inactive ranges.

Military munitions become a solid waste (or a hazardous waste, if applicable) when transported off-range for the purposes of storage, reclamation, treatment, disposal, or treatment prior to disposal; if buried or landfilled either on- or off-range; or if the munition lands off-range and is not promptly rendered safe and/or retrieved. Transportation, storage, and disposal activities for solid (hazardous) waste are governed by RCRA Subtitles C and D.

As applied to RDT&E and support for military training activities undertaken in the Patuxent River Complex, specifically in the aerial and surface firing range and at and around the three targets, the Military Munitions Rule states that stores deposited in the active aerial and surface firing range are not considered solid waste unless removed and transported off-range for disposal.

3.9.1.2 NAS Patuxent River

The Navy has adopted stringent standards for the handling and storage of ammunition and explosives, as these operations affect land use and other operations. In accordance with these standards, NAS Patuxent River provides for the transport, management, and storage of ordnance, both inert and explosive, including those energetic materials associated with inert ordnance (explosive cartridges, igniters, flares, detonation cords, ammunition, powders, solid rocket motors, and fuzes). Ordnance received has been packaged according to the appropriate US Department of Transportation (USDOT) regulations or military specifications and transported by a licensed carrier. Arriving carriers are directed to a holding area and upon approval by the air station's weapons inspector, are escorted into the weapons compound. All ordnance used in flight operations is stored in one of several approved magazines under the direction of the weapons inspector.

The magazines at NAS Patuxent River are equipped with static electricity protection (e.g., lightning protection), explosion-proof electrical systems, and electrical grounding and bonding. Magazine environments are maintained at appropriate temperatures, ventilated, and placarded. Further, the magazines are routinely inspected, inventoried, and secured.

The location of the magazines and designated buffer zones or Explosive Safety Quantity Distance (ESQD) Arcs are shown in Figure 3.9-1 (Explosive Safety Quantity Distance [ESQD] Arcs). These ESQD arcs were identified on the basis of the types and quantities of explosives handled/stored at each location and are intended to protect personnel and property from undue injury in the event of an explosion or fire. Permitted land uses and activities within these arcs are constrained to ordnance-related activities or other facilities not permanently staffed and preclude community or administrative uses.

When required for operations, ordnance is assembled and loaded in Navy approved ordnance loading areas. Stores containing energetic material are loaded on the flight line or at the combat aircraft loading area, depending on the store type and hazard class. Ordnance is inspected preflight and postflight (using the appropriate checklists) by a member of the weapons inspection team, the Ordnance Support Team leader, and the Ordnance Safety Officer.

3.9.1.3 OLF Webster Field

Ordnance is not handled at Webster Field.

Explosive Safety Quantity Distance (ESQD) Arcs

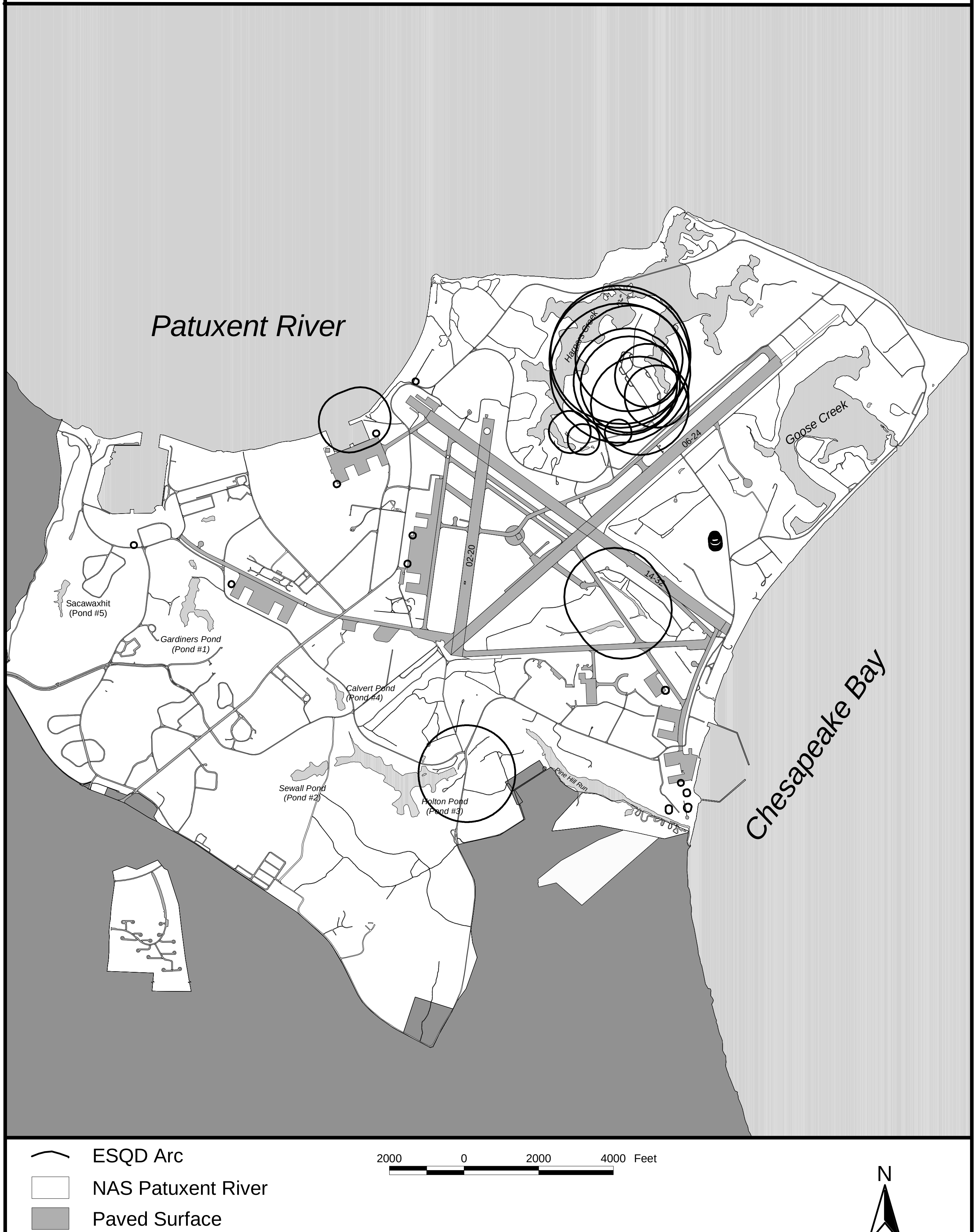


Figure 3.9-1

3.9.2 Aviation Fuels

According to the *Comprehensive Fuel System Study* for NAS Patuxent River (1997), the following aviation fuels are received, stored, and used: JP5, JP-8, and 100 LL (AVGAS).

3.9.2.1 Jet Fuel

NAS Patuxent River provides storage capacity for both JP-5 and JP-8 at its tank farm. The authorized storage capacity JP-5 aviation turbine fuel at NAS Patuxent River is nearly 11.4 million liters (3 million gallons). The current annual consumption is 74.9 million liters (19.7 million gallons). The current busiest ten-day period for JP-5 use was 5.3 million liters (1.4 million gallons). There are no planned changes to JP-5 storage capacity. However, there is a modernization study underway that may lead to future changes in JP-5 storage capacity.

The JP-8 fuel is used for Army and Air Force turbine-powered aircraft. There is currently one 380,000-liter (100,000-gallon) fuel tank containing this product at the air station's fuel farm, which is planned for replacement by two 190,000 liter (50,000 gallon) above ground storage tanks. Annual usage of JP-8 is about 3.6 million liters (960,000 gallons) per year.

3.9.2.2 100 LL Gas (AVGAS)

The main storage location for this product is a 114,000 liter (30,000 gallon) above ground storage tank at the tank farm. Annual usage of 100 LL Gas is reportedly small.

3.9.3 Hazardous Materials and Waste Management

3.9.3.1 Chesapeake Test Range

Hazardous materials and hazardous waste are not normally generated in the CTR unless the released stores and related materials are transported off-range for the purpose of storage, reclamation, treatment, disposal, or treatment prior to disposal; are buried or landfilled either on- or off-range; or land off-range and are not promptly rendered safe and/or retrieved (see earlier discussion of the Military Munitions Rule). This does not occur on the active CTR. Spill prevention and control is discussed later in this subchapter.

3.9.3.2 NAS Patuxent River

This subchapter provides a baseline on the current management of both hazardous materials and hazardous waste at NAS Patuxent River. Also included is a discussion of pesticide and herbicide management at the air station. An understanding of these programs is important since they would be impacted by proposed future increases in ground-operations at the Patuxent River Complex (e.g., increased operating hours for the dedicated laboratories and other facilities located at NAS Patuxent River and Webster Field).

Hazardous Materials and Waste Management

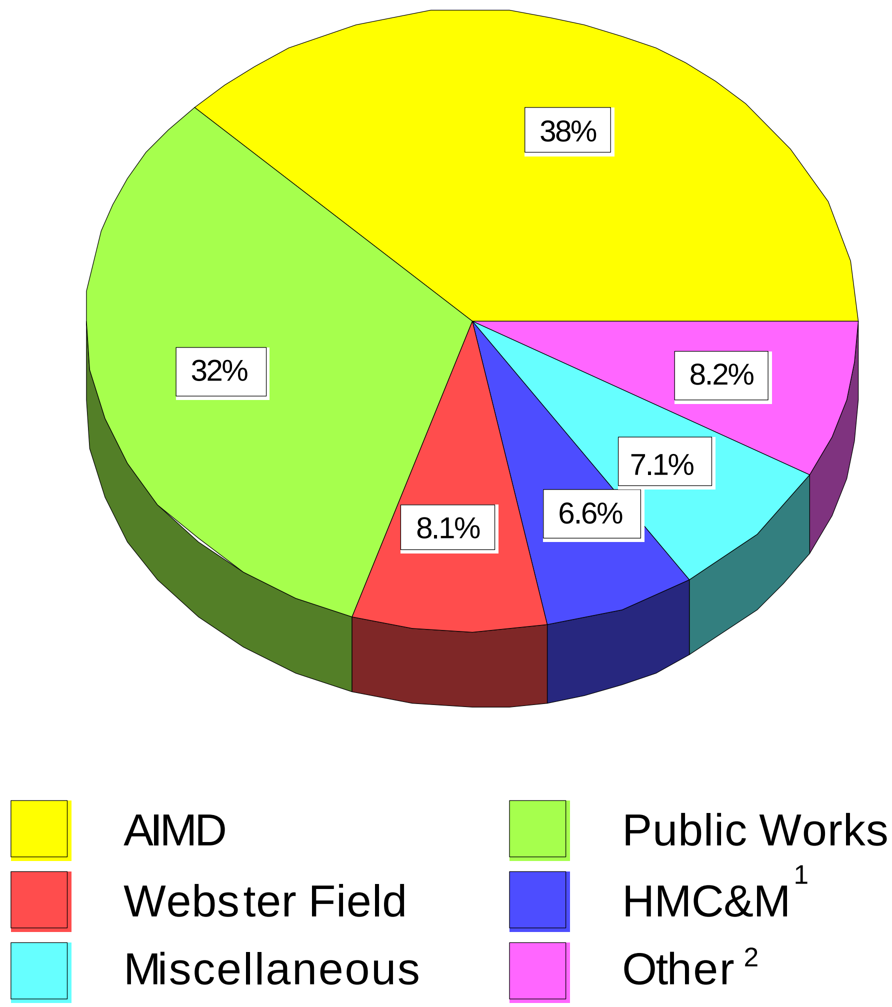
Activities at NAS Patuxent River that are primary generators of waste defined as hazardous under the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 and the Superfund Amendment Reauthorization Act (SARA) are shown in Figure 3.9-2 (Hazardous Waste Produced by NAS Patuxent River and Webster Field Activities) with their relative contributions. Aircraft Intermediate Maintenance Department (AIMD) operations and Public Works produce the bulk of the hazardous waste, contributing 70 percent of the total (RMC, Inc., 1997).

The industrial processes performed at the base in support of the above activities which generate hazardous waste include: painting operations; fluid changeouts; solvent degreasing operations; battery operations; abrasive blasting; plating shop operations; and industrial operations/industrial maintenance. Abrasive blasting operations using plastic beads -- and less often sand, glass beads, or metal pellets -- to mechanically clean painted and corroded metal surfaces produced more hazardous waste than any other base process, 38 percent of the total 51,552 kg (114,560 lbs) produced at NAS Patuxent River in 1996, as illustrated in Table 3.9-3. NAS Patuxent River has begun several initiatives to reduce plastic bead waste stream so that even with the addition of hazardous waste from the Webster Field, Warminster, Pennsylvania, and Trenton, New Jersey activities, this waste stream will fall to 28 percent of the total.

Ethylene glycol was the chemical most often found in hazardous waste products used at NAS Patuxent River and Webster Field in 1996. This chemical is used in the form of pure ethylene glycol, antifreeze, and hydraulic fluid for arresting gear. It is employed to service aircraft lavatory systems, for ground support equipment, vehicles and boats, and less frequently for arresting gear and steam catapult fluid changeouts. Ethylene glycol is used in the greatest quantities for the following base operations listed in order of amount used: Catapult and Arresting Gear (TC-7), Air Operations, Labs, VQ-4, AIMD, Range, and Public Works Maintenance (Johnson Controls).

Freon 22, the second greatest chemical quantity purchased in 1996, is found primarily in products used by Johnson Controls and AIMD for heating and ventilating systems and refrigeration. Methyl ethyl ketone (MEK), the chemical ingredient purchased in the third greatest quantity in 1996, is used as a paint thinner and in paint removal and clean-up. In 1996, MEK was used for the operations of (in order of amount used): AIMD, Strike, Force Warfare, VX-1, NRL, Webster Field, Rotary-Wing,

Hazardous Waste Produced by NAS Patuxent River and Webster Field Activities



Notes: 1. Combined waste received from multiple activites
2. "Other" denotes hazardous waste generated by Range, Strike, Force Warfare, and V-22 Electronic Systems T&E Lab

Source: RMC, Inc., September 1997.

Figure 3.9-2

Table 3.9-3

Hazardous Waste Produced by Air Station Processes (1996)

Process	NAS Patuxent River		Webster Field		Warminster		Trenton		Total	
	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs
Abrasive Blasting	19,495	43,323	396	881	--	--	--	--	19,892	44,204
Battery Operations	2,481	5,514	276	613	525	1,166	--	--	3,282	7,293
Chemical Paint Stripping	152	338			--	--	--	--	152	338
Plating Shop Wastes	776	1,724	702	1,561	57	127	--	--	1,535	3,412
Expired Shelf Life, Non-Ship	1,323	2,941	1,364	3,032	2,294	5,098	1,582	3,515	6,564	14,586
Fluids Changeouts	4,349	9,665	1,171	2,602	98	217	722	1,605	6,340	14,089
Industrial Maintenance	3,128	6,951	228	507	20	44	--	--	3,376	7,502
Industrial Operations	747	1,660	473	1,050	--	--	--	--	1,220	2,710
Painting Operations	7,546	16,768	1,112	2,471	1,244	2,765	--	--	9,902	22,004
Spill Clean-up	1,645	3,655	18	41	--	--	2,305	5,123	3,969	8,819
Solvent Degrease Operations	9,614	21,365	--	--	148	328	1,208	2,685	10,970	24,378
Miscellaneous	254	565	779	1,732	--	--	--	--	1,034	2,297
Photo and Reprographic	15	33	--	--	--	--	--	--	15	33
Fire Fighting Operations	11	24	--	--	--	--	--	--	11	24
Research and Development	5	12	--	--	45	100	--	--	50	112
Ordnance Disposal	5	10	--	--	--	--	--	--	5	10
Electronics and Refrigeration	5	10	34	75	--	--	--	--	38	85
Industrial Waste Treatment	1	2	--	--	--	--	--	--	1	2
Bilge Tank Empty and Clean							2,582	5,738	2,582	5,738
Fuel/Defueling					141	314			141	314
Total	51,552	114,560	6,553	14,565	4,572	10,159	8,399	18,666	71,079	157,950

Notes:
1. Data shown for Warminster operations are only for those sources which moved to NAS Patuxent River in 1996; data are for 1995, the last available.
2. Data shown for Trenton operations are only for those sources which will be moving to NAS Patuxent River.
3. Total for NAS Patuxent River does not include one time 1996 events: Installation Restoration disposal (417,829 lbs); One time abrasive blast of fuel tanks (36,434 lbs); and PCB removal (15,381 lbs).

Source: RMC, Inc., 1997

TPS, and McDonnell Douglas. Other processes not mentioned above which use chemical substances include plastic target surface cleaning, disinfecting potable water, and avionics cleaning.

The NAS Patuxent River Hazardous Materials Control and Management Office (HMC&M) is responsible for controlling the life cycle management of hazardous materials and waste throughout the complex (OPNAVINST 4110.2). Receiving, storing, issuing, and accounting for hazardous materials are governed by the hazardous material warehousing operation (HAZMART) within the HMC&M Program Office. One hundred percent of the hazardous materials procured is managed by HAZMART for its entire life cycle, including its storage, use, and waste handling.

Executive Order 12856 requires federal facilities to comply with EPCRA and the Pollution Prevention Act of 1990. The Navy requires the preparation of pollution prevention plans for reaching DoD pollution reduction goals by the end of 1999. The requirements are for increased training and pollution prevention awareness and a 50 percent reduction in hazardous waste and toxic chemical releases. NAVAIR goals, included in air station planning, are to reduce hazardous waste by 60 percent by weight by 1999. The NAS Patuxent River Draft Pollution Prevention Plan (1997) details the methods HMC&M is using or proposing to use to reduce the amount of hazardous waste produced.

Foremost among the options is material substitution (i.e., the substitution of non-hazardous propylene glycol for hazardous ethylene glycol), which accounted for a 54 percent decrease in the pounds of ethylene glycol used from 1995 to 1996. Other reduction options are to reclaim substances using new equipment and to reduce the amount of hazardous material required for a process. For instance, the use of high volume, low pressure paint guns and paint gun washers with filters could reduce the amount of solvents associated with painting operations, and hence, the amount of MEK required as a thinner.

The largest recurring hazardous waste stream on the station -- plastic media bead abrasive blast waste -- can be reclaimed and recycled. Plans are being finalized to implement reclamation through use of a closed-loop paint and corrosion stripping booth, which would use the plastic media beads until they become too small and then give them to a recycling contractor for re-use as plastic products. Another initiative is the use of parts washers with filtration systems to reduce the amount of solvents used by filtering the solvents in tanks for reuse. Lastly, hazardous material procurement procedures are being changed to limit the number of products with expired shelf life dates and the size of containers purchased, as well as limit inventory to a five-day supply.

NAS Patuxent River plans a significant reduction of its hazardous waste by implementing the projects above. If all the projects were to be implemented by the target year of 1999, it is estimated that the hazardous waste produced could be reduced by approximately 27,450 kg (61,000 lbs) a year (Table 3.9-4). Hazardous waste produced would then decline from the 1996 level of 71,078 kg (157,950 lbs) to approximately 45,000 kg (100,000 lbs) per year by 1999 (RMC, Inc., 1997). This would represent a 47 percent reduction in hazardous waste for the Patuxent River Complex, or a 39

Table 3.9-4

NAS Patuxent River Project-Specific Hazardous Waste Reduction Goals

Project	Activity	Process	Hazardous Waste Reduction Goals	
			kg	lbs
Plastic Media Bead Recycling	Aircraft Intermediate Maintenance Dept.	Abrasive Blast	18,000	40,000
Solvent Part Washers with Filters/Aqueous Parts Washer	Aircraft Intermediate Maintenance Dept. Test Pilot School Rotary Wing Range Support Equipment Evaluation/Verification Morale, Welfare, and Recreation Dept. Naval Research Laboratory V-22 AWSEP Public Works Transportation Webster Field Target Support Flight Line Electrical Distribution System/Wells Engine Test Cell Facility	Solvent Operations	7,200	16,000
Paint Gun Washers with Filters/HVLP Paint Guns	Aircraft Intermediate Maintenance Dept. VX-1 Webster Field Strike Force Warfare Range Naval Research Laboratory Test Pilot School Materials Lab	Painting Operations	450	1,000
Particle Counters	VX-1 Aircraft Intermediate Maintenance Dept. Strike Test Pilot School Force Warfare V-22 Naval Research Laboratory Rotary Wing	Fluid Changeouts (Hydraulic Patch Test)	1,800	4,000
Total			27,450	61,000

Source: RMC, Inc., 1997.

percent reduction compared to the amount of hazardous waste produced by the Patuxent River Complex plus the hazardous waste to be contributed by the addition of facilities from Warminster, Pennsylvania and Trenton, New Jersey.

Pest Management

The Pest Management Program at NAS Patuxent River (including Webster Field), administered by the Public Works Department, is responsible for pest control (insects, rodents, weeds) in accordance with an *Integrated Pest Management Plan* adopted in 1994. The emphasis of the plan is on a comprehensive approach to pest management or prevention that considers various chemical, physical, and biological suppression techniques, the habits of the pest, and the environment. The program stresses preventive pest control measures in lieu of corrective measures wherever cost effective. For example, inspections, sanitation, and pest proofing methods (e.g., natural buffer zones) are used to control pests and nuisance animals. Pesticides and herbicides used for spraying are low in toxicity to lessen the impact on the environment, and only minimal amounts of chemicals are used. The *Integrated Pest Management Plan* also includes a comprehensive hangar bird control plan. The plan recommends the use of permanent structural modifications whenever possible.

Spill Prevention and Response

NAS Patuxent River (including Webster Field) has developed a comprehensive spill contingency and prevention program that utilizes the air station’s resources, as well as those in the surrounding community. The program consists of a Spill Prevention, Control, and Countermeasures Plan with a tank management plan and an Oil and Hazardous Substance Spill Contingency Plan.

The existing Spill Prevention, Control, and Countermeasures (SPCC) Plan contains information on historic spills, storage tanks, secondary containment, drainage, pipelines and tank transfer, records, inspections, security, training, and the implementation of spill prevention policies. Potential spill locations, such as storage tanks, are mapped in detail. The existing SPCC Plan is undergoing revision to provide an increased level of tank/spill management. The plan revisions will be based on Global Positioning System (GPS) data points, Geographic Information System (GIS) coverage, SPCC database development, and digitization of SPCC sites for inclusion in GIS databases.

Implementation of the tank management program portions of the SPCC Plan at NAS Patuxent River has resulted in a decreased potential for fuel spills. Underground storage tanks, for example, are being eliminated and replaced with above-ground storage tanks, where feasible. Further, the number of above-ground storage tanks is also being reduced through elimination or consolidation. An installed leak detection system covers bulk fuel storage areas and associated piping on the air station’s tanks.

The USEPA-approved Oil and Hazardous Substance Spill Contingency Plan for the air station provides the plan of action for site specific spill response. Waterborne and land-based drills and exercises are conducted on a regular basis and involve several activities at the air station, including the Naval Hospital and several departments (Morale, Welfare, and Recreation; Public Works; and Fire departments), as well as the On-Scene Operations Team. In the event of a spill, the response system design is three-tiered. Primary response to the spill would be from NAS Patuxent River personnel and equipment. The second-tier response would be provided by a private local oil spill removal organization capable of responding within one hour. The third-tier response would be the Supervisor of Salvage at Cheatham Annex near Williamsburg, Virginia.

3.9.3.3 OLF Webster Field

In 1996, activities at Webster Field generated 8.1 percent of the total hazardous waste produced by the Patuxent River Complex. Processes at Webster Field created 6,554 kg (14,565 lbs) of hazardous waste; expired shelf life of chemicals, fluids changeouts, and painting operations accounted for 56 percent of the total. Refer to Table 3.9-3 for a breakdown of hazardous waste produced by type of process (RMC, Inc., 1997). Pest management and spill prevention at Webster Field are discussed above in Subchapter 3.9.2.2.

3.9.4 Radio Frequency Sources

Man-made sources of radio frequency (RF) energy are generally intended to make use of the electromagnetic environment for communications, radar, lighting, etc. The antennas and transmitters at NAS Patuxent River and Webster Field operate in the RF band of the electromagnetic spectrum, which is defined as the range of EM waves with frequencies between 3 kilohertz (kHz) to 300,000 megahertz (MHz). The portion of the RF region where frequencies are above 1,000 MHz is commonly called microwave.

The principal biological effect that can be associated with microwave exposure is a temperature increase. At relatively low RF energy intensities, the heat induced can usually be accommodated by the natural heat-regulating capabilities of the species exposed. Thus, any effects produced would generally be reversible. At high intensities, the natural heat-regulating capabilities of the exposed species heat gain may exceed the natural heat loss, leading to thermal distress or even irreversible thermal damage to biologic tissue. The effects of RF energy on humans depends on the frequency of the energy field, the polarization of the field, the size and shape of the individual, and the individual's ability to dissipate the absorbed energy by normal biological response.

In 1996, the Occupational Health and Safety Office at NAS Patuxent River conducted a survey of antennas and transmitters at the air station and Webster Field to determine safe separation or standoff distances. This survey used a computer program developed at the Atlantic Test Ranges to calculate standoff distances for transmitters while in the transmit mode.

At Webster Field, a survey of all 160 RF sources was performed. At NAS Patuxent River, all sources capable of generating at or above 100 watts peak power (193 sources) were surveyed. Data was gathered about location, transmitters, frequency, type of emission and receivers for each RF sources. Safe standoff distances were then determined using frequency, maximum power output, gain, type of emission and line loss. The information obtained from the survey have been used by the Radiation Safety Officer to ensure the safe standoff distances are followed at both NAS Patuxent River and Webster Field.

In addition, NAS Patuxent River is the home of the Mid-Atlantic Area Frequency Coordination Office. This office ensures effective and compatible authorized use of the radio frequency spectrum by all activities, tenants, and contractors in the Patuxent River Complex. Among the office's responsibilities is the coordination and approval of all Navy electronic warfare frequency usage in the Middle Atlantic area. Radio frequency use in the complex is approved and monitored at all times. As a result, off-base interference with commercial television and radio signals does not occur except for those occasions when required by specific equipment tests. Such tests are rare occurrences, and their off-base impacts are minimized by very early morning scheduling (e.g., 2:00 am-3:00 am timeframe) and operation of the equipment in short bursts of less than a second.

The following phenomena could be responsible for any television and radio interference that may occur in the Patuxent River Complex:

- **Electrical Interference** - Anything with a motor such as home appliances, automobiles, trucks, or airplanes can cause electrical interference with home entertainment equipment. Radio communication equipment, such as CB radios, pagers, cellular phones or other communications devices can also interfere with home entertainment equipment. The level of interference varies depending on the quality of the receiver in the home entertainment system. Some receivers are better than others in protecting from interference.

  In addition, "leaky insulators" on overhead power lines can also cause interference with home entertainment equipment. At every electrical pole the power lines are held up by insulators. As these insulators age they will start arcing slightly at the connecting points. When this happens, "broadband noise" can be seen on almost every channel within a short distance.

- **Multipath -** When a signal bounces off an object it usually reaches an antenna "out of phase" with the signal received directly from the source. This will "cancel out" or lower the signal strength of the desired received signal. For example, a television picture gets "fluttery" when an airplane flies by. In addition to military aircraft, there are many commercial and civilian airplanes flying around the Chesapeake Bay region that can cause multipath interference with home entertainment systems.

- **Ducting** - When there is a an unusual temperature variation in the atmosphere, the natural phenomenon of ducting may occur. This happens anytime when there are cool nights and warm days, usually in the spring or fall. Ducting causes radio frequency signals to bounce back down to earth and to be received at unusual distances from their source. This is a problem around the Chesapeake Bay, given the region's distance from the predominant source of signals in Washington and Baltimore. When ducting occurs, stations from Norfolk and Richmond may be received along with the weak signals from farther north. Ducting is also worse around water, as water does not change temperature as fast as the air above.

3.10 Topography, Geology, and Soils

3.10.1 Chesapeake Test Range

The origins of the Chesapeake Bay date to approximately 18,000 years ago when the most recent retreat of the glaciers began. The continued rise of sea levels due to glacial melting resulted in the creation of the Chesapeake Bay from the drowned stream beds along the ancient Susquehanna River Valley. Reaching its present dimensions about 3,000 years ago, the shape of the Chesapeake Bay resembles a shallow tray with a deep channel of troughs extending much of its length. These troughs permit the transit of large commercial vessels.

Approximately 322 km (200 mi) in length, the Chesapeake Bay encompasses more than 7,081 km (4,400 mi) of shoreline. Close to 6.4 km (four mi) wide near Annapolis, Maryland, the width of the Bay expands to 48.3 km (30 mi) at the mouth of the Potomac River. The Bay, on average, contains approximately 68.4 trillion liters (18 trillion gallons) of water. While its main stem has an average depth of about nine m (30 ft), the average depth of the entire system, including all tidewater tributaries, is only six m (20 ft) (Lippson & Lippson, 1997). The Bay has 19 major tributaries, including the Susquehanna, Potomac, Rappahannock, York, and James rivers, in addition to several hundred creeks and streams.

The Chesapeake Bay is located entirely within the physiographic province of the Atlantic Coastal Plain, a flat land area not exceeding 91.4 m (300 ft) above sea level. Crystalline bedrock, covered with wedge-shaped layers of sand, clay, and gravel, supports the Coastal Plain. The Bay's watershed, which includes parts of New York, Pennsylvania, Delaware, West Virginia, Maryland, Virginia, and all of the District of Columbia, is comprised of portions of both the Piedmont and Appalachian Provinces. The rolling Piedmont Plateau is separated from the Coastal Plain by a fall line. The Appalachian Province is within the western and northern portions of the watershed.

Constant erosion and deposition of sediments have affected the shoreline of the Chesapeake Bay since its creation. Peninsulas and headlands continue to be smoothed by the forces of both tides and currents. In fact, many islands that existed in the Bay centuries earlier are now submerged or severely eroded. Accumulated sediments from the erosion process may alter the landscape, as well as form flat deposits of silt and mud, becoming stabilized by the presence of hydrophytic vegetation and wetlands (USEPA, April 1995; Lippson & Lippson, 1997).

3.10.2 NAS Patuxent River

Since NAS Patuxent River lies within the boundaries of the CTR, it also is located in the Atlantic Coastal Plain physiographic province. Most of the facility stands in a zone of level lowlands less than 12.2 m (40 ft) above sea level. Additionally, the area includes an upland ridge/plateau with elevations reaching 36.6 m (120 ft). The southwestern section of the base is hilly and contains the highest elevations. The current topography of NAS Patuxent River is drastically different from the original landscape due to extensive re-grading which occurred during Navy acquisition in the 1940s (Pogue, April 1983; Draft INRMP, Undated).

A major stream, Pine Hill Run, drains into the Chesapeake Bay from the uplands. The tidal creek systems consist primarily of Harpers-Pearson and Goose creeks located in the lowlands. Deposits of gravel, silt, sand, and clay comprise the lowland soils. Upland deposits of gravel and sand (with minor amounts of silt and clay), as well as the St. Mary's Formation, constitute the ridge/plateau. Characteristics of the soils of both the lowlands and uplands include: a range from level to strongly sloping; moderately well to well drained; silty; and loamy. The majority of the soils are suitable for cultivating crops, although some may need artificial drainage (Pogue, April 1983).

3.10.3 OLF Webster Field

The topography of Webster Field is generally flat, ranging in elevation from sea level to 6.7 m (22 ft). As at NAS Patuxent River, the highest elevations are located in the southwestern section, and extensive re-grading has dramatically shaped the current topography (Draft INRMP, Undated).

3.10.4 Localized Target Areas

The bottom sediments around the target areas are variable (NAS Patuxent River Operational Environmental Planning Office, October 1997). In general, the bottom sediments around Hooper target are comprised of silty clays. Sandy sediments, extending bayward about 1.6 km (one mi), follow the shoreline from below Cedar Point to south of Point Lookout. Bottom sediments surrounding both the Hannibal and Tangier Island targets are primarily sand.

3.11 Vegetation and Wetlands

This subchapter focuses on the vegetation and wetlands of the land and water areas underlying the CTR.

3.11.1 Chesapeake Test Range

3.11.1.1 Terrestrial Vegetation and Threatened and Endangered Species

Terrestrial plant communities underlying the CTR include forests, agricultural fields, marshes, old fields, aquatic vegetation, and scrub/shrub habitats. About 31 percent of the land area underlying the footprint of the CTR or more than 71,400 hectares (178,500 acres) is forested (McKenzie, June 23, 1997; MD Office of Planning, 1991). These areas contain a multitude of hard- and softwood trees, such as various species of cedar (*Juniperus spp.*), ash (*Fraxinus spp.*), pine (*Pinus spp.*), oak (*Quercus spp.*), and maple (*Acer spp.*), in small and large stands.

While plant communities within the CTR contain a number of plant species considered rare, threatened, or endangered within the states of Delaware, Maryland, and Virginia, only two federally-listed threatened species, sensitive joint vetch (*Aeschynomene virginica*) and swamp pink (*Helonias bullata*), occur in the counties below the CTR. The swamp pink occurs in Dorchester County, while the sensitive joint vetch is known in Somerset and Wicomico counties in Maryland.

3.11.1.2 Wetlands

Approximately ten to 12 percent (about 26,000 hectares [64,000 acres]) of the more than 230,000 hectares (576,000 acres) of land underlying the footprint of the CTR is wetland, according to the National Wetland Inventory maps for the area (Figure 3.11-1, Major Wetland Areas in the CTR). Based on these calculations, it is estimated that approximately 9,300 hectares [23,000 acres] of the wetland are classified as palustrine emergent wetland; that is, freshwater swamps, marshes, and meadows. The remaining 16,700 hectares (41,000 acres) of wetland are classified as estuarine emergent (salt and brackish marsh environments).

3.11.1.3 Submerged Aquatic Vegetation in the Chesapeake Bay

Submerged aquatic vegetation (SAV) consists of large stands of marine plants that are similar to land plants with green leaves, flowering buds, seeds, and roots firmly anchored in sandy to muddy bottoms (Lippson & Lippson, 1997). These plants grow below the low-tideline out to depths of about 2.7 m (nine ft). In addition to providing an indirect source of food (detritus or

Major Wetland Areas in the CTR

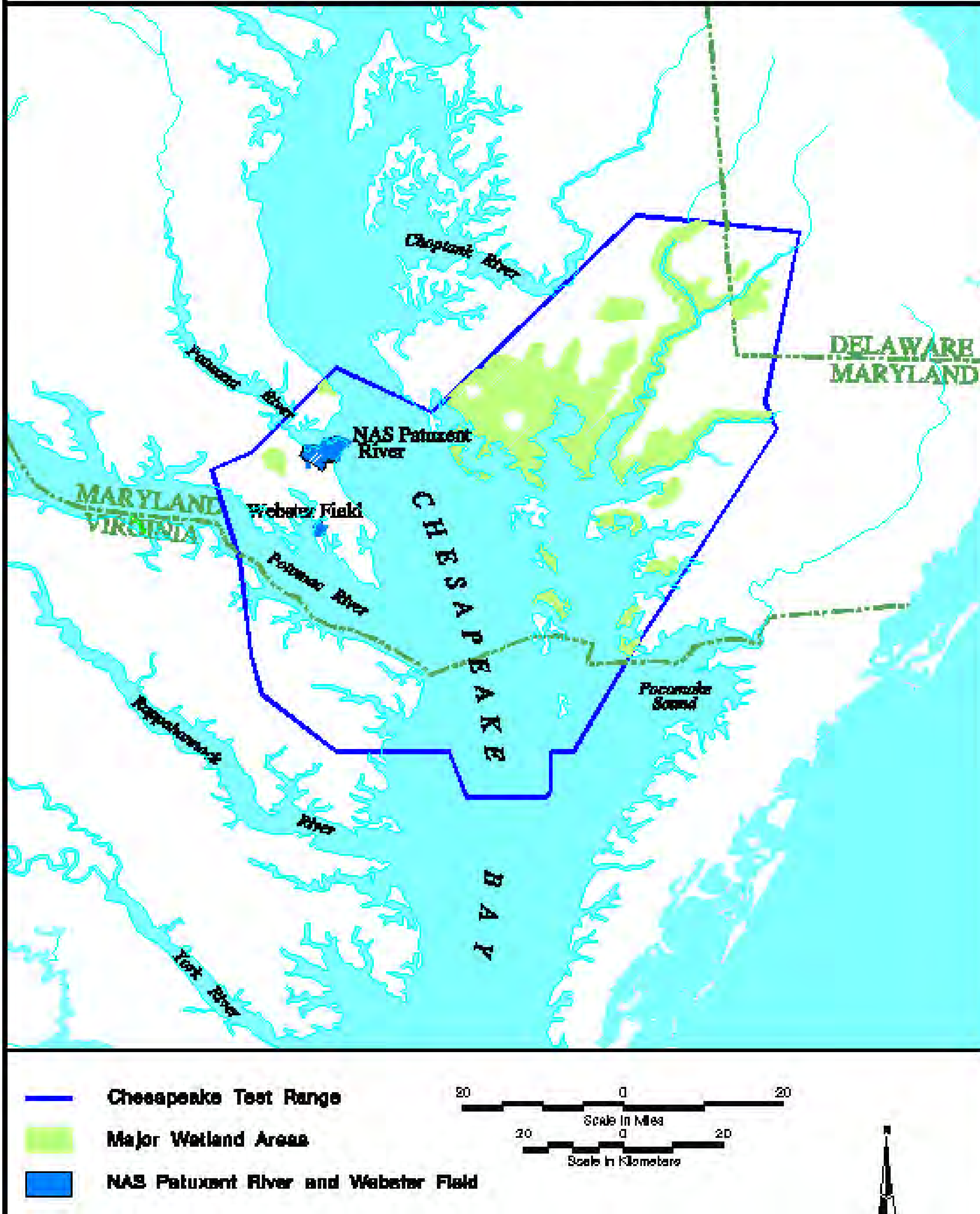


Figure 3.11-1

decayed/decaying plant material), the SAV provides shelter and habitat for waterfowl, shellfish, and invertebrates. The SAV beds also produce oxygen, filter and trap sediment, and slow/dispel the energy of wave motion (thereby protecting shorelines from erosion). During the growing season, the SAV takes up and retains nitrogen and phosphorus, thereby removing excess nutrients from the Bay.

There are 13 species of SAV commonly found in the Bay or nearby rivers (USEPA, April 1995). Their distribution is determined by salinity, water depth, and bottom sediment. The most important SAV species are eelgrass (*Zostera marina*) and widgeon grass (*Ruppia maritima*). Eelgrass prefers shallow, sandier, and more turbulent areas, while widgeon grass can be found in lower-salinity waters, even into tidal freshwater (Lippson & Lippson, 1997). In the mid-Bay, common SAV species include redhead grass (*Potamogeton peroliatus*), sago pondweed *(Potamogeton pectinatus*), horned pondweed (*Zannichellia palustris*), and Eurasian water milfoil (*Myriophyllum spicatum*).

In recent decades there has been a decline in the amount and variety of SAV in the Chesapeake Bay, although this trend has slowed since the early 1990s (Lippson & Lippson, 1997). For example, historically, more than 80,000 hectares (200,000 acres) of SAV grew along the Bay's shoreline, which by 1978 had decreased to about 16,400 hectares (41,000 acres) (USEPA, April 1995). By 1993, the SAV coverage in the Bay had increased again to more than 29,200 hectares (73,000 acres).

Figure 3.11-2 (Submerged Aquatic Vegetation in the Chesapeake) shows the extent of SAV underlying the CTR. Table 3.11-1 provides areas of coverage of SAV by US Geological Survey (USGS) quadrangle. A total of more than 5,300 hectares (13,100 acres) of SAV beds underlaid the CTR in 1995 (the most recent year of complete data) (Orth, et al., November 1996). This coverage decreased by more than 750 hectares (1,850 acres) from the 1994 total of about 6,100 hectares (15,075 acres).

3.11.2 NAS Patuxent River

3.11.2.1 Terrestrial Vegetation

Plant communities on NAS Patuxent River are typical to the area of the CTR as a whole, and include forests, agricultural fields, marshes, old fields, scrub/shrub areas, various types of wetland, and submerged aquatic vegetation. Approximately 42 percent of the land area comprising the air station (1,150 hectares [2,841 acres]) is characterized by forests of pine, hardwood tree species, shrubs, and vines (Draft INRMP, Undated). Softwood forests characterized by loblolly (*Pinus taeda*) and Virginia pine (*Pinus virginiana*) account for approximately 11 percent of the forests, and are located generally throughout the southeast portion of the air station. The mixed softwood/hardwood forests

Submerged Aquatic Vegetation in the Chesapeake

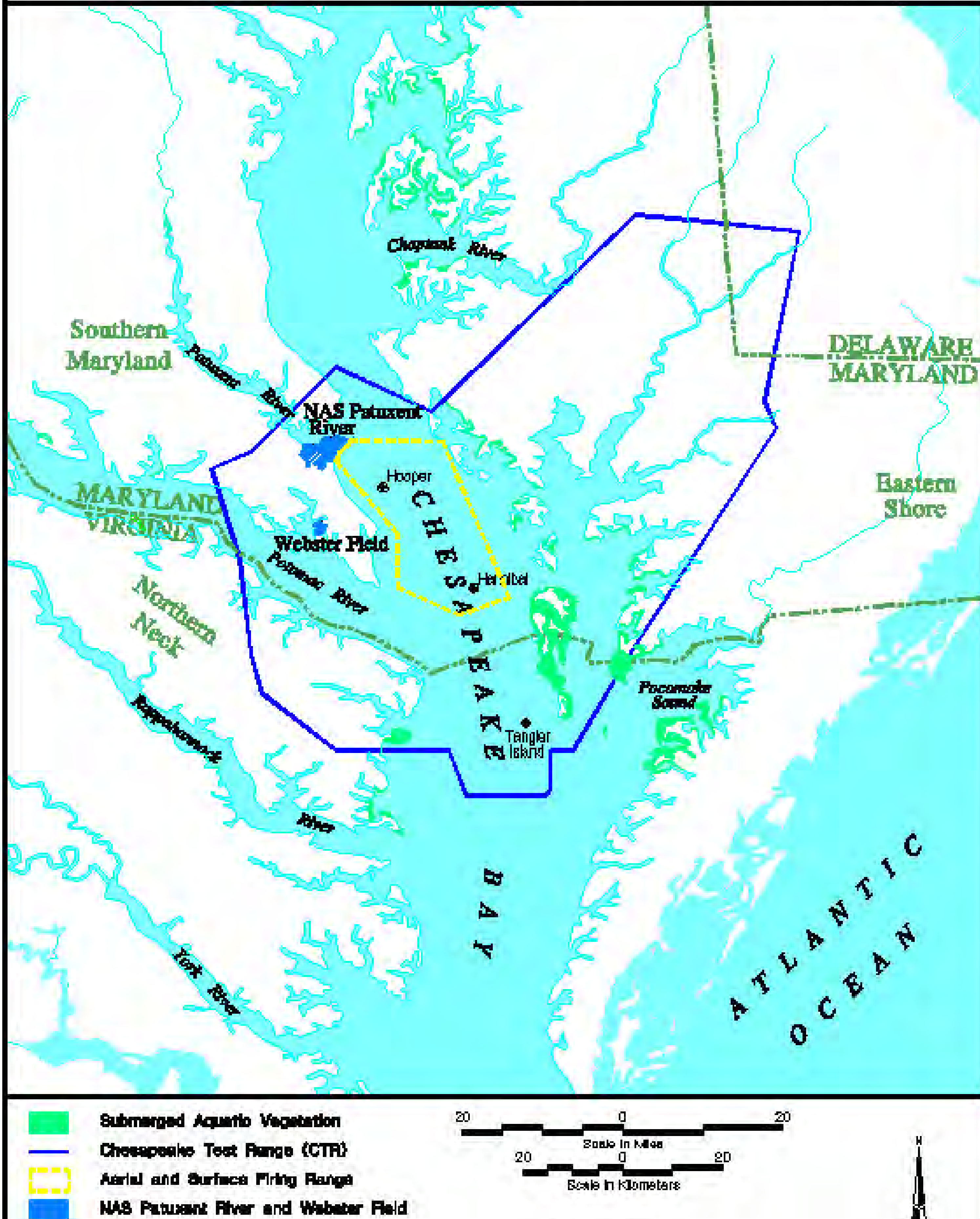


Figure 3.11-2

Table 3.11-1

SAV Areal Coverage in the Chesapeake Bay Underlying the CTR

Location (VIMS Map No.)		Amount in 1994 (hectares)	Amount in 1995 (hectares)
East New Market, MD	(054)	0.0	0.0
Cove Point, MD	(061)	#	#
Taylors Island, MD	(062)	53.8	8.1
Hollywood, MD	(070)	#	#
Solomons Island, MD	(071)	#	#
Barren Island, MD	(072[3])	0.0	0.0
Honga, MD	(073[3])	798.0	410.1
Wingate, MD	(074)	503.5	407.6
Nanticoke, MD	(075)	0.0	0.0
St. Clements Island, VA-MD	(078)	#	19.1
Piney Point, MD-VA	(079)	0.0	0.0
St. Mary's City, MD	(080)	0.0	2.9
Point No Point, MD	(081[2, 3])	--	--
Richland Point, MD	(082[3])	14.7	0.0
Monie, MD	(085)	5.6	4.2
Kinsale, VA-MD	(088)	0.0	0.0
St. George Island, VA-MD	(089)	0.0	0.0
Point Lookout, MD	(090[3])	0.0	0.0
Kedges Straits, MD	(091[3])	632.4	486.2
Terrapin San Point, MD	(092)	173.0	183.1
Marion, MD	(093)	236.1	262.5
Lottsburg, VA	(096)	--	0.0
Heathsville, VA-MD	(097)	--	0.0
Burgess, VA-MD	(098)	--	0.0
Ewell, MD-VA	(099)	1,705.4	1,596.8

Table 3.11-1

SAV Areal Coverage in the Chesapeake Bay Underlying the CTR

Location (VIMS Map No.)		Amount in 1994 (hectares)	Amount in 1995 (hectares)
Great Fox Island, VA-MD	(100)	1,145.9	1,160.8
Crisfield, MD-VA	(101)	179.1	179.8
Lively, VA	(105)	--	0.0
Tangier Island, VA	(107)	485.8	464.2
Mardela Springs, MD	(163)	0.0	0.0
Wetipquin, MD	(164)	0.0	0.0
Goose Island, VA	(179[1])	162.6	157.6
Total SAV Coverage		6,095.9	5,343.0

Notes:
1. Indicates area surrounding the Tangier Island target.
2. Indicates area surrounding the Hooper target.
3. Indicates area surrounding the Aerial and Surface Firing Range.
-- Indicates no picture taken -- assumed to be no SAV.
No aerial photographs taken -- ground truthing only.

Source: Orth, et al., November 1996.

characterized by chestnut oak (*Quercus prinus*), eastern white oak (*Quercus alba*), sweetgum (*Liquidambar styraciflua*), yellow-poplar (*Liriodendron tulipifera*), and hickory (*Carya spp.*), which account for approximately 41 percent of the forest, and are located along the south side of the air station. Pure hardwood stands, including the hardwood species listed above, plus red maple (*Acer rubrum*), tupelo (*Nyssa sylvatica*), hornbeam (*Carpinus caroliniana*), and sycamore (*Platanus occidentalis*) comprise approximately 48 percent of the forests (Turner, Collie, & Braden, Inc., August 1994). The Draft Integrated Natural Resources Management Plan (Draft INRMP) for NAS Patuxent River contains a list of trees surveyed on the air station.

Agricultural land, which can be used for growing cash crops such as corn and soybeans, represents approximately eight percent of the landscape of NAS Patuxent River. The 207 hectares (512 acres) of agricultural land, located mainly around the eastern portion of the air station, are cropped for corn, soybeans, barley, rye, sorghum, and clover (Draft INRMP, Undated).

Approximately 96 hectares (237 acres) of NAS Patuxent River are old fields that, without management, will convert into young woodland cover types. These areas, located throughout the air station, are characterized by shrubs, perennial grasses, and composite plants. Scrub/shrub areas at the air station, characterized by young trees, shrubs, and herbaceous vegetation, comprise approximately 290 hectares (716 acres) of NAS Patuxent River (Draft INRMP, Undated). Left untouched, these areas will also succeed to a young woodland cover type.

3.11.2.2 Wetlands

About 70 percent of NAS Patuxent River is flat and fairly well-drained. However, some low areas of the air station are poorly-drained and become intermittently flooded and/or saturated (Turner, Collie, & Braden, Inc., August 1994). About ten percent, or 260 hectares (640 acres) of the air station, is open water or wetland.

According to National Wetland Inventory maps, approximately three percent of the air station (80 hectares [200 acres]) is wetland. Several wetland types have been identified at the air station, including forested wetlands, scrub/shrub wetlands, saline marshes (estuarine), freshwater tidal marshes (palustrine), nontidal marshes, and open water/emergent wetlands (Draft INRMP, Undated).

The open water areas occur along the edges of the air station -- brackish open waters are present along the north and east borders of the air station and fresh open waters are located along the southeast side of the air station. Non-tidal marshes are located along the edges of freshwater streams and ponds, and estuarine wetland is located along the edges of brackish waters. The wetland types encompass about one percent and two percent of NAS Patuxent River, respectively.

The vegetation in the freshwater emergent wetlands consists mainly of flat-sedges (*Kyllinga spp.*), bulrushes (*Scirpus spp.*), common cattails (*Typha latifolia*), spatterdock (*Nuphar advena*), and

Eurasian water milfoil, with non-vegetated shorelines and open ground interspersed. Tidal marshes comprise about 138 hectares (56 acres) along the borders of Pearson, Goose, and Harper creeks, as well as Pine Hill Run (Draft INRMP, Undated). The tidal wetlands are dominated by saltwater and saltmarsh cordgrasses (*Spartina spp.*).

3.11.2.3 Submerged Aquatic Vegetation

A small amount of SAV, consisting mostly of horned pondweed and some widgeon grass and Eurasian water milfoil, occurs in the waters around the air station (Orth, et al., November 1996), and in the four tidal creeks (Harper and Pearson creeks north of the major runways and the confluence of the Patuxent River; Goose Creek east of the runways and southwest of Cedar Point; and Pine Hill Run near the southeastern boundary of the air station).

3.11.2.4 Threatened and Endangered Species

There are no federally-listed rare, threatened, or endangered plants known to occur at NAS Patuxent River (Draft INRMP, Undated). Seven species listed as rare by the state of Maryland, including fall witchgrass (*Leptoloma cognatum*), tobacco weed (*Elephantopus tomentosus*), clasping leaved St. Johns pennywort (*Hypericum gymnathum*), sandplain flax (*Linum intercursum*), clustered beakrush (*Rhynchospora glomerata*), creeping cucumber (*Melothria pendula*), and anglepod *(Matelea carolinensis)* do occur at the air station.

3.11.3 OLF Webster Field

3.11.3.1 Terrestrial Vegetation

Webster Field, like the air station, contains various vegetated habitats, including open fields, shrub communities, various forests, and agricultural fields. The agricultural lands at Webster Field are located in the central portion of the annex near the runways. The southeast portion of Webster Field consists of natural, unimproved lands, including open fields, forests, and scrub-shrub habitats (Draft INRMP, Undated).

3.11.3.2 Wetlands

Webster Field has just over five hectares (11 acres) of water and five km (three mi) of shoreline. Though many of the wetland areas at the annex have been altered in some way by the influence of man, several wetland types have been identified. These include forested wetlands, scrub/shrub wetlands, saline marshes, freshwater tidal marshes, nontidal marshes, and open water/emergent wetlands (Draft INRMP, Undated).

According to National Wetland Inventory maps, approximately one percent of Webster Field (four hectares [ten acres]) is wetland. Of this wetland, it is estimated that (one hectare [2.5 acres]) is palustrine and three hectares (7.5 acres) are estuarine.

3.11.3.3 Submerged Aquatic Vegetation

Waters adjacent to Webster Field include beds of submerged aquatic vegetation. Acreage of SAV within the navigation easement associated with Webster Field is included in the estimates in Table 3.11-1. The SAV beds closest to Webster Field are comprised largely of widgeon grass (Orth, et al., November 1996). Eurasian water milfoil and spatterdock are very common in the two ponds at Webster Field (Draft INRMP, Undated).

3.11.3.4 Threatened and Endangered Species

There are no federally-listed rare, threatened, or endangered plants known to occur at Webster Field (Draft INRMP, Undated).

3.11.4 Localized Target Areas

3.11.4.1 Terrestrial Vegetation

The targets and their prohibited areas are surrounded by open water. There are no stands of forest, agricultural fields, old field (scrub-shrub communities), or rare, threatened, or endangered plants on or near these areas.

3.11.4.2 Wetlands

There are no wetlands at the targets or within their designated prohibited zones, or underlying the aerial and surface firing range.

3.11.4.3 Submerged Aquatic Vegetation

As shown in Figure 3.11-2, some beds of SAV occur near the Tangier Island target, but none occur around the Hooper or Hannibal targets. SAV requires sunlight to undergo the process of photosynthesis. The waters around these targets are some of "the deeper areas of the Bay," and enough sunlight to support plant growth is unable to penetrate to the bottom (USEPA, April 1995). The Tangier Island target is located approximately six km (3.5 nautical miles) southwest of Tangier Island, and seven km (four nautical miles) southwest of the SAV beds east of that island.

In 1995, SAV covered about 1,050 hectares (2,600 acres) around the aerial and surface firing range and the target areas -- a decrease from the 1,600 hectares (3,950 acres) estimated in 1994 (Orth, et al., November 1996). This decrease had no effect on the areas surrounding the targets, since no SAV was covering these areas in 1994.

3.12 Wildlife and Fisheries

3.12.1 Wildlife

3.12.1.1 Chesapeake Test Range

The CTR overlies the brackish mid-region of the Chesapeake Bay, where fresh and more saline waters meet. It includes the island archipelago formed by Bloodsworth, Adam, South Marsh, Holland, Smith, Tangier, and several smaller islands. Several rivers connect vast tidal wetlands to the waters adjacent to these islands, and the tidal wetlands continue down the eastern shore of the Delmarva Peninsula. The islands themselves are largely characterized by brackish marsh communities, with only remnants of uplands remaining, mainly due to erosion. The marshes and waters of the Bay support a variety of marine mammals, reptiles, birds, fish, and shellfish.

Marine Mammals

Information on marine mammals in the Chesapeake Bay is limited. To date, the only systematically-collected data available are for strandings. There are several limitations in using this data:

- Stranding information only includes animals found;
- Sightings may include several reports of the same individual; and
- There are limited data for many years and the information available is not complete.

Several organizations, including the Virginia Marine Science Museum, the National Aquarium in Baltimore, and the US Coast Guard, are initiating programs to collect data systematically on live animal sightings within the Bay. However, results will not begin to be available until next year.

Most occurrences of marine mammals have been reported as individuals south of the Potomac River, in the Virginia portion of the Bay. However, some individuals of several species have also been reported as far north in the Bay as the mouth of the Susquehanna River (Blankenship, 1996). MDNR stranding and sighting data indicate that individuals of dolphin, seal, and whale species are occasional visitors to the Bay (Table 3.12-1). Individual humpback whales and harbor porpoises have been reported with some regularity in the Maryland portion of the Bay (Barco, April 17, 1997) and bottlenose dolphins are very prevalent during certain times of the year as well (Scofield, March 27, 1997). The single West Indian manatee that has been documented in the Chesapeake Bay has been known to travel far north into the Bay as well as up the East Coast, though in recent years the individual has only frequented the Bay's southern portion (NBS, October 1996).

Table 3.12-1

Marine Mammals Sighted in the Chesapeake Bay

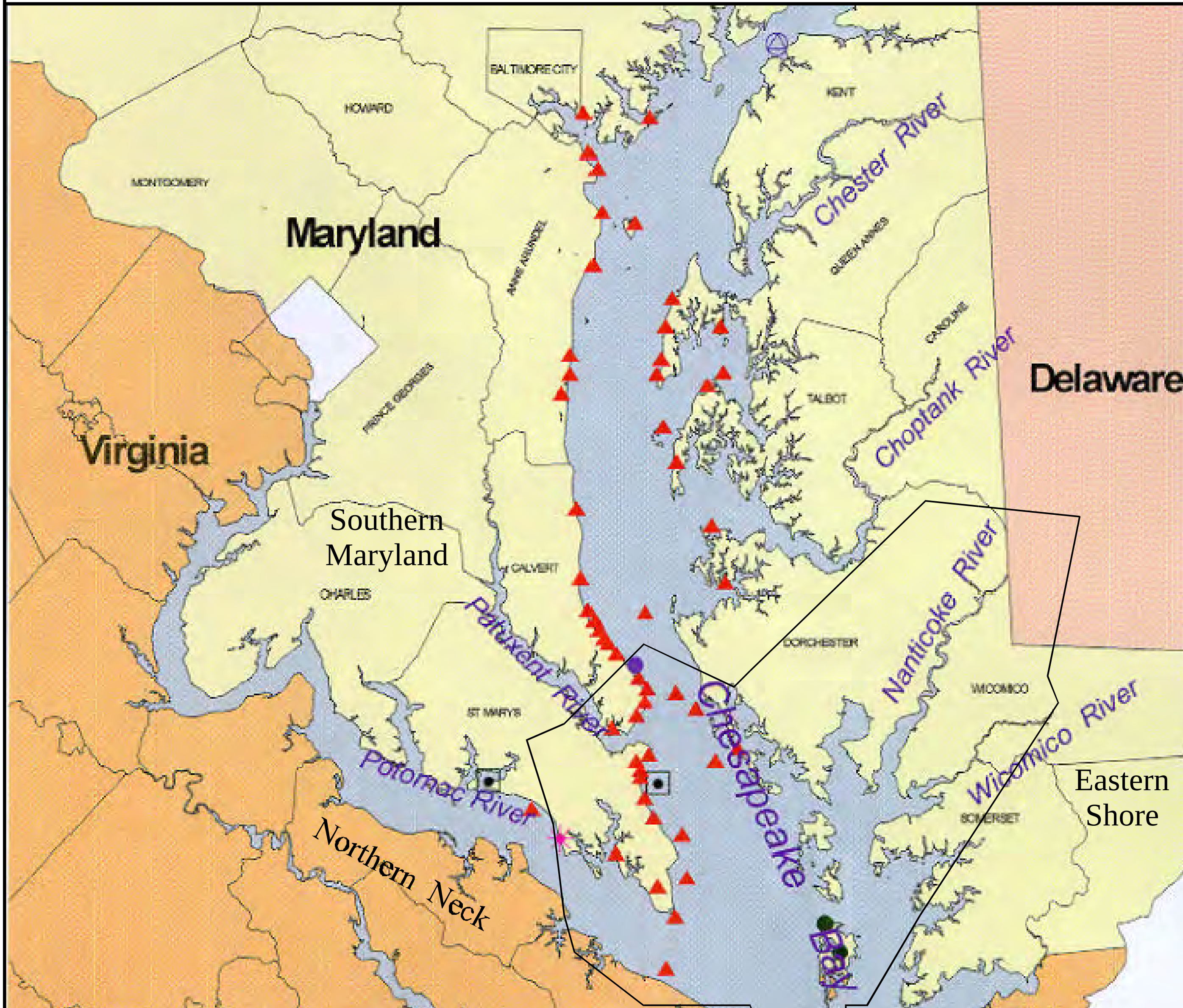
Common Name	Latin Name
Bottlenose Dolphin	*Tursiops truncatus*
Harbor Porpoise	*Phocoena phocoena*
Unidentified Seal	*Not Available*
Minke Whale	*Balaenoptera acutorostrata*
Fin Whale	*Balaenoptera physalis*
Humpback Whale	*Megaptera novaeangliae*
Unidentified Whale	*Not Available*
West Indian Manatee	*Trichechus manatus*

Of these species, the fin and humpback whales and the West Indian manatee are federally-listed as "endangered" under the Endangered Species Act, while NMFS is proposing the harbor porpoise for federal listing as "threatened." MDNR stranding and sighting data since 1990 confirm these species. MDNR added the minke whale and an unidentified seal species to the list of marine mammals known to visit the Maryland portion of the Bay; the exact location of the fin whale is not known. The National Aquarium at Baltimore, in conjunction with staff from the St. Inigoes US Coast Guard Station, is presently monitoring bottlenose dolphin activity in the area of NAS Patuxent River (Scofield, March 27, 1997).

Figure 3.12-1 (Chesapeake Bay Marine Species Stranded [1991-1995]) shows where individuals have been reportedly stranded in the Bay, and Figure 3.12-2 (Chesapeake Bay Marine Species Sightings [1991-1995]) shows where individuals have been sighted for each of the marine mammal and sea turtle species recorded in the Bay. When assessing these data, it is important to recognize that these sightings have occurred over a four-year period and are sightings of individuals only.

Marine mammal numbers peak in June, largely due to the presence of dolphins. While dolphins may be present in the Bay from April through November or December (Barco, April 17, 1997), they are likely common only from May through October (Scofield, March 27, 1997). Whales are most common from December through February and March, and seals are becoming increasingly common during the winter months (Barco, April 17, 1997). The absolute number and diversity of animals in the Bay increases during the summer months as supported by the stranding data.

Chesapeake Bay Marine Species Stranded (1991-1995)



Not to Scale

- Loggerhead Turtle
- Leatherback Turtle
- Kemp's Ridley Turtle
- Dolphin
- Minke Whale
- Harbor Porpoise
- Chesapeake Test Range

N

Source: RMC, Inc., 1997.

Figure 3.12-1

It is likely that marine mammals come into the Bay to feed on the many bait fish species available (e.g., menhaden, anchovies, and silversides). The expansion of the bottlenose dolphin's range into the Bay as, at least, a seasonal resident is not unique. At least two bottlenose dolphins have taken up residency in Cape Cod Bay (Massachusetts) in recent years. Researchers believe that the dolphins are adjusting to new environmental conditions or changes in ecological conditions (Wiley, Wenzel, and Young, 1994).

Sea Turtles

Sea turtles are generally ocean dwellers that require well-drained, clean sandy dunes with grassy vegetation for nesting. Most major nesting sites are on the barrier islands of North Carolina to the Florida Keys (Turner, Collie, & Braden, Inc., August 1994). However, sea turtles, including the Atlantic loggerhead (*Caretta caretta*), Atlantic leatherback, (*Dermochelys coriacea*), and Kemp's Ridley (*Lepidochelys kempi*), are known to occur within the Bay, with loggerhead turtles the most common sea turtle species found in Maryland waters (Barco, April 17, 1997). Kemp's Ridley and leatherback sea turtles are federally-listed under the Endangered Species Act as "endangered," while the loggerhead is listed as "threatened."

MDNR stranding and sighting data indicate that leatherbacks are also present in Maryland waters, and local researchers report that Kemp's Ridley sea turtles appear in Maryland waters, but are most common in Virginia's portion of the Bay (Evans, May 1997). The NAS Patuxent River Natural Resources Division has also reported that two turtle species may be transient in the waters near the air station and Webster Field -- the federally-listed "threatened" Atlantic green sea turtle (*Chelonia mydas*) and Atlantic hawksbill turtle (*Eretmochelys imbricata*) (Draft INRMP, Undated).

As with mammals, most turtles are present in the Bay during summer months. Sightings data indicate that leatherbacks may be most common from June through August, and loggerheads from June through September. Leatherback strandings occur in June, July, and October, while loggerhead strandings have been recorded in January and June through November, with the highest number of strandings in June. Some researchers believe that sea turtles are regular residents in the Bay, and that individuals spend entire summers there (Evans, May 1997). As with marine mammals, sea turtles come into the Bay to feed; there is no evidence of use of the beaches for nesting. Leatherbacks and loggerheads are known to feed on jellyfish. Loggerheads also feed on horseshoe and blue crabs which are abundant in the Bay.

Birds

The CTR, NAS Patuxent River, and Webster Field are located within the Atlantic Flyway, which results in greatly increased numbers of birds during the migratory season. Low-level flights present hazards due to the potential for bird/aircraft strike hazards (BASH). Most birds migrate at altitudes below 900 m (3,000 ft) above ground level (AGL), and flights below this elevation are more prone to BASH. Areas where high concentrations of birds occur (e.g., wildlife refuges), particularly larger birds such as waterfowl, can also increase the potential for bird strikes (Labat Anderson, Inc., August 1995).

The Martin and Blackwater NWRs are located beneath the CTR's airspace R-4006. The minimum overflight altitude for R-4006 is 1,067 m (3,500 ft). As a measure to protect waterfowl from disturbance, the US Fish and Wildlife Service requests that pilots maintain a minimum flight altitude of 600 m (2,000 ft) AGL to avoid disturbance to birds within the refuges (Labat Anderson, Inc., August 1995). Several wildlife management areas operated by the MDNR also lie within the CTR. The NWRs are noted for their large flocks of overwintering waterfowl, including tundra swans (*Cygnus columbianus*), Canada and snow geese (*Branta canadensis* and *Chen caerulescens*), and over 20 species of ducks. While the state wildlife management areas include a greater proportion of upland habitats, most of these areas also support overwintering waterfowl populations.

Aerial surveys conducted by the Maryland Wildlife Administration and staff of the NAS Patuxent River Natural Resources Division indicate that the entire mid-Bay region, with its many islands, is important as a stopover during migration, and as an overwintering area for waterfowl (Rambo, November 1996). Twenty-five to 30 species of waterfowl use the portion of the Atlantic Flyway that overlaps the CTR and NAS Patuxent River. The inaccessibility to land-based predators also makes the islands attractive to waterfowl for nesting. Dabbling ducks, particularly black duck *(Anas rubripes*) and pintail (*Anas acuta*), are attracted to supplies of widgeon grass. Diving ducks such as redhead (*Aythya americana*) and canvasbacks (*Aythya valisineria*) overwinter on a diet of eelgrass and widgeon grass. Some species, such as oldsquaw (*Clangula hyemalis*), scoter (*Melanitta ssp.*), and bufflehead (*Bucephala albeola*), feed on the shellfish and other benthic invertebrates that populate the marshes and near-shore waters (US Department of the Interior, June 1996).

Breeding black ducks, once abundant in the upper Bay, have declined markedly, but presently exist in good numbers in the lower eastern shore marshes and island habitats. Surveys indicate that the habitat provided by some of the islands is marginal, particularly where marshes are dominated by black needlerush. This conclusion is based on several factors: the apparent low percentage of females nesting during their first season; the low hatching success caused by predation and flooding by tides; and the lack of re-nesting attempts (US Department of the Interior, June 1996).

Nine species of wading birds nest on the islands of the Chesapeake Bay. Of these, yellow-crowned night herons (*Nyctanassa violacea*), black-crowned night herons (*Nycticorax nyticorax*), little blue herons (*Egretta caerulea*), tri-colored herons (*Egretta tricolor*), great egrets (*Casmerodius albus*), and glossy ibis (*Plagadis falcinellus*) nest in large numbers. These species are sustained by a variety of foods, including various fishes and crabs associated with a variety of habitats from the interior marsh to offshore waters. Island habitats are attractive to these birds for several reasons: they tend to have fewer predators; they place the birds in closer proximity to food resources; they improve the efficiency of foraging during the chick season; and they reduce the probability of human disturbance during nesting (US Department of the Interior, June 1996).

Rookeries for wading birds are limited, however, by the availability of tree hummocks, which are disappearing as sea levels rise and the land erodes. The islands of Smith, Bloodsworth, South Marsh, and Tangier formed a peninsula at the end of the Pleistocene Era 10,000 years ago that has eroded into islands which continue to erode today. Historical records and submerged tree stumps attest to the gradual conversion of upland forest to low salt marsh (US Department of the Interior, 1993). As part of a cooperative agreement between NAB Little Creek and NAS Patuxent River, nesting platforms were erected on the northern end of Bloodsworth Island to replace trees that have been disappearing as Bay waters invade and salinity levels increase. The platforms support a large rookery for great blue herons (*Ardea herodias*). Furthermore, as part of a cooperative agreement with the USFWS and the MDNR, this northern part of Bloodsworth Island has been established as a "no fire area." Nesting on Bloodsworth Island appears to be successful despite the fact that the island is open and has been heavily used for military training exercises in the past.

On the mid-Bay islands, green herons (*Butorides striatus*) use the lower branches of groundsel trees, and thus have been susceptible to the effects of sea level rise on pine and other tree hammock species. Other colonial waterbirds, namely the great and snowy egrets (*Egretta thula*) and the night-herons, are less common (Brinker, November 25, 1996).

There are also two small heron rookeries, one at the south end of Adam Island and one at the northern tip of Pone Island. As of the 1996 breeding season, the Adam Island rookery has about 12 birds, including great blue and yellow-crowned night herons, and great egrets. The Pone Island rookery consists of two pairs of great blue herons (US Department of the Interior, January 27 and 31, 1997).

Shorebirds also use the islands within the CTR, most extensively during the migratory season. Species recorded include: black-bellied plover (*Pluvialis squatarola*); ruddy turnstone (*Arenaria interpres*); red knot (*Calidris canutus*); least sandpiper (*Calidris minutilla*); semipalmated sandpiper (*Calidris pusilla*); dunlin (*Calidris alpina*); willet (*Catoptrophorus semipalmatus*); and dowitcher (*Limnodromus ssp.*). Of these, willet are the most common and the only non-transient species -- they nest on stream banks and inlets.

Few species of songbird nest on the islands, largely due to the shift to wetter conditions and the decline in upland habitats which has reduced the diversity of cover types. The islands provide ample nesting and feeding habitats for marsh species, such as red-winged blackbirds (*Agelaius phoeniceus*), marsh wrens (*Cistothorus palustris*), and sparrows, including the seaside sparrow (*Ammodramus maritimus*) and sharp-tailed sparrows (*Ammodramus caudacutus*) (Brinker, November 25, 1996).

Ospreys (*Pandion haliaetus*), despite limited nest sites, fare well in the area of the CTR. They nest on the ground and on artificial nesting platforms, including incidental platforms caused by human activities (osprey have been observed nesting on the antennae at Bldg 1703, the Electronic Systems Flight Test Facility, at NAS Patuxent River).

Populations of bald eagle (*Haliaeetus leucocephalus*), a federally-listed threatened species, have recovered around the Bay. Three nests occur within 3.7 km (two mi) of the air station. Bald eagles forage approximately 3.2 to 4.8 km (two to three mi) from their nest and could, therefore, potentially occur within the CTR (ICF Kaiser International, Inc., January 1997). Nine bald eagle nests have been found in St. Mary's County between the Patuxent and Potomac rivers. There is also a vacant nest on the northern tip of Holland Island, at which the last observed activity occurred in 1994. If no occupancy or nesting occurs at the territory within 1997, both the USFWS and the MDNR will presume the territory is no longer occupied (US Department of the Interior, January 27 and 31, 1997).

Similarly, peregrine falcons (*Falco peregrinus*), a federally-listed endangered species, are generally present within the Bay, primarily during spring and fall migration. However, they also are known to nest on bridges and other structures around the Bay.

Other Species of Importance

The northeast beach tiger beetle (*Cicindela dorsalis d.*), a federally-listed threatened species, occurs at ten locations in Virginia and Maryland, including four sites in Calvert County, and sites in Somerset and St. Mary's counties. One of the Calvert County locations is the beach across the Patuxent River from the air station. While the beetle may be present at NAS Patuxent River, it does not breed at the air station. The beetle is very susceptible to beach activities that disturb or compact the sand.

The puritan tiger beetle (*Cicindela puritana*) is also federally listed as a threatened species. Most populations occur on high, gradually eroding earthen-cliff faces and beaches. There are about ten locations in Calvert County that are known for this species. While the beetle may be present at NAS Patuxent River, it does not breed at the air station. The loss of beaches below the cliffs to erosion and development, as well as the modification of the cliffs, are the principal causes of endangerment (Labat Anderson, Inc., August 1995).

3.12.1.2 NAS Patuxent River

Mammals

Wildlife management at NAS Patuxent River follows the principles of ecosystem management consistent with DoD policy to protect biodiversity on its installations to the extent feasible while still meeting its mission requirements. The various plant communities and aquatic areas on the air station provide habitat for about 45 species of mammals. Of these, about 25 species are considered common, and include species such as white-tailed deer (*Odocoileus virginianus*), eastern gray squirrel *(Sciurus carolinensis*), southern flying squirrel (Glaucomys volans), beaver (*Castor Canadensis*), river otter (*Lutra canadensis*), mink (*Mustela vison*), muskrat (*Ondatra zibethicus*), eastern cottontail rabbit (*Sylvilagus floridanus*), gray and red fox (*Urocyon cinereoargenteus* and

Vulpes fulva), several bats (*Chiroptera ssp*.), woodchuck (*Marmota monax*), opossum (*Didelphis virginiana*), skunk (*Mephitis mephitis*), and smaller rodents such as mice and voles. Of these, white-tailed deer, beaver, the two squirrel species, muskrat, cottontail rabbit, the two foxes, and skunk are subject to management.

The beaver population is managed by annual sustained harvest and transfer to other areas. The objective of the management is to maintain a level of activity that allows some beaver ponds (which provide valuable wetland habitats) to be maintained, but prevents nuisance activity, such as damming of culvert pipes, that would lead to flooding of roads and runways. Trapping of beaver and other species (muskrat, otter, mink, raccoon, opossum, and gray and red fox) is allowed (Turner, Collie, & Braden, Inc., August 1994).

Through the Deer/Aircraft Strike Hazard (DASH) Program, white-tailed deer populations are also managed through harvest and habitat controls to maintain a level that balances deer/aircraft strikes, aesthetics, and recreation and educational uses. For example, the vegetation around runways is maintained in a manner that makes it unattractive to deer (Turner, Collie, & Braden, Inc., August 1994).

Reptiles and Amphibians

Sea turtles occur in the waters surrounding NAS Patuxent River and Webster Field. Several dead loggerheads have been found on the shores of the air station, but are not believed to be nesting there or anywhere in the Bay.

Nineteen amphibian and 29 reptilian species have been confirmed to occur on the air station. Of these, six are abundant, 18 are common, three are fairly common, and 17 are uncommon (Turner, Collie, & Braden, Inc., August 1994).

Birds

Habitats for birds are managed to maintain diversity, but also to minimize BASH. Over 260 bird species have been observed at the air station at some time during the year, with 29 of those species abundant, 92 common, and 85 uncommon. The rest are rare or occasional visitors, with several species only having been observed once. BASH management includes discouraging colonial nesting birds and waterfowl near runways, where practical, and providing food plantings and nesting structures away from runways and taxiways. Hunting for gamebirds is permitted and follows state and federal regulations (Turner, Collie, & Braden, Inc., August 1994).

The ponds, impoundments, and tidal creeks on the air station provide resting areas for waterfowl, as do the adjacent Bay waters. Large flock movements occur both during the day and at night at low altitudes (below 305 m or 1,000 ft) (ICF Kaiser International, Inc., January 1997). For safety reasons and to mitigate detrimental effects on waterfowl, pilots are instructed to minimize low-level flights (below 152 m or 500 ft) during the winter (ICF Kaiser International, Inc., January 1997).

The tip of Point Lookout has been observed to have large congregations of migratory songbirds during the fall and spring. About 150 species of migratory songbirds have been identified at the air station. Long-term management goals include restoration of large blocks of old growth forest for forest interior bird species (Draft INRMP, Undated).

Although increasing in number Bay-wide, bald eagles are uncommon (no nests have been observed) at the air station itself. While peregrines have been observed in the vicinity of the air station during migration, they have not been observed nesting there.

The NAS Patuxent River natural resources personnel monitor nesting activity of the least tern *(Sterna antillarum*), which is considered rare in Maryland. It is managed for BASH objectives, as well as for maintaining populations in appropriate areas. The air station has the only known remaining natural nesting colony on the western shore of the Chesapeake Bay.

Other Species of Importance

The northeastern beach tiger beetle (*Cicindela dorsalis d.*), a federally-listed threatened species, has been sighted twice on NAS Patuxent River -- once slightly east of Cedar Point and once at Fishing Point. However, the tiger beetle individuals were thought to have originated from a location across the Patuxent River. The habitat of the air station is not typically conducive to supporting this particular subspecies of tiger beetle, nor does the beetle breed at the air station (Turner, Collie, & Braden, Inc., August 1994).

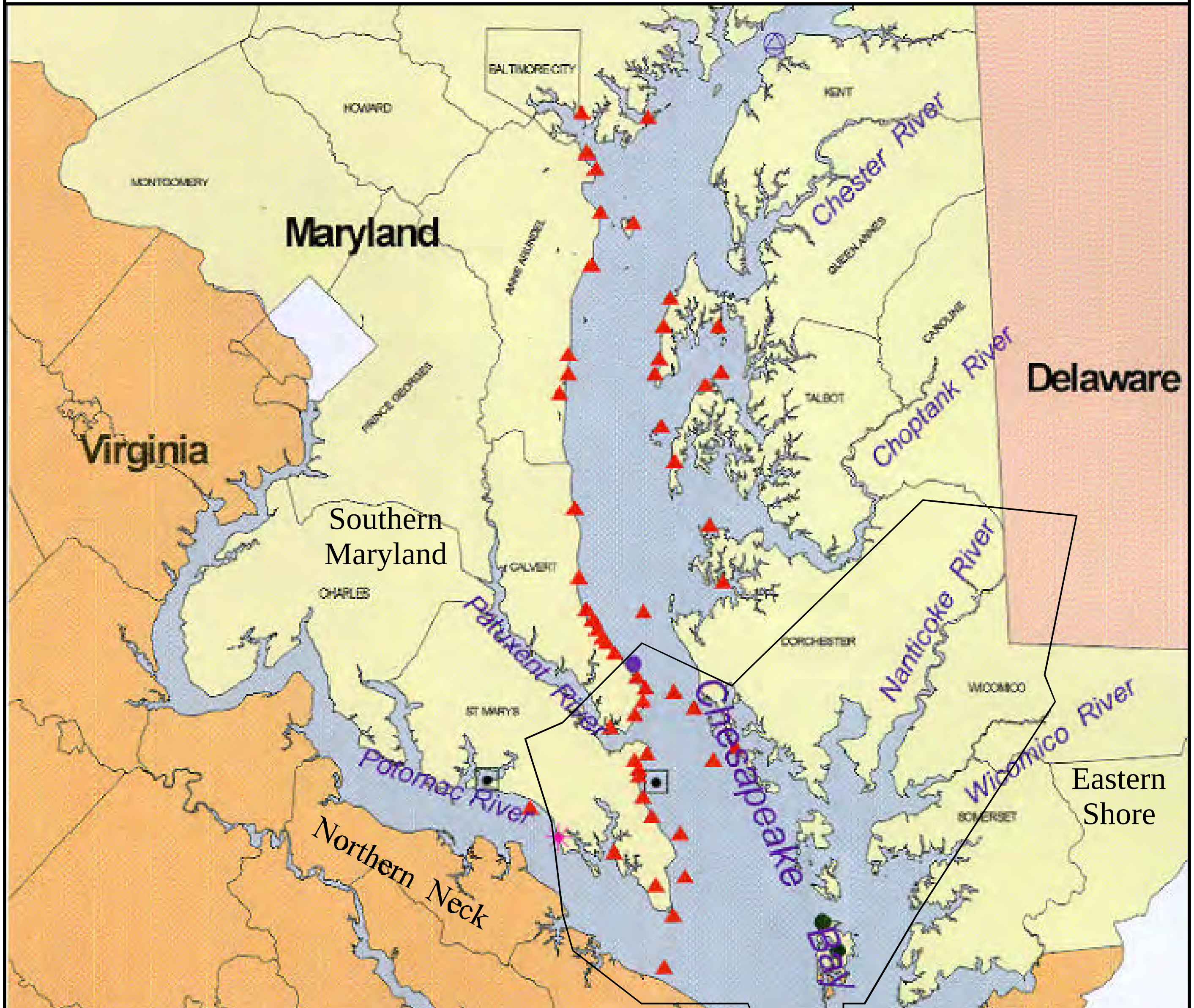
3.12.1.3 OLF Webster Field

Much of Webster Field consists of habitat types similar to those that exist at NAS Patuxent River, and therefore, similar species of wildlife occur there. Runway and ground management plans are similar to those at NAS Patuxent River, and are aimed at discouraging birds and deer from approaching the runways.

3.12.1.4 Localized Target Areas

Information specific to the target areas is not available. However, based on the information summarized in Subchapter 3.12.1, humpback whale, harbor porpoise, bottlenose dolphin, minke whale, fin whale, and an unidentified seal species may occur in this portion of the Bay. Figures 3.12-1 and 3.12-2 show where individuals have been stranded and sighted for each of the marine mammal and sea turtle species recorded in the Bay, with the exception of the fin whale, whose exact location is unconfirmed. The National Aquarium at Baltimore, in conjunction with staff from the St. Inigoes US Coast Guard Station, is presently monitoring bottlenose dolphin activity in the area of NAS Patuxent River (Scofield, March 27, 1997).

Chesapeake Bay Marine Species Stranded (1991-1995)



Not to Scale

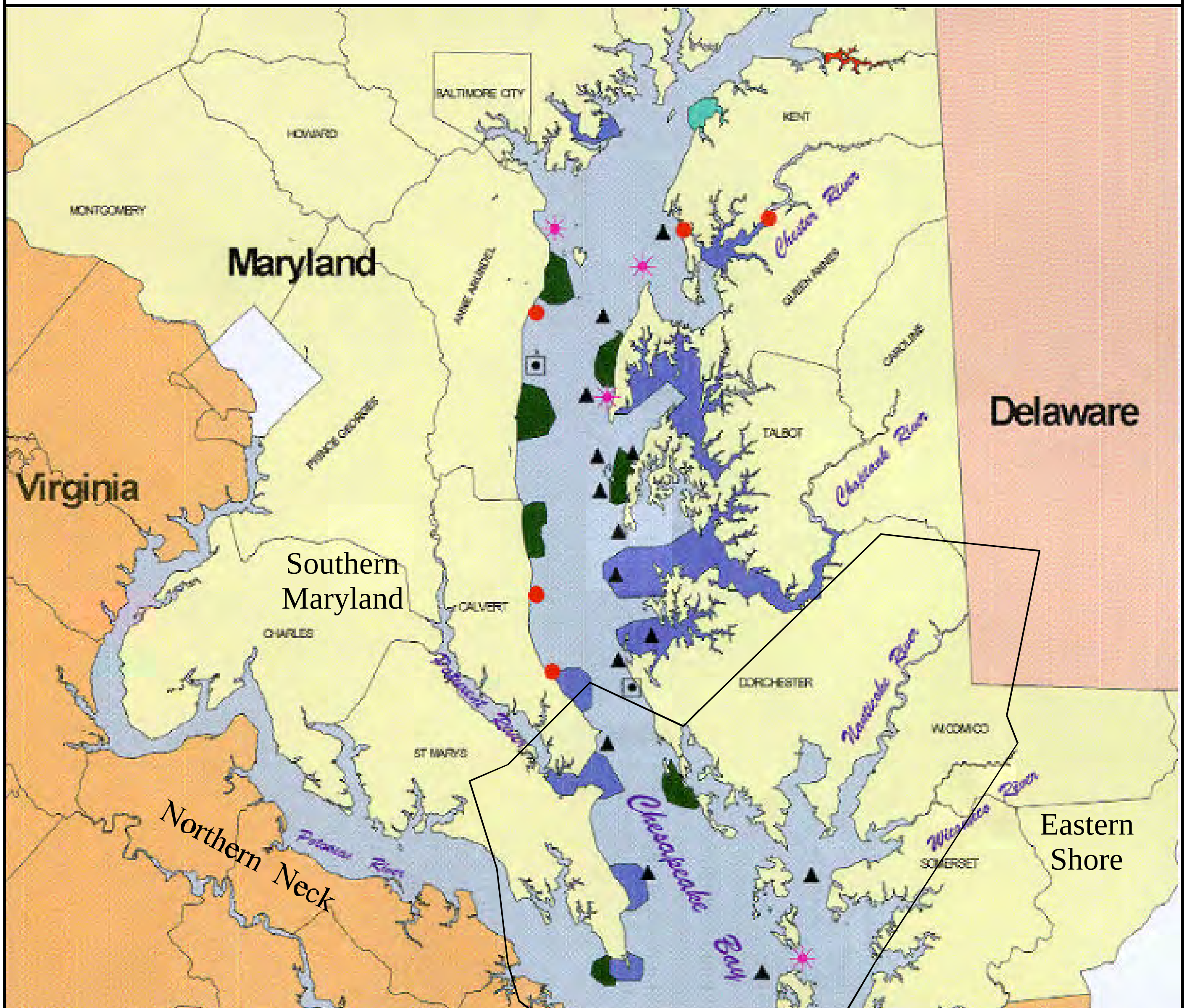
- Loggerhead Turtle
- Leatherback Turtle
- Kemp's Ridley Turtle
- Dolphin
- Minke Whale
- Harbor Porpoise
- Chesapeake Test Range

N

Source: RMC, Inc., 1997.

Figure 3.12-1

Chesapeake Bay Marine Species Sightings (1991-1995)



Not to Scale

- Humpback Whale
- Unknown Sea Turtle
- Leatherback Turtle
- Seal
- Unknown Whale
- Bottlenose Dolphin
- Loggerhead Turtle
- Manatee
- Chesapeake Test Range

N

Source: RMC, Inc., 1997.

Figure 3.12-2

3.12.2 Fisheries

The information provided in this subchapter is drawn primarily from *Life in the Chesapeake Bay* (Lippson & Lippson, 1997).

3.12.2.1 The Chesapeake Test Range

The Chesapeake Bay with its associated estuarine marshes is not only the largest estuary in North America, but one of the most productive in the world. In the middle portion of the Bay, fish and shellfish populations are enhanced by vast expanses of estuarine marshes that line the eastern shore -- and to a much lesser extent the western shore. These marshes shelter the young and enhance the fertility of the water. Similarly, submerged aquatic vegetation, where available, provides fish with nursery and refuge sites.

However, fish and shellfish populations in the Bay have been and are being affected by over-fishing of some species, declining acreage of SAV and estuarine marshes, and pollution. As described earlier in Subchapter 3.10, SAV has declined in extent from its historic level in the Bay. In addition, oyster populations have been decimated by two protozoan parasites -- MSX (*Haplosporidium nelsoni*) and Dermo (*Perkinsus marinus*) (Lippson & Lippson, 1997). Further, the microbe *Pfeisteria piscidcida* threatens fish with lethal toxins in the southeast part of the CTR, thought to be the result of over-fertilization of Bay waters by farming and livestock production (Warrick and Shields, October 3, 1997).

The variation in species of shellfish and finfish found in the middle part of the Chesapeake Bay under the CTR footprint is controlled largely by salinity levels. Waters here are considered moderately salty, containing ten to 18 parts per thousand (ppt) salt (ocean water has 30-35 ppt) (Lippson & Lippson, 1997). This area is less diverse in both plant and animal species than either the upstream freshwater or the downstream ocean, and salinity levels shift with rainfall, currents, water depth, and location (the eastern side of the Bay is saltier). However, fish species "that can tolerate the vagaries of salinity in this region [of the Bay] are favored with unusual productivity, a result in part of the lack of species competition" (US Department of the Interior, June 1996). Salinity levels fall proceeding up the tidal rivers of the Potomac, Patuxent, Nanticoke, Great and Little Wicomico, Big and Little Annemessex, Manokin, Wicomico, and Blackwater, resulting in a different assemblage of fish and shellfish species.

Almost 300 species of fishes have been recorded in the Bay and its tributaries; about half are ocean fishes that enter the Bay to feed in warmer months, then return to the ocean. Ocean fishes are more likely to be found south of the CTR. While most of these "summer visitors" spawn in the ocean, their larvae and juveniles enter the Bay at an early age to grow rapidly on the dense populations of invertebrates and small forage fishes found in its shallow waters. Atlantic menhaden (*Brevoortia* *tyrannus*) is probably the most abundant and most commonly seen fish in the Bay. The most abundant ocean species found in the shallows in the middle to lower parts of the Bay are three species of drum -- spot (*Leiostomus xanthurus*), Atlantic croaker (*Micropogonias undulatus*), and silver perch (*Bairdiella chrysoura*).

Many fish species move into shallow waters in summer and out to deeper Bay waters in the fall months. The most common Bay species found in shallow waters are the killifishes, anchovies, and silversides. They range in size from 2.5 cm (one in) -- rainwater killifish (*Lucania parva*) -- to 20 cm (eight in) -- striped killifish (*Fundulus majalis*). Mummichogs (*Fundulus heteroclitus*) and banded killifish (*Fundulus diaphanus*) stay close to shore in less saline waters, with the mummichogs entering marshes to feed with the tides. Sheepshead minnow (*Cyprindon variegatus*) is also typical of shallow waters. Long, slender needlefish (*Strongylura marina*) patiently stalk these small fish close to shore.

Bay anchovies (*Anchoa mitchilli*) -- closely related to grocery store anchovies -- and silversides (the Atlantic silverside [*Menidia menidia*], inland silverside [*Menidia beryllina*], and the rough silverside [*Membras marinica*]), are some of the most plentiful fishes in the Bay. Anchovies and silversides are favored prey of the voracious bluefish (*Pomatomous saltatrix*) and striped bass (*Morone saxatilis*).

Flatfish are common in the shallows, and the most likely to be found within the footprint of the CTR are the small, bony hogchokers (*Trinectes maculatus*), winter flounder (*Pleuronectes americanus*), and in more saline areas, summer flounder (*Paralicthys dentatus*), windowpane (*Scophthalmus aquosus*), and blackcheek tonguefish (*Symphurus plagiusa*). Older flatfish move into deeper waters or to the ocean to spawn.

Every spring, anadromous (spawn in fresh water, live in ocean) herrings and shad enter the rivers and streams in large schools to spawn. Shad species common in the Bay include: American (white) shad (*Alosa sapidissima*) from which shad roe is taken in the spring; hickory shad (*Alosa mediocris*); and gizzard shad (*Dorosoma cepedianum*), which is common in the upper part of the CTR and stays in the Bay all year. The closely related river herring species are alewife (*Alosa psuedoharengus*) and blueback (*Alosa aestivalis)*.

Striped bass or rockfish and white perch (*Morone americana*) prey on smaller fish and are semi-anadromous, seeking rivers and streams to spawn, then migrating down the rivers and Bay (though most remain in the Bay for their whole lives). Young catadromous (spawn in ocean, live in freshwater) American eels (*Anguilla rostrata*) or elvers, hatched in the Sargasso Sea east of the Bahamas, enter the Bay or its tributaries in great numbers to stay for five to 20 years before leaving to spawn.

Freshwater species that can tolerate somewhat saline waters often can be found in shallow streams and protected coves of the larger estuarine rivers. Yellow perch (*Perca flavescens*) is the best known freshwater species in the Bay, and, in fact, has become so acclimated to brackish water that it behaves more like the semi-anadromous white perch and gizzard shad. Other freshwater fishes commonly found in somewhat to barely brackish water include: brown bullhead (*Ameiurus nebulosus*); white catfish (*Ameiurus catus*); channel catfish (*Ictalurus punctatus*); white sucker (*Catostomus commersoni*); carp (*Cyprinus carpio*); goldfish (*Carassius auratus*) set free from fish tanks; golden shiner (*Notemigonus chrysoleucas*); silvery minnow (*Hybognathus regius*); spottail shiner (*Notropis hudsonius*); satinfin shiner (*Cyprinella analostana*); pumpkinseed (*Lepomis gibbosus*); bluegill (*Lepomis macrochirus*); black crappie (*Pomoxis nigromaculatus*); smallmouth bass (*Micropterus dolomieu*); largemouth bass (*Micropterus salmoides*); longnose gar (*Lepisosteous osseus*); chain pickerel (*Esox niger*); redfin pickerel (*Esox americanus*); and eastern mudminnow (*Umbra pygmaea*).

Fish of the deeper, open waters include schooling predator fishes, bottom-feeding fishes, reef-type fishes, and small foraging species. The adults of most species found in the shallows are found here, too. Large schools of menhaden and anchovies are preyed upon by schools of striped bass, bluefish, and seatrouts (spotted [C*ynoscion nebulosus*] and weakfish [*Cynoscion regalis*]); all four are avidly sought by sport fishermen. Rockfish populations declined severely during the late 1970s and 1980s, a situation probably attributable to overfishing, pollution, larval sensitivity to toxic metals and pesticides, and reductions in zooplankton which fed the young (USFWS, 1990). For a number of years, rockfish fishing was closed in Maryland to allow the population to recover. The population is rebounding, and fishing is again allowed.

Bottom-feeding fishes of deeper waters tend to be solitary. Species groups found in the Bay include whitings (kingfish), hakes, puffers, sea robins, lizardfish *(Synodus foetens*), and stargazer (*Astroscopus guttatus*) that can produce a perceptible electric shock.

Sharks, skates, and rays are found in the Bay, but are much more common in the more saline waters south of the CTR footprint. The species most likely to be found in the CTR are cownose rays (*Rhinoptera bonasus*), bull sharks (*Carcharhinus leucas*), and sandbar sharks (*Carcharhinus plumbeus*). Cownose rays and sandbar sharks are commonly found cruising over eelgrass beds looking for a meal, but can enter deeper waters, too. Bull sharks can reach more than 3.6 m (12 ft) in length, but in the Bay, a maximum of 1.8 m (six ft) is more likely. Schools of the common dogfish sharks, smooth (*Mustelus canis*) and spiny (*Squalus acanthias*), may be found cruising in deeper waters in the southern part of the CTR. They reach 0.6 to 1.5 m (two to five ft) and up to 1.2 m (four ft) in length, respectively.

The Chesapeake Bay also hosts a diversity of crabs, shrimp, clams, and oysters. The best known of these are the blue crab (*Callinectes sapidus*) and the American oyster (*Crassotrea virginica*). Both are found throughout the CTR, as is the less-sought-after but commercially harvested soft-shelled clam (*Mya arenaria*). Commercially-marketed pink (*Pinaius duorarum*), white (*P. setiferus*), and brown (*P. aztecus*) shrimps occur in the Bay, but not in sufficient quantities to harvest. Altogether, about 28 species of mollusks and 25 species of shrimp and crab are likely to be found in the portion of the Bay or its tributaries underlying the CTR.

Crabs are particularly abundant in the shallow waters around Tangier, Smith, and Bloodsworth islands in the warmer months. Blue crabs mate from June through October in the mid-Bay salinities of the CTR. Males mate with soft-shelled, molted females. After their shells have hardened, females move down the Bay floating and swimming on the surface with the aid of the tides to the Bay mouth where they lay their eggs. The larvae become plankton that are eventually swept back into an estuary.

Oysters cluster together in dense colonies, creating oyster bars resembling miniature reef communities complete with small fish and crabs, a myriad of worms, bryozoans, sea squirts, anemones, and snails. Oyster shells provide cover and points of attachment for other creatures on what would otherwise be a muddy bottom. Oyster beds form on non-shifting surfaces in water depths of 2.4 to 7.5 m (eight to 25 ft) in the Bay to avoid freezing temperatures. Oyster beds have declined in extent precipitously, battered by pollution, sedimentation, over harvesting, and diseases. The diseases MSX and Dermo have severely reduced harvests from the early 1980s. Today, the most productive oyster bars are in the mid-Bay area with salinities low enough to reduce saltwater predators and diseases yet high enough to sustain the oysters.

Once plentiful throughout the Chesapeake and harvested in great numbers until the turn-of-the-century, the anadromous Atlantic sturgeon is the largest fish to be found in the Bay. They can grow to 4.2 m (14 ft) in length and more than 365 kg (800 lbs). In 1996 Natural Resources staff at NAS Patuxent River reported that a dead specimen of Atlantic sturgeon (*Acipenser oxyrhyncus*) was collected in 1994 on the beach near Fishing Point. The Atlantic sturgeon has a global ranking of G3 (very rare and local throughout its range). On September 23, 1998, the National Marine Fisheries Service denied a 90-day finding for a petition to add this species to the List of Threatened and Endangered Wildlife and to designate a critical habitat. The smaller shortnose sturgeon (*Acipenser brevirostruma*) is now very rare all along the Atlantic Coast, but is capable of sustaining populations in the Patuxent River and the Bay. It is federally-listed as endangered.

The potential also exists that dwarf wedge mussel (*Alasmidonta heterodon*), a freshwater mussel, might be found in the river systems tributary to the Chesapeake Bay in areas underlying the footprint of the CTR. This freshwater mussel is federally-listed as endangered and has declined over the last hundred years, suffering from the results of channelization, construction projects, removal of riparian vegetation, pollution, and sedimentation. At present it is known to exist at 19 locations in seven river systems. At one time, this species was found in estuarine rivers along the Atlantic Ocean from New Brunswick to North Carolina. In Chesapeake Bay tributaries, the mussel is known to live in Norwick Creek and Long Marsh Ditch in the Choptank River system located in Queen Anne and Talbot counties. Historically, the mussel was found in the Potomac River system near Washington, DC, in Nanjemoy Creek in Charles County, and McIntosh Run in St. Mary's County (Turner, Collie, & Braden, Inc., August 1994).

Data collected for the USEPA Environmental Monitoring and Assessment Program (EMAP) provides a picture of the nature of the fish and benthic communities in the CTR. The EMAP is a nationwide program administered by the USEPA's Office of Research and Development to survey ecological indicators in the Virginia Province (Cape Cod, Massachusetts to Cape Henry, Virginia) estuaries. Indicators specific to biota are fish and benthic community structure. These data collected in during the first EMAP cycle (1990-1993) will eventually be used by USEPA to establish baseline conditions in the Virginia Province for future trends analyses (USEPA, 1995).

Figure 3.12-3 (Select USEPA Invertebrate and Fish Sample Locations) shows EMAP sampling stations in the Chesapeake Bay. Table 3.12-2 and 3.12-3 show EMAP data on benthic invertebrates and fish from a number of the stations sampled within, and in the vicinity of, the CTR. These data show tremendous variability between sites. One trend is apparent. The number of species and overall abundance of organisms is not apparently associated with a specific location in the middle Chesapeake Bay. Some stations exhibit low abundance and diversity, while other stations have high abundance and diversity.

3.12.2.2 NAS Patuxent River

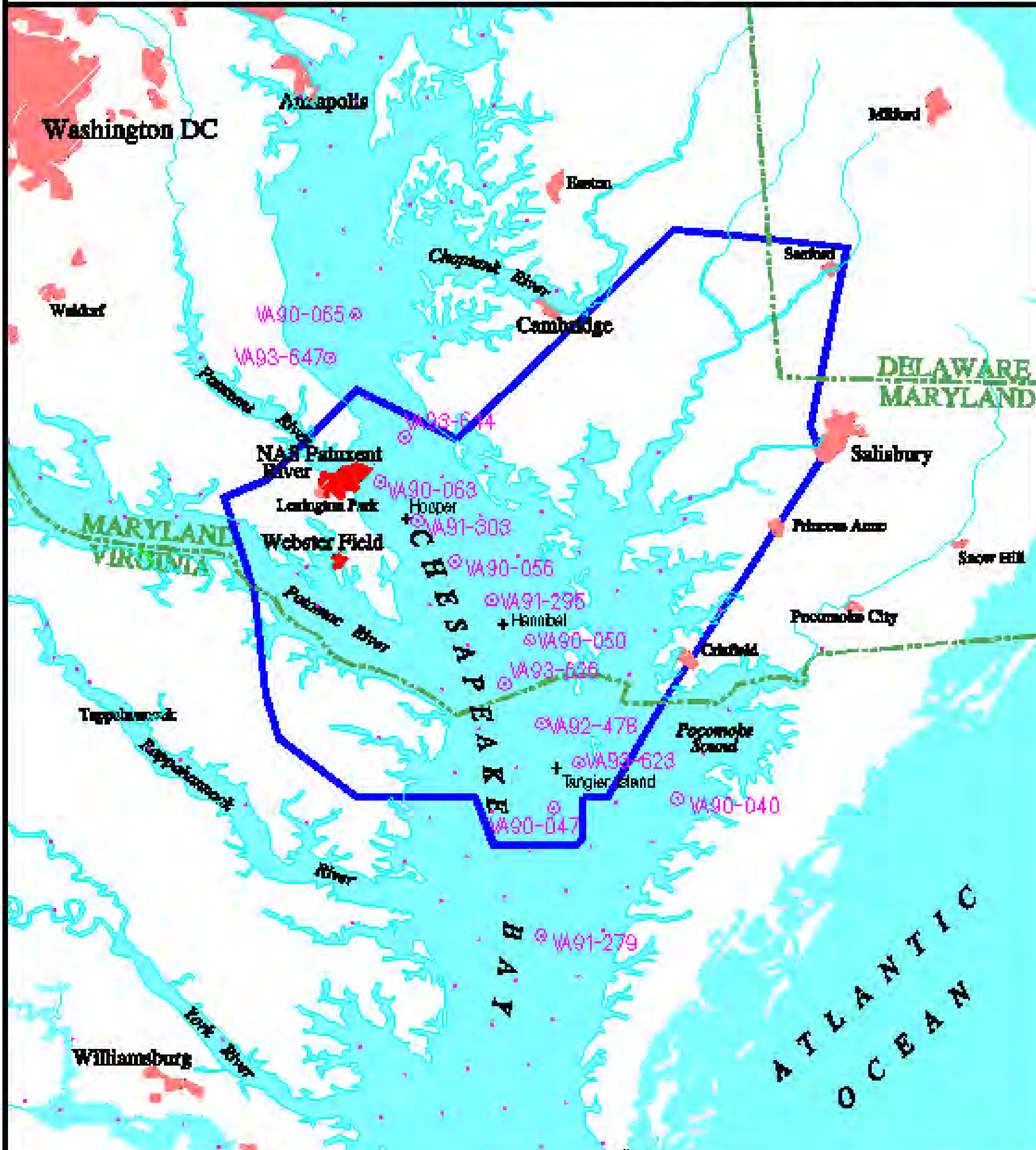
NAS Patuxent River encompasses aquatic environments that can support a wide variety of fish species. On the air station are six freshwater ponds, small perennial and intermittent streams, tidal creeks and associated wetlands, freshwater wetlands, and frontage directly on the Chesapeake Bay and the Patuxent River. Salinity levels vary considerably over these water bodies, creating a number of distinct habitats each with its own assemblage of fish, shellfish, and mollusk species. The information in the remainder of this section is taken from the Draft INRMP now being prepared unless otherwise noted (Draft INRMP, Undated).

The air station is located at the confluence of the Patuxent River and the Chesapeake Bay. Lippson & Lippson (1997) classify the waters around the station as "moderately salty" with ten to 18 ppt salinity levels. The fish, shellfish, and mollusk species that are likely to be found along the 11.2 km (seven miles) of shoreline are as described in the previous section for shallow waters of the Chesapeake Bay underlying the CTR.

Five of the freshwater ponds -- Gardiner, Sewall, Holton, Calvert, and Sacawaxhit -- support populations of green sunfish (*Lepomis cyanellus*), black crappie, pumpkinseed, blue gill, redear sunfish (*Lepomis microlophus*), golden shiner, American eel, largemouth bass, carp, brown bullhead, black bullhead (*Ictalurus melas*), channel catfish, and blue catfish (*Ictalurus furcatus*). A sixth pond is used as a brood pond to provide stock for the other ponds. The ponds range in size from 0.8 to 11.2 hectares (two to 28 acres).

A 1984 study found 15 fish species in tidal Harper and Pearson creeks: spot, alewife, bluefish, white perch, striped bass, hogchoker, mummichog, striped killifish, Atlantic silverside, sheepshead minnow, naked goby (*Gobiosoma bosci*), four-spine stickleback (*Apeltes quadracus*), banded killifish, Atlantic needlefish, and summer flounder. The tiny gobies are commonly found lurking in oyster shells in oyster bar communities, while the equally tiny sticklebacks typically live in eel grass communities.

Select USEPA Invertebrate and Fish Sample Locations



Sample Point Location
Referenced in Tables 3.12-2,3
Chesapeake Test Range
NAS Patuxent River and Webster Field
Target

Source: USEPA, 1995.

Figure 3.12-3

Table 3.12-2

EMAP Benthic Data for Selected Sites Associated with the CTR

Station	General Location	Mean No. of Taxa per Grab	Mean No. of Organisms per Grab	Mean Biomass per Grab (grams)
VA90-040	Outside of CTR (to the east)	25	219	0.2510
VA90-047	Outside of CTR (to the west)	29	163	0.8036
VA90-050	Just southeast of Hannibal target	11	49	0.1606
VA90-056	Between Hannibal and Hooper targets	0	0	0.0005
VA90-063	Northeast of Hooper target	10	71	0.1869
VA90-065	Outside of CTR (to the north)	20	253	0.6532
VA91-279	Outside of CTR (to the south)	29	140	0.2984
VA91-295	Just north of Hannibal target	21	93	0.3429
VA91-303	Just east of Hooper target	1	1	0.0000
VA92-626	Between Hannibal and Tangier Island targets	21	307	0.1694
VA92-478	Between Hannibal and Tangier Island targets	19	159	0.1099
VA93-647	Outside of CTR (to the north)	0	0	0.0000
VA93-644	Northeast of NAS Patuxent River	1	1	0.0002
VA93-623	Just east of Tangier Island target	21	93	0.3429

Notes: 1. *VA90* - *VA93* refers to year sample was collected (i.e., 1990, 1991, 1992, 1993).
Source: USEPA, 1995.

Table 3.12-3

EMAP Fish Data for Selected Sites Associated with the CTR

Station	General Location	Total Number of species collected	Total number of individuals collected
VA90-040	Outside of CTR (to the east)	9	321
VA90-047	Outside of CTR (to the west)	7	90
VA90-050	Just southeast of Hannibal target	4	30
VA90-056	Between Hannibal and Hooper targets	2	2
VA90-063	Northeast of Hooper target	6	399
VA90-065	Outside of CTR (to the north)	1	2
VA91-279	Outside of CTR (to the south)	10	112
VA91-295	Just north of Hannibal target	3	14
VA91-303	Just east of Hooper target	4	30
VA92-478	Between Hannibal and Tangier Island targets	1	4
VA93-623	Just east of Tangier Island target	2	12
VA93-626	Between Hannibal and Tangier Island targets	3	4
VA93-644	Northeast of NAS Patuxent River	1	1
VA93-647	Outside of CTR (to the north)	0	0

Notes: 1. *VA90-VA93* refers to year sample was collected (i.e., 1990, 1991, 1992, 1993).
Source: USEPA, 1995.

The species present suggest that at the time of the study, a well-balanced shallow water Chesapeake Bay community existed in the creeks (Fred C. Hart Associates, 1984, in Draft INRMP, Undated).

Studies done at the air station before 1984 reported oysters, clams, and crabs in Pearson, Harper, and Goose creeks. Catfish, bluegill, and bass are found in the upper portion of Pine Hill Run, while carp, white perch, and other tidal creek fishes are found in the lower segment. As the result of cooperative agreements with the MDNR, NAS Patuxent River has started an oyster enhancement program to increase the shellfish population by placing shell cultch and seed oysters into the tidal creeks.

The perennial and intermittent streams found on the station are generally associated with the ponds and tidal creeks. Several contain beaver ponds and are likely to harbor freshwater fish species similar to the ones in the ponds and as described in the preceding section for freshwater species which can live in slightly brackish waters. The streams have been observed to be home to anadromous fish that come to spawn as reported by Beaven (1994) and described in the Draft INRMP. American eels, eastern mudminnows, pirate perch (*Aphredoderus sayanus*), suckers, killifish, bullheads, and on occasion, species of sunfish, have been observed in these streams.

3.12.2.3 OLF Webster Field

Webster Field is bounded by the tidal St. Inigoes Creek on the north and the St. Mary's River on the west. The waters of the St. Mary's River, which is a tributary of the Potomac River, are considered moderately salty and should support a typical shallow water Chesapeake Bay community of fish and shellfish species. In the past, the St. Mary's River was noteworthy as a nursery for shellfish. Disease and over-harvesting, as well as pollution from developed areas north of St. Inigoes, have diminished the quality and quantity of catches in recent years. A shellfish study is currently being conducted by the state of Maryland.

Within Webster Field there are considerable areas of estuarine marsh, tidal freshwater marsh and nontidal marsh, two freshwater ponds, and numerous intermittent streams. In the mid-1980s both ponds were stocked with largemouth bass and bluegill, and both have been open for fishing since 1990.

3.12.2.4 Localized Target Areas

While Hannibal and Tangier Island targets consist of scuttled ships, Hooper target consists of four concrete columns supporting a concrete structure. Wrecks and deep pilings such as these constitute the “reefs” of the Chesapeake Bay and attract shellfish and particular “reef” fish that congregate around them (Lippson & Lippson, 1997). Cobia (*Rachycentron canadum*), black sea bass (*Centropristis striata*), black drum (*Pogonias cromis*), and orange filefish (*Aluterus schoepfi*) are likely to be found in the moderately salty waters surrounding the targets. Cobia or crab-eaters are a fierce fighting fish prized by sportsmen. They can grow up to 1.8 m (six ft) and 31 kg (70 lbs) and prefer to live in the shade around wrecks and buoys. Black drum, which feed on mollusks, can reach 45 kg (100 lbs) or more in weight.

The Tangier Island and Hannibal targets are scuttled ships resting in relatively shallow water. According to the *Chesapeake Bay Chartbook* (ADC of Alexandria, Inc., 1996), Tangier Island target is in 3.6 m (12 ft) of water, Hannibal target is in 5.1 m (17 ft) of water, and Hooper target is in 10.8 to 12 m (36 to 40 ft) of water. For all three, the water is measured at mean lower low water. Given the water depths, crabs, oysters, and shallow water fishes are much more likely to be found around the Tangier Island and Hannibal targets than around Hooper.

Despite the fact that the targets are surrounded by 915-m (1,000-yd) prohibited areas, Hannibal and Tangier Island targets are identified in the *Chesapeake Bay Chartbook* as being within outlined "fishing areas" designated as "The Old Hannibal" and "The Targets," respectively. The fishing area designation for Hannibal is drawn almost exactly around the prohibited area. Fishermen are known to tie their boats to Hannibal's scuttled cargo ship. Both the map designations and observations for use by fishermen suggest that fish populations in the target areas are large and attractive enough to lure fishermen despite the prohibitions against entry. NAWCAD uses a series of range clearance procedures to ensure that fisherman or recreational boaters are restricted from areas where testing is being conducted (these procedures are described in more detail in Subchapter 3.14).

3.13 Water and Sediment Quality

3.13.1 Chesapeake Test Range

3.13.1.1 Surface Waters and Sediments

The Chesapeake Bay is essentially the flooded river valley of the ancient Susquehanna River and its tributaries. The old riverbed is now the deep channel of the present Bay. The north-south axis of the Bay is over 290 km (180 mi) long, extending from the mouth of the Susquehanna River in northeastern Maryland to Cape Henry in Virginia, and is roughly parallel with the Atlantic Coast. Nineteen principal rivers and over 400 lesser creeks and streams, draining a total of more than 165,760 sq km (64,000 sq mi), empty into the Bay and contribute to the more than 7,400 km (4,600 mi) of tidal shoreline. The average water depth is 9.1 m (30 ft), but the central channel is deeper than 100 m (325 ft) in some places (Lippson & Lippson, 1997).

Circulation in the Chesapeake Bay is driven by tidal and non-tidal factors, producing a net seaward movement of freshwater at the surface, with a net landward movement of salty water on the bottom. (Pritchard, 1967 and Biggs, 1978: in Sellner and Peters, 1987). Higher salinity waters move up-Bay along the eastern shore, while fresher, surface waters flow seaward along the western shore (Sellner and Peters, 1987).

The CTR is situated in the middle portion of the Chesapeake Bay, where salinity concentrations are typical of brackish waters, ranging between ten and 20 parts per thousand (ppt) (Lippson & Lippson, 1997; ICF Kaiser International, Inc., January 1997). Salinity generally increases from surface to bottom waters, and bottom waters can be two to three ppt higher than surface waters. Salinities may run about two ppt less than average in the spring when freshwater inflows are highest due to melting snow and spring rains. In the autumn when freshwater flows are lowest, salinities can be two to six ppt higher.

Freshwater inflows are primarily from western shore tributaries that drain broader watersheds (extending up into the Appalachian ranges) than eastern shore tributaries. As a result, salinities are usually lower along the western shore than along the eastern shore. The eastern shore tributaries drain the low, flat countryside of the Delmarva Peninsula, and are characterized by extensive marshes. Three of the principal rivers, the Susquehanna, Potomac, and the James, together contribute over 80 percent of the freshwater inflow to the Bay (Lippson & Lippson, 1997; USEPA, June 1993)

The CTR is located in the segment of the Bay designated 02-13-99-98 (Lower Chesapeake Bay) by the MDNR for water quality monitoring and evaluation purposes. Water quality in this segment is generally classified as “good” by the MDNR and Maryland Department of Environment (MDE). This segment contains the Bay’s deepest waters and is subject to deep water anoxia (low dissolved oxygen conditions). Anoxia occurs during the mid-summer to early fall at depths below ten m (32.8 ft), when the process of decomposition of organic materials deposited in bottom sediments depletes free oxygen in the water column.

Nutrients, including the various forms of nitrogen and phosphorus, are important in aquatic ecosystems because they can stimulate plant production, which, when excessive, will deplete oxygen in the water column. In the Chesapeake Bay, nitrate and total nitrogen levels decline from the upper portion of the segment off Kent Island to the Little Choptank River. Orthophosphate levels decline in the upper portion of the segment, but remain high throughout the lower portion of the segment. Ammonium levels remain high throughout the segment. Elevated nutrient levels are due to upstream sources and natural conditions (MDNR, December 1996; Turner, Collie, & Braden, Inc., August 1994; USEPA, June 1993).

Algal blooms occur in this portion of the Bay at different times of the year, particularly along the western shore and mouth of the Patuxent River (Turner, Collie, & Braden, Inc., August 1994). However, turbidity in many areas is still low enough to permit adequate light levels to support SAV growth in many areas (MDNR, December 1996). Waters of the Bay are typically neutral to slightly alkaline, with pH levels ranging between seven and eight, providing some buffering capacity (ICF Kaiser International, Inc., January 1997).

The middle and lower Bay receive suspended particulates primarily from shore erosion (52 percent) and phytoplankton (40 percent) (Sellner and Peters, 1987). Particulate loads in the mid-Bay region are one to six milligrams per liter (Schubel, 1968 and Biggs, 1970: in Sellner and Peters, 1987). Annual sedimentation rates in the middle portion of the Chesapeake Bay vary between 0.09 and 0.12 centimeters (cm) (Schubel and Hirschberg, 1977: in Sellner and Peters, 1987).

The CTR extends over tidal portions of the Patuxent, St. Mary's, Potomac, Big Annemesex, Manokin, Wicomico, Nanticoke, and Choptank rivers (Figure 3.13-1, Chesapeake Bay and Tributaries). Of these, the Patuxent, Potomac, and St. Mary's drain the area on the western shore of the Chesapeake Bay, while the others drain Maryland's Eastern Shore and southwestern Delaware. These waters are generally classified as fair to good (the Patuxent and St. Mary's rivers are described later in this subchapter):

- **Potomac River** - In the lower portion of the Potomac River, water quality is "good," with elevated nutrient levels occurring due to agricultural runoff, poor flushing characteristics, and other upstream sources. Agricultural runoff and erosion contribute to elevated suspended sediment levels. Low dissolved oxygen levels in the deeper waters of the lower river during the summer are believed to be due to an extension of the conditions present in the bottom waters of the Chesapeake Bay.

- **Big Annemesex River** - Water quality in this river is "fair," with high ammonia, total nitrogen, and orthophosphate levels in its tidal portion. Deeper waters suffer

Chesapeake Bay and Tributaries

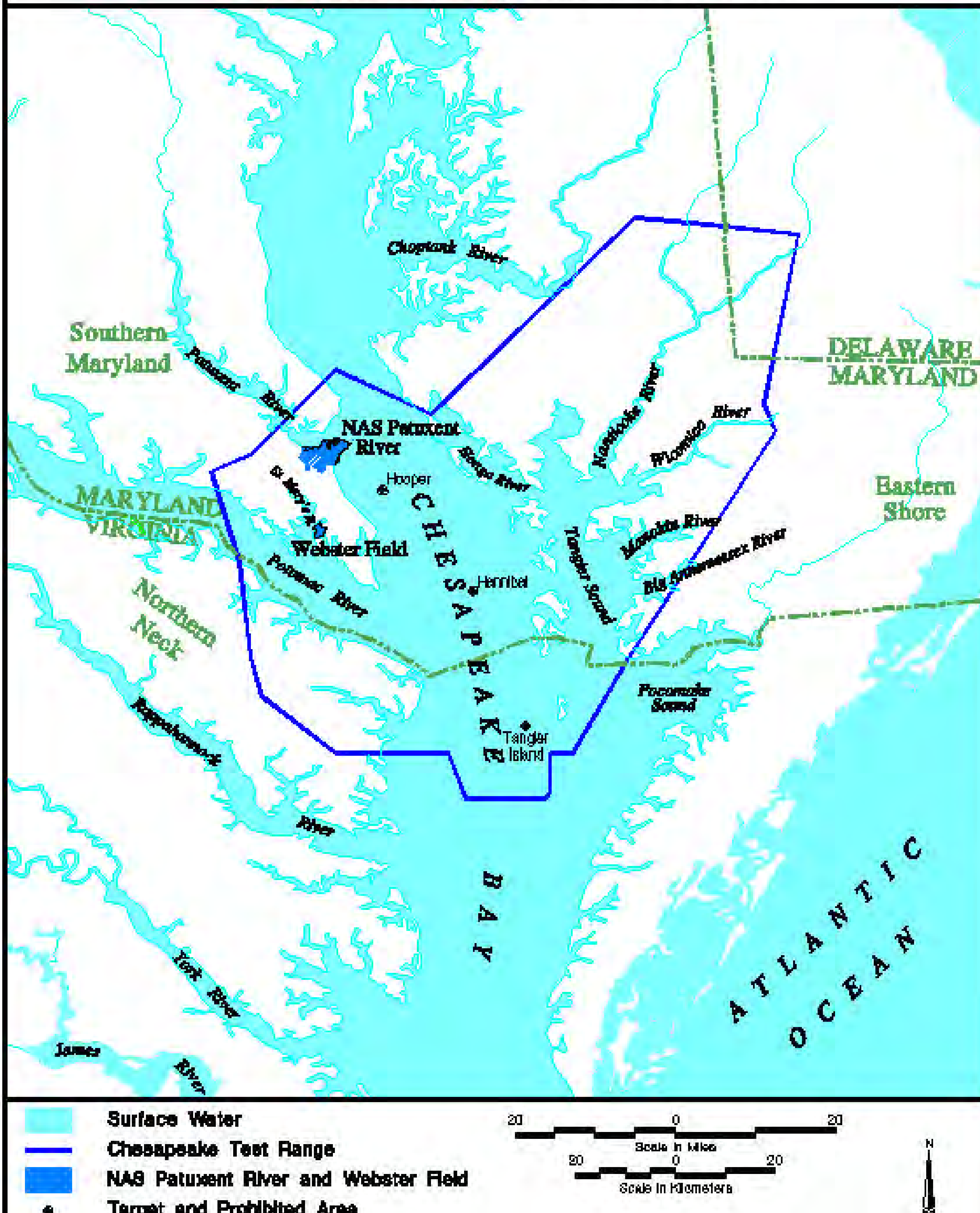


Figure 3.13-1

from seasonal low dissolved oxygen levels, probably because of natural drainage from extensive tidal wetlands.

- **Manokin River** - In this river, water quality is "fair," with high ammonia, total nitrogen, orthophosphate and total phosphorus levels, and seasonal low oxygen levels in deeper waters.

- **Lower Wicomico River** - Water quality is "fair" immediately below Salisbury, but improves to "good" in the lower river. It is characterized by high nitrate, total nitrogen, orthophosphate and total phosphorus, elevated ammonia, and low dissolved oxygen (in deeper waters).

- **Nanticoke River** - The lower portion of this river has "good" water quality, but it degrades slightly upstream. Elevated bacteria and nutrient levels occur in the upper reaches, due to agricultural and natural runoff and upstream sources. High nitrate, total nitrogen, orthophosphate, total phosphorus, ammonia, and chlorophyll occur in the upper Nanticoke, with some decline in orthophosphate downstream.

- **Choptank and Honga rivers** - There are no formal water quality monitoring stations for these rivers, but with the exception of degradation near more populated areas, the classification is likely "good."

Elevated bacteria levels can result in closure of some areas for shellfish harvesting. For example, shellfish harvesting is prohibited in a 52-hectare (0.2-square mile) area of the Big Annemesex River, and another 648 hectares (1,600 acres) are "conditionally approved," and may be closed if rainfall in the basin exceeds 2.5 cm (one in) in 24 hours. Sections of the Manokin, Lower Wicomico, Nanticoke, Potomac, Patuxent, and Choptank rivers are also closed or conditionally approved for shellfish harvest (MDNR, December 1996).

The Chesapeake Bay Agreement, as amended in 1987, established a goal to reduce the amount of nitrogen and phosphorus entering the Bay by 40 percent. Signatories to the agreement, the states of Pennsylvania, Maryland, and Virginia, the District of Columbia, DoD, and others have contributed to meeting the established goals. For example, between 1985 and 1995, more than 600,000 hectares (1.5 million acres) of farmland were placed under nutrient management plans in Maryland, Pennsylvania, and Virginia. For point source control, Biological Nutrient Removal was installed in 22 major treatment plants around the Bay (Chesapeake Bay Program Internet Website, Accessed March 4, 1997). Progress to date on the nutrient reduction goals is currently being examined.

The USEPA's Environmental Monitoring and Assessment Program (EMAP), has included as part of its four-year effort (1990 to 1993), sediment and water quality sampling and analysis (USEPA, 1995). Of the data collected, data on metals are relevant to historical operations at the CTR.

Metals data were reviewed for ten stations (see Figure 3.13-2, Select USEPA Sediment Sample Locations) within the limits of the CTR, two stations upstream (north) of the CTR, and two stations downstream (south) of the CTR. These data, retrieved from USEPA's EMAP database, are summarized in Table 3.13-1. Also included are the National Oceanic and Atmospheric Administration (NOAA) ecological effects concentrations, derived from a compilation of available data. The Effects Range-Median (ER-M) value for each analyte represents the concentration above which biological effects were frequently or always observed or predicted among most species (NOAA, 1990). The ER-M values are used as a basis for assessing the relative degree of contamination among the 14 stations and the potential for ecological effects and are not used as sediment standards or criteria for cleanup purposes.

3.13.1.2 Groundwater

The major sources of groundwater in Calvert and St. Mary's counties are the Aquia and Piney Point-Nanjemoy aquifers. Total water consumption is about 76 million liters (20 million gallons) per day. Water levels in the Aquia have been declining since 1952, particularly in the areas of Lexington Park and Cove Point in St. Mary's County and Prince Frederick in Calvert County. The declines are attributed to increasing domestic and industrial groundwater pumping (Labat Anderson, Inc., August 1995).

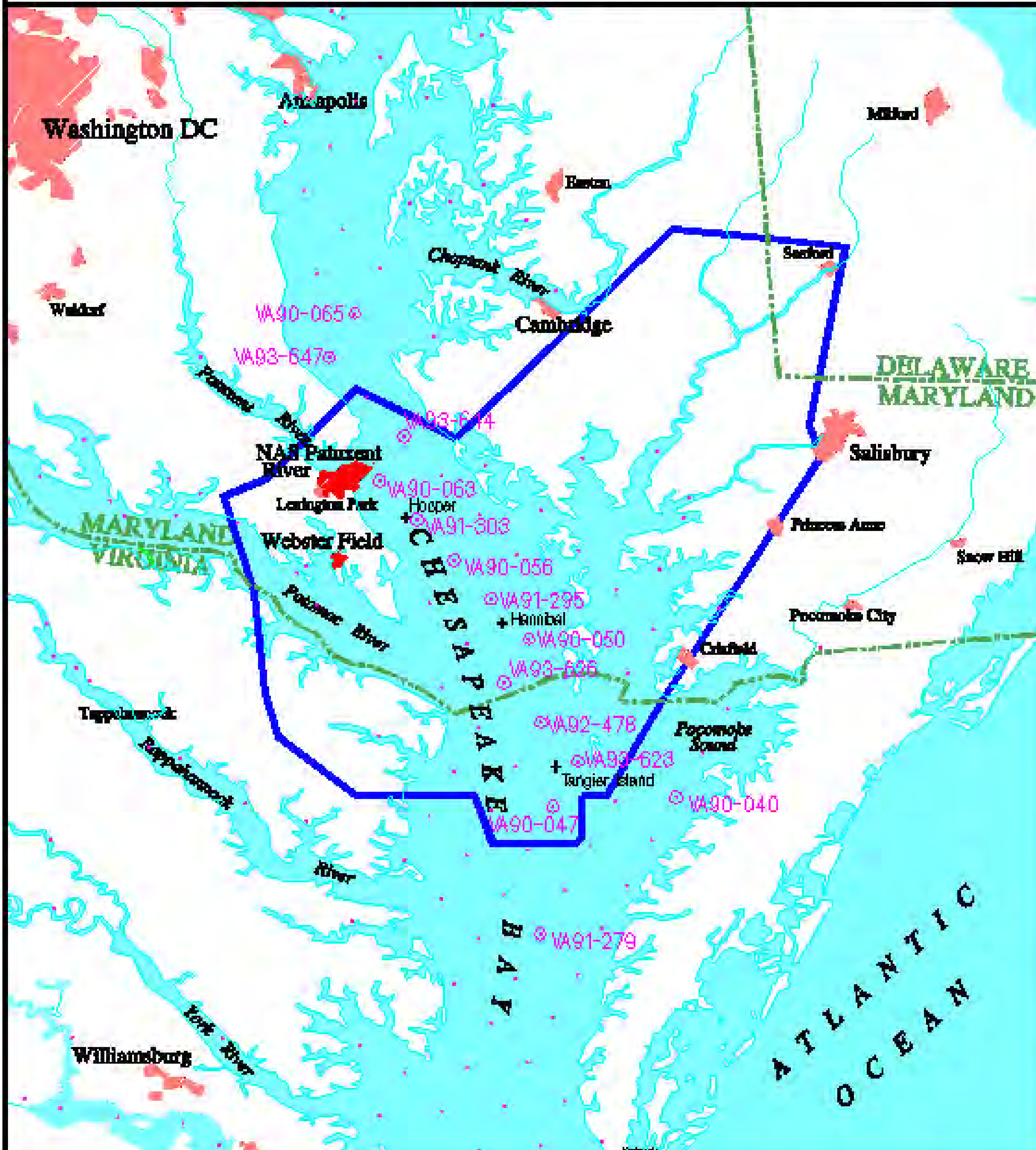
Water levels in the Piney Point-Nanjemoy aquifer show a similar history to the water levels of the Aquia aquifer. The Piney Point-Nanjemoy aquifer is relatively shallow, and many of the early wells flowed without pumping, making use of this aquifer attractive to many people (Turner, Collie, & Braden, Inc, August 1994; NAWCAD, August 1995).

3.13.2 NAS Patuxent River

3.13.2.1 Surface Waters

NAS Patuxent River is bounded on the north by the Patuxent River, which drains a watershed of about 2,418 sq km (930 sq mi) in Maryland. The steep, hilly southern and western portions of the air station are characterized by many natural drainage channels, which drain southwest to northeast into Pine Hill Run and then the Bay. On the flatter northern and eastern portions of the air station, drainage is either toward the Patuxent River or to the Chesapeake Bay, with Runway 6/24 forming the drainage divide (Figure 3.13-3, Water Bodies at NAS Patuxent River).

Select USEPA Sediment Sample Locations



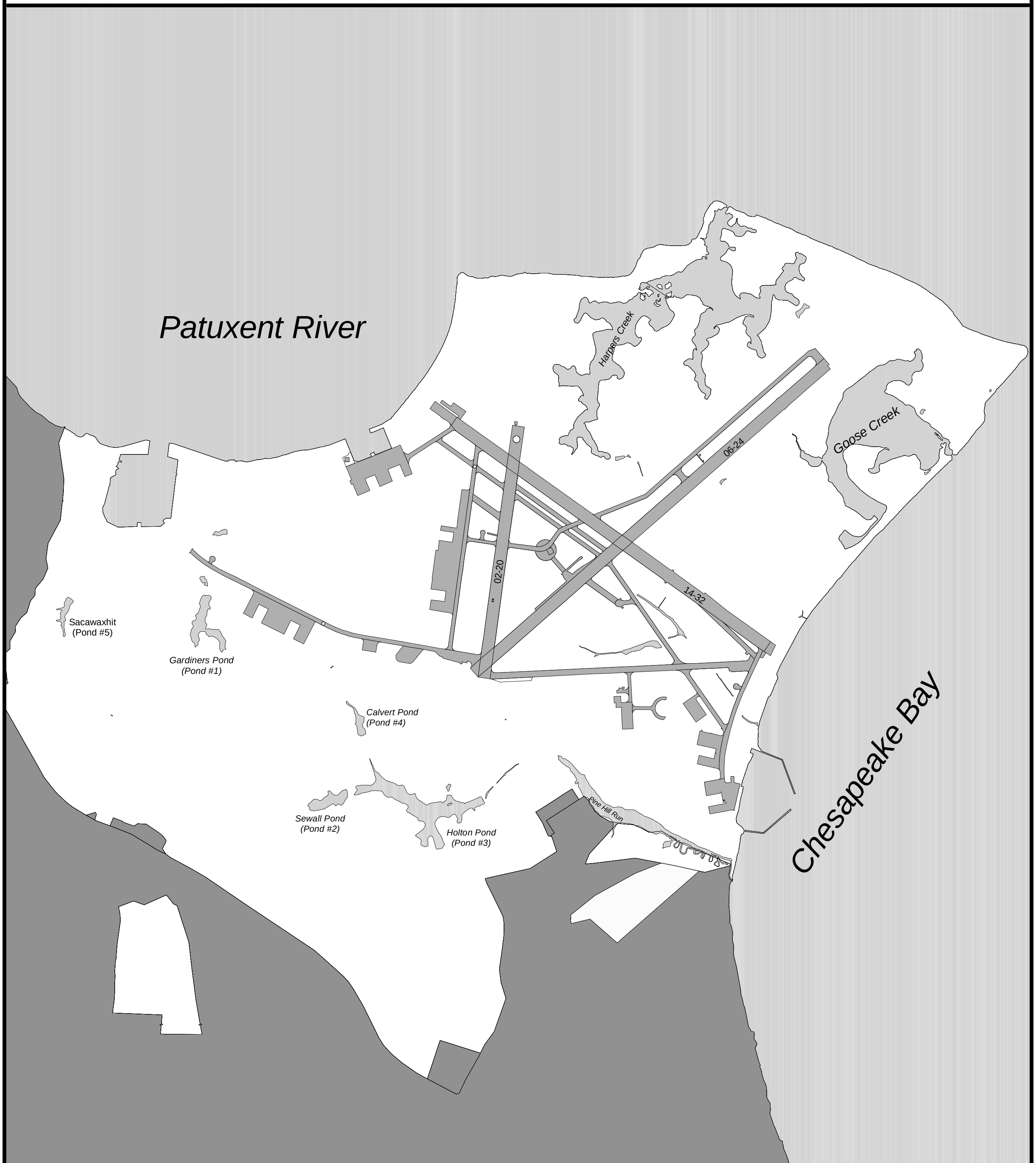
Sample Point Location
Referenced in Tables 3.12-2,3
Chesapeake Test Range
NAS Patuxent River and Webster Field
Target

20 0 20
Scale in Miles
20 0 20
Scale in Kilometers

Source: USEPA, 1995.

Figure 3.13-2

Water Bodies at NAS Patuxent River



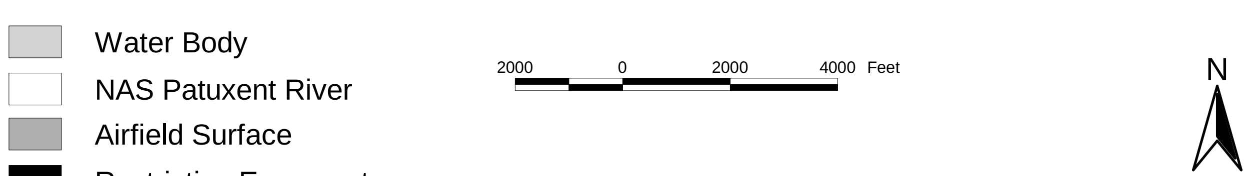


Figure 3.13-3

Table 3.13-1

USEPA's EMAP Sediment Data, 1990-1993: Metals Concentrations (Fg/g)

Analyte Code	Analyte	NOAA ER-M Conc. (Fg/g)	Sample ID													
			VA90-040	VA90-047	VA90-050	VA90-056	VA90-063	VA90-065	VA91-279	VA91-295	VA91-303	VA92-478	VA93-623	VA93-626	VA93-644	VA93-647
			Location													
			South of CTR	Within CTR	Near Hannibal Target	Within CTR	Within CTR	North of CTR	South of CTR	Near Hannibal Target	Near Hooper Target	Within CTR	Near Tangier Target	Within CTR	Within CTR	North of CTR
			Date Collected													
			8/19/90	7/29/90	9/20/90	8/19/90	8/25/90	8/16/90	8/23/91	8/21/91	8/27/91	8/24/92	8/8/93	9/3/93	9/2/93	8/5/93
AL	Aluminum	NA	17,800	23,300	57,300	60,300	20,100	6,390	53,600	4,660	58,200	15,700	3,190	16,500	53,100	56,100
SB	Antimony	25	0.018	0.012	0.14	0.122	0.113	--	--	0.145	0.618	0.135	--	--	0.44	0.217
AS	Arsenic	85	1.61	1.4	7.58	9.3	2.69	0.11	5.36	0.99	12.8	2.96	0.856	3.16	12.6	5.79
CD	Cadmium	9	0.146	0.067	0.453	0.535	0.348	--	0.138	--	0.777	0.0392	--	0.126	0.347	--
CR	Chromium	145	10.9	16.2	54.9	72.5	22.4	2.9	39.2	4.57	64.2	11.9	--	18.4	56.4	72.6
CU	Copper	390	2.9	3.2	22.1	27.3	9.4	--	11	2.09	34.9	3.83	--	4.56	19.1	34.7
FE	Iron	40,000	6,390	11,300	24,000	30,300	11,200	1,530	23,600	2,130	31,100	8,700	1,240	34,900	29,400	30,100
PB	Lead	110	9.6	7.2	16	29.3	10.3	--	23.4	6.16	33.8	14	--	6.42	15.8	27
MN	Manganese	1,100	136	185	273	328	226	29	364	54	368	196	28.9	160	470	387
HG	Mercury	1.3	--	--	--	--	0.02	--	0.0361	0.0117	0.0852	0.0231	0.00931	0.011	0.0552	0.257
NI	Nickel	50	3.5	7.3	28.3	32.3	9.9	--	17.1	1.89	33.5	4022	--	--	20.5	33.6
SE	Selenium	NA	0.164	0.175	0.98	1.27	0.375	0.059	0.441	--	1.21	0.157	--	--	--	--
AG	Silver	2.2	--	--	--	--	--	--	0.0189	0.0136	0.148	0.0108	0.0105	0.026	0.0949	0.267
SN	Tin	NA	0.55	3.54	2.1	2.5	4.57	0.32	1.65	0.396	3.58	0.593	0.201	0.902	2.26	2.99
ZN	Zinc	270	27.6	40.6	110	145	64.6	7.3	60.1	8.45	165	19.4	--	47.4	91.9	174

Notes:
1. All concentrations in Fg/g, dry weight (ppm)
2. Sample locations shown in Figure 3.13-2

Source:
1. Sediment data from USEPA's EMAP database
2. NOAA ER-M concentrations from Long and Morgan, NOAA (1990), except Iron and Manganese, which are "Severe Effect Levels" from Persaud, et al. (1992) in New York State Department of Environmental Conservation ,November 1993.

Water quality in the lower Patuxent River is "fair," with high total phosphorus and elevated chlorophyll levels, the latter due to algal blooms from nutrients released from the sediments. High bacterial nutrient and suspended sediment levels are the result of agricultural runoff. Review of past years' data indicates that, although nutrient levels are high, phosphorus levels have declined dramatically since 1985, and chlorophyll levels, while elevated, are not very high, although occasional algal blooms occur in summer and fall. High turbidity levels limit light penetration and therefore, the growth of submerged aquatic vegetation (MDNR, December 1996).

Cedar Point is cut by several tidal creeks (Harper, Pearson, and Goose creeks). These creeks are estuarine embayments which are connected to the Chesapeake Bay through narrow openings. They likely are subject to varying salinities and temperatures and occasionally anoxic conditions. NAS Patuxent River property also encompasses a number of small impoundments, ranging from 0.8 to 11.2 hectares (two to 28 acres), as well as several small streams. Most of the ponds are manmade impoundments, although beaver activity has enlarged these and caused new ponds.

Low-lying areas along the coast, the tidal creeks, and boat basins (West and East Patuxent Basins), and along Pine Hill Run, are within the 100-year floodplain as defined by Executive Order 11988 (Floodplain Management) (Turner, Collie, & Braden, Inc., August 1994).

Discharges of industrially-related wastewater from the air station are regulated under its State Discharge Permit No. 96-DP-2518 (NPDES Permit No. MD0020150). This permit expires November 30, 2001. There are three permitted outfalls (003, 009, and 012), which discharge to the Chesapeake Bay via the Patuxent River, Goose Creek, Pearson Creek, and Pine Hill Run:

- **Outfall 003** (near the West Patuxent Basin) is authorized for discharges of washdown water from the engine test area and stormwater;

- **Outfall 009** (near end of Runway 32 at the Chesapeake Bay) is authorized for discharges of steam catapult drainage, groundwater, and stormwater; and

- **Outfall 12** (Drainage swale near Bldg 1583) is authorized to discharge contact cooling water from the jet engine test cell and stormwater.

These outfalls are being monitored for pH, total suspended solids, total petroleum hydrocarbons, and temperature (as appropriate).

Air station water discharges are also regulated under State Discharge Permit No. 96-DP-2518. The discharge permit requires the development and implementation of a Storm Water Pollution Prevention Plan to address these potential pollutants using Best Management Practices (BMPs). These BMPs work to prevent or contain any spills of significant materials, thus preventing pollutants from entering the stormwater drainage system. There are the primary means to achieve compliance with future regulations in the Clean Water Act.

The air station is divided into 71 primary drainage basins with 106 outfalls and 1,037 stormwater structures collecting and conveying stormwater. Thirty-eight of these drainage areas have been identified as having the potential to collect stormwater pollutants from as may as 244 different sources. Specific BMPs have been designed for these areas, and several have had BMPs implemented. The Plan requires that future activities having a potential impact on stormwater quality must have BMPs developed and implemented to prevent or minimize the runoff of pollutants.

3.13.2.2 Groundwater

The Piney Point-Nanjemoy and Aquia aquifers are about 60 m (200 ft) and 150 m (500 ft) below mean sea level at the air station, respectively. The air station uses about three million liters (800,000 gallons) per day of water drawn from 24 wells, primarily in the Aquia aquifer.

3.13.3 OLF Webster Field

Webster Field is located 13 km (seven mi) south of NAS Patuxent River, on the eastern shore of the St. Mary’s River. St. Inigoes Creek and its coves abut the northern boundary of Webster Field. There are no state water quality monitoring stations on the St. Mary’s River. However, based on land use and resource information, elevated bacteria and nutrient levels may occur due to agricultural runoff. A bioassessment at one site on the St. Mary’s River indicated moderately impaired habitat and moderately impacted biological communities (MDNR, December 1996). St. Inigoes Creek is considered part of the same water quality monitoring segment by the MDNR. Discharges of stormwater from Webster Field are regulated under Maryland General Discharge Permit No. 92-GP-0001 (NPDES Permit No. MDR000001). NAS Patuxent River is awaiting reauthorization of this permit by the state of Maryland.

3.13.4 Localized Target Areas

The MDE has two water quality monitoring stations (CB5.1 and CB5.2) in the vicinity of the Hannibal and Hooper targets. For the period between 1992 and 1995, monitoring data for Station CB5.1, which is closest to the Hooper target, has shown average monthly salinities ranging from a low of about 14 ppt during April to a high of about 20 ppt in October at a depth of 34 m (110 ft). Temperatures ranged from about 2EC (37EF) in February to about 26EC (79EF) in August. Dissolved oxygen ranged from less than two milligrams per liter (mg/l) in July to 11.5 mg/L in February. The pH ranged from 7.5 in July to 8.0 in February (ICF Kaiser International, Inc., January 1997).

Monitoring data for Station CB5.2, which is closest to the Hannibal target, show average monthly salinities ranging from a low of about 14 ppt in April to a high of 19.5 ppt in October for the same period (1992 and 1995), at a depth of 30 m (98 ft). Temperatures ranged from about 3EC (37EF) in February to about 26EC (79EF) in August. Dissolved oxygen ranged from less than three mg/L in July to more than 11 mg/l in February. The pH ranged from 7.6 in July to 8.1 in February (ICF Kaiser International, Inc., January 1997).

3.14 Aircraft Operations and Safety

3.14.1 Flight Safety

Flight safety is a top priority for all types of aircraft operations at the Patuxent River Complex. Efforts to minimize risk to participants, the public, and property are part of daily operations and test planning and flight operational procedures. The safety program is comprised of several independent elements to ensure that flight operations are the safest possible:

- **The Flight Test Team** - A test team plans and executes each flight test conducted at the Patuxent River Complex. The test team evaluates the risk and safety implications of all operations throughout the test program, and its commitment to safety is the foundation of the safety program at the Patuxent River Complex.

- **Instrumentation and Human Resources** - The second element of the safety program includes the ground-mounted instrumentation and the personnel who operate them by directing test flights to achieve test objectives.

- **Network of Safety Personnel with the Test and Evaluation Competency** - The sole responsibility of these individuals is to ensure that test operations are conducted in the safest manner possible. Personnel from the safety organization participate in every part of the test process, from planning through aircraft and equipment preparation through actual conduct of the test. Their responsibilities and authorities are documented and supported by Navy instructions, directives, and standard operating procedures (SOPs).

- **Safety Training and Procedures** - A fourth element in the Complex's safety program consists of the procedures, knowledge, and training provided to all personnel involved with flight operations. The Navy has standard safety procedures and precautions, such as the Naval Aviation Training and Operating Procedure Standardization (NATOPS) program to make safe operations standard for all personnel. Safety procedures also have been instituted in the CTR to amplify standard safety procedures for special applications and provide for specific procedures needed for high risk or hazardous firing exercises or weapon tests meant to simulate a wartime environment within the CTR. All participants, both military and civilian, are provided continuous safety training throughout their career with the Navy. Through an ongoing responsibility to call attention to any questionable item and the willingness of test team members to respond, test team members, as well as all other flight operations support personnel, maximize the safety of each flight operation. Using these resources, all personnel practice a daily commitment to safety.

Specific safety procedures are followed for each of the four areas within the Patuxent River Complex, including the CTR, NAS Patuxent River, Webster Field, and the target areas.

3.14.1.1 Chesapeake Test Range

Test Planning

Safe aircraft operations within the CTR begin with test planning. As part of test planning, test flight profiles are developed that will fulfill operational and data acquisition needs of the project. Hazard analyses are prepared which develop risk factors for the flight profiles, including expected in-flight maneuvers. Preparation of hazard analyses is a process that requires test team planners to consider alternative flight profiles until a safe flight profile is identified. Hazard analyses also encompass surface hazard patterns (footprints) that predict where stores separated from an aircraft or gun fire would impact ground areas, or any other operation is contemplated that poses a hazard to property or personnel on the ground. Again, alternative flight profiles and stores release/gun firing timing are considered to ensure a safe plan is developed.

Safety is a major objective of flight profile design. Using hazard analyses, test team planners develop flight profiles that minimize risk during maneuvers to the aircraft, ensure safe flight throughout its air operation, and ensure that stores release/gun firing occurs over a clear surface area. Flight profiles are designed for each specific test to ensure a high level of safety throughout the test program. The flight profile defines flight vectors to fly through, which specify altitude, direction, and speed for each component of the flight, thereby defining the entire flight. Also, flight controllers use the flight profile to direct the flight crew with great precision on when to release weapons, fire guns, or conduct any other hazardous operation.

Each completed test plan is subjected to a peer review and then submitted for approvals. Approvals must be obtained from range safety and the Test Squadron Aviation Safety Office. Also, approval must be obtained from the Test Squadron Executive Review Board, which is headed by the Squadron Commanding Officer and the Test and Evaluation Engineering Competency representative. Safety is also a major issue during the review process. Each participant in the review process can request revisions to the plan as a condition of granting approval.

Test Article Preparation

Installation of test instrumentation and systems follows safety instructions and directives (NAVAIRWARCENACDIVINST 13050.1, 55000FA). Engineers and technicians with specialized skills design, install, and maintain the instrumentation and systems required for test programs. Instrumentation installation personnel are responsible for inspecting their work while it is in process. Upon completion, all instrumentation installations are inspected a second time by trained aircraft instrumentation safety inspectors, and then a third time by aircraft maintenance inspectors upon its return to the Test Squadron. Further tests are conducted to ensure the instrumentation will not affect the operation of the aircraft or its systems. As a final measure, the Test Squadron must submit documentation of the modified aircraft to NAVAIRSYSCOM for flight clearance prior to the first flight.

CTR Instrumentation and Air Traffic Control

The Patuxent River Complex has several types of instrumentation in place at ground locations to measure test aircraft and weapon performance and location. Instrumentation includes radar, cinetheodolites, laser rangers, ground positioning systems, and real-time telemetry data processing systems. Information from this instrumentation is transmitted to CTR flight controllers. Flight controllers in turn use this information to transmit instructions to aircraft during flight operation, affecting control of test aircraft location on the range. The CTR restricted airspace is heavily used by all NAWCAD test operations.

NAS Patuxent River Air Operations is responsible for monitoring and controlling the CTR airspace while it is activated. Flight controllers at Air Operations use air search radars to deconflict the air traffic within the Complex, including the airfields and the CTR. For safety purposes, only ten "groups" of aircraft are permitted to operate within the CTR at any one time (known as the "ten aircraft rule"). A "group" of aircraft may consist of one or more aircraft in a tight formation, usually a test aircraft and chase plane combination. Rarely does a group consist of more than two aircraft. This rule was implemented to provide a safe flying environment in the CTR and minimize the potential for mishaps.

Safety Precautions for Weapons/Stores Separation Tests

Particular safety precautions are taken with each type of testing. One type is the weapons/stores separation test as described in Chapter 2. Regardless of the type of store, the separation test involves its release store from an aircraft and its impact in the target area. As a safety measure, each weapons/stores separation test is designed for the specific aircraft to be used, the particular store, and the type of release maneuver required to achieve test objectives.

Weapons/stores separation tests are designed to meet two safety related objectives. First, the flight profile is designed to be accommodated within the CTR restricted airspace. Second, the combination of flight profile and separation event is designed such that the required surface impact hazard area will be no larger than the space available. Flight profiles include positive control of the aircraft at all times. Profiles specify altitude, patterns, velocity, and altitude throughout the flight.

Weapons/stores separation testing is conducted for the purpose of evaluating the physical ability of a store to separate reliably and safely from an aircraft; the effectiveness of the weapons/stores themselves is not a part of this type of test. For that reason, all weapons/stores tests in the CTR are conducted with inert stores. The impact hazard area available within the CTR is large enough to accommodate most weapons/stores, with the exception of some missile firing, which is generally accomplished in areas outside the control of the Patuxent River Complex.

3.14.1.2 NAS Patuxent River

The safety program described above for the CTR is equally applicable to aircraft operations at NAS Patuxent River. Air Operations provides air traffic control for all aircraft flights. A primary indicator of safety practices is the safety record for NAS Patuxent River. Since 1990, only five Class A mishaps have occurred at NAS Patuxent River: one ground mishap in 1993, three flight mishaps in 1992, and one flight mishap in 1990. A Class A mishap is one that incurs a loss of life or causes total damages to aircraft and/or land-based property in excess of $1,000,000. Only one Class B ground mishap has occurred in the complex since 1990. A Class B mishap is one that incurs damages between $200,000 and $1,000,000 with no loss of life.

3.14.1.3 OLF Webster Field

Flight safety procedures and practices applicable to the NAS Patuxent River as described above also apply to Webster Field. With respect to the UAVs, this program experienced aircraft losses in the past; however, since these are unmanned vehicles, only minor property damage was involved. Since these mishaps occurred, the reliability of the engine has been substantially increased through redesign and no incidents have occurred in the last two years. In any event, the Navy specifically selects UAV training areas to avoid overflights of densely populated areas.

3.14.1.4 Localized Target Areas

Specific safety procedures have been instituted for each of the three target areas within the CTR:

- **Hooper target** - navigation is prohibited at all times within a prohibited area that extends 915 m (1,000 yd) from the target in all directions;

- **Hannibal target** - navigation is prohibited at all times within a prohibited area that extends 915 m (1,000 yd) from the target in all directions; and

- **Tangier Island target** - navigation is prohibited at all times in an area that extends 915 m (1,000 yd) from the target in all directions. Also, navigation is prohibited when firing is or will soon be in progress in an area that extends 5.56 km (3 nm) in all directions from the target.

No person or vessel may enter or remain within the prohibited areas as designated for each target. Infractions of these safety regulations are enforced by NAS Patuxent River, and are punishable as a misdemeanor. (Range clearance procedures are discussed in subchapter 3.14.2 below.) Specification of the prohibited and restricted areas and the enforcement authority is contained in federal regulations (33 CFR). These safety regulations provide for ensuring the public's safe use of the Chesapeake Bay within the CTR and in the vicinity of the targets.

3.14.2 Range Clearance Procedures

Target areas are cleared approximately one hour before they are scheduled for use. Specific procedures depend on the type of testing and the season of the year (clearance has not been required during night hours). The procedures include visual sweeps of the area using one or more surface craft and chase aircraft and/or radar sweeps. Recreational boaters, fishermen, or watermen are requested to exit the restricted areas via radio transmission, written signs, hand signals, or other appropriate methods. Helicopters equipped with loudspeakers are sometimes used. Should an individual refuse to leave the area, tickets are issues by the Range Safety Officer, or the US Coast Guard is called in to escort the individual out of the area. However, recreational boaters, fishermen, and watermen are usually cooperative with the Range Safety personnel from NAS Patuxent River. As an additional safety measure, prior to release, the pilot flies over a target to perform a visual check to make sure the targets are clear. Also, all involved parties (range clearance boats, CTR flight controllers, the Range Computation and Control System engineers, Air Operations control tower staff, and other range safety personnel) are linked together by a voice radio system.

3.14.3 Accident Potential Zones and Impact Hazards

3.14.3.1 Air Installation Compatible Use Zones

The Navy's Air Installation Compatible Use Zone (AICUZ) program acts as a guide to local government for safe and proper development of land on, and near facilities with military airports and airfields, including military landing strips. By using AICUZ as a guideline for future development, projects can be planned for the appropriate site(s) near an airfield. The AICUZ defines zones where a variety of uses are possible, and allows the land to be used to its maximum potential. Used for planning purposes, AICUZ:

- Ensures proper development in areas with loud aircraft noise;
- Minimizes public exposure to possible safety hazards related to aircraft operations; and
- Protects the flight operations of the airfield.

The AICUZ establishes Clear Zones (CZ), and Accident Potential Zones (APZ) and noise potential zones. The APZs define areas where accidents could occur -- not the possibility that accidents will occur -- but simply the more likely locations should any accidents occur. The APZs are defined as:

- **The Clear Zone** - the area just beyond the end of a runway which is where accidents are naturally most likely to occur and is kept clear of obstructions by limiting land use to underground utilities. Due to the characteristics of flight operations, the Clear Zone is typically fan-shaped.

- **Accident Potential Zone 1 (APZ 1)** - the area beyond the Clear Zone that is moderately likely for an accident to occur. APZ 1 is used under flight paths that experience 5,000 or more annual flights. The shape of the APZ 1 can be modified to represent the actual curve of the flight path. At NAS Patuxent River, APZ I includes the transition area for takeoff and touch down of aircraft and extends 915 m (3,000 ft) from the end of the runways in the standard approach fan.

- **Accident Potential Zone 2 (APZ 2)** - the area beyond APZ 1 has a lower likelihood for aircraft accidents. APZ 2 can also be modified to represent the actual flight path curve. At NAS Patuxent River, APZ II includes the outer portion of takeoff and landing flight patterns and has the least restrictions on its use.

Figure 3.14-1 (AICUZ at NAS Patuxent River) depicts the current AICUZ zones. In addition, although not appearing separately on Figure 3.14-1, zones called “noise potential zones” define the area around an airfield where noise is greatest, based on noise studies identifying day-night average sound levels (DNL). These zones are based on the nationally recognized Composite Noise Rating method and are divided by AICUZ into three Composite Noise Rating Zones. Composite Noise Rating Zone 3 is where the loudest aircraft noise occurs. At NAS Patuxent River all of the land use in Composite Noise Rating Zone 3 lies with the boundaries of the air station.

St. Mary’s County was introduced to the Navy’s AICUZ program in 1973, and in 1977 incorporated the program into their *Comprehensive Plan*. In 1974, the St. Mary’s County Commissioners passed Resolution No. 74-43 (Aircraft Impact Districts). This resolution restricts the amount of residential building and the uses for land in Composite Noise Rating Zone 2 and also established a 300-m (1,000-ft) buffer zone around the zone.

An update to the AICUZ Plan was approved in August 1979 and adopted by the county in December 1980. In 1984, and again in 1995, the Navy measured aircraft noise to ensure that updated noise information was incorporated into the AICUZ.

AICUZ at NAS Patuxent River

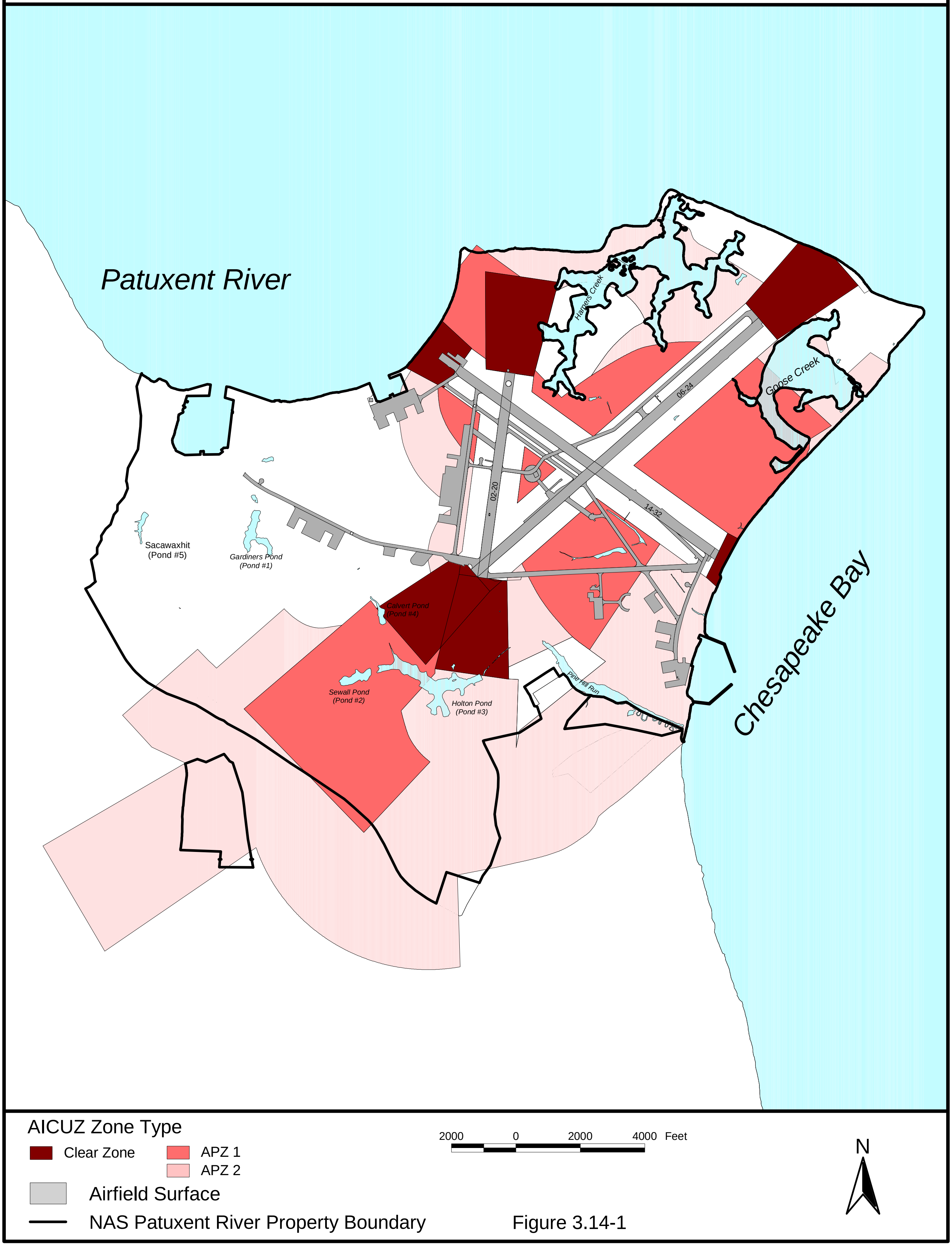


Figure 3.14-1

3.14.3.2 Impact Hazards

Aircraft impact hazards are posed by birds, other wildlife on the ground, other aircraft, and autos. Each of these is handled with precautions tailored to the specific hazard potential. Among the various species of birds in the region, waterfowl present the greatest hazard due to their larger size, abundance, and habit of flying in flocks. NAS Patuxent River is within the Atlantic Flyway, used by migrating birds in the fall and spring. Also, numerous congregating areas, including wildlife refuges and other wetlands, exist in the region and are used by migratory birds for foraging and resting. These areas serve to increase their numbers in flocks. The staff of the NAS Patuxent River Natural Resources Division has identified through surveys weeks of peak migratory bird quantities, and typical altitudes for various migratory birds, including waterfowl and raptors. Pilots are trained to avoid high bird count areas. Warnings are provided to pilots when bird concentrations occur near runways and taxiways. Adherence to the BASH Plan written for the complex reduces the potential of accidents caused by birds. The plan details responsibilities of personnel to deal with the hazard, practices to reduce BASH potential, and guidelines to decrease airfield attractiveness to birds.

Among other wildlife, the white-tailed deer presents the greatest hazard to aircraft. NAS Patuxent River maintains a DASH Plan to keep the deer population at acceptable levels. A primary strategy is to maintain areas in the near vicinity of the runways as habitat that is normally unattractive to deer. Sorghum, an acidic plant disliked by deer, has been planted on agricultural outlease land near the runways to deter deer from wandering onto the runways.

In addition, roads used by automobiles and trucks intersect taxiways at several places on the base. To minimize the hazard of aircraft colliding with automobiles or trucks, a flashing red light atop a stop sign at the intersection is activated by sonar to warn of an oncoming or exiting aircraft.

3.14.4 Military Training Routes

Safety is also a major concern in the use of airspace, and both the military and general aviation must take precautions when using the same air space. The military uses some airspace below 3,000 m (10,000 ft) for training operations and frequently flies at speeds of more than 250 knots. The combined use of low altitude spaces by fast military planes and slower civilian aircraft creates obvious low-altitude flying concerns.

The FAA and the DoD have outlined rules for low-altitude, high speed training to ensure the greatest safety for both military and general aviation. The FAA requires that high speed low-altitude military training be conducted in limited charted airspace called Military Training Routes (MTRs). Exceptions to this regulation are made only when absolutely required and announced in advance. The charted airspace includes the various types of low-altitude airspaces used for military flight activities and is indicated on most aeronautical charts.

MTRs are used only for military flight training at airspeeds of more than 250 knots. There are two types of MTRs:

- **Visual Flight Rules (VFR) MTRs** - for low-altitude navigation and tactical training below 3,000 m (10,000 ft) at airspeeds in excess of 250 knots under visual flight rules.

- **Instrument Flight Rules (IFR) MTRs** - for low-altitude navigation and tactical training below 3,000 m (10,000 ft) at airspeeds in excess of 250 knots at night and in foul weather.

MTRs also have their own special operating procedures regarding scheduling, areas to be avoided along each segment, advisories on potential bird hazards, alternate entry and exit points, altitudes, etc., which are mandatory at all times. Besides following the rules of the Federal Aviation Regulation (FAR) 91.79, which states that no plane may fly closer than "150 m (500 ft) from any person, vehicle, vessel or structure," the military has also established its own rules on low-level altitudes and speed, to ensure the greatest safety for both military and general aviation.

There are four MTRs in close vicinity of the CTR -- VR 1709, VR 1711, VR 1712, and VR 1713 (Figure 3.14-2, Military Training Routes). These MTRs can be used to access the CTR. The rules associated with each of these MTRs is summarized as follows:

- **VR 1709** - This is a visual flight rule MTR and is operational between sunrise and sunset daily. The route width along the MTR varies from four to 12 nautical miles along its center line. This MTR is controlled, scheduled by, and originates from McGuire Air Force Base in New Jersey. The route is divided into seven segments. Aircraft are allowed to fly between the altitudes of 150 m (500 ft) to 450 m (1,500 ft) above ground level (AGL).

- **VR 1711** - This is a visual flight rule MTR that originates at, and is controlled and scheduled by, Andrews Air Force Base, Maryland, and operational between 7:30 am and sunset daily. The route width is three nautical miles along either side of the center line. The MTR is divided into seven segments, and the allowed altitude along the route also varies between 150 m (500 ft) to 450 m (1,500 ft) AGL.

- **VR 1712** - This is a visual flight rule MTR also originating at Andrews Air Force Base, Maryland, which is also the controller and scheduler. It is operational between 7:30 am and sunset daily, and is three nautical miles wide along either side of the center line. The MTR is also divided into seven segments. Aircraft are allowed to fly between the altitudes of 150 m (500 ft) to 450 m (1,500 ft) AGL.

- **VR 1713** - Originating at, controlled, and scheduled by Andrews Air Force Base, Maryland, this visual flight rule MTR is operational between 7:30 am and sunset

Military Training Routes

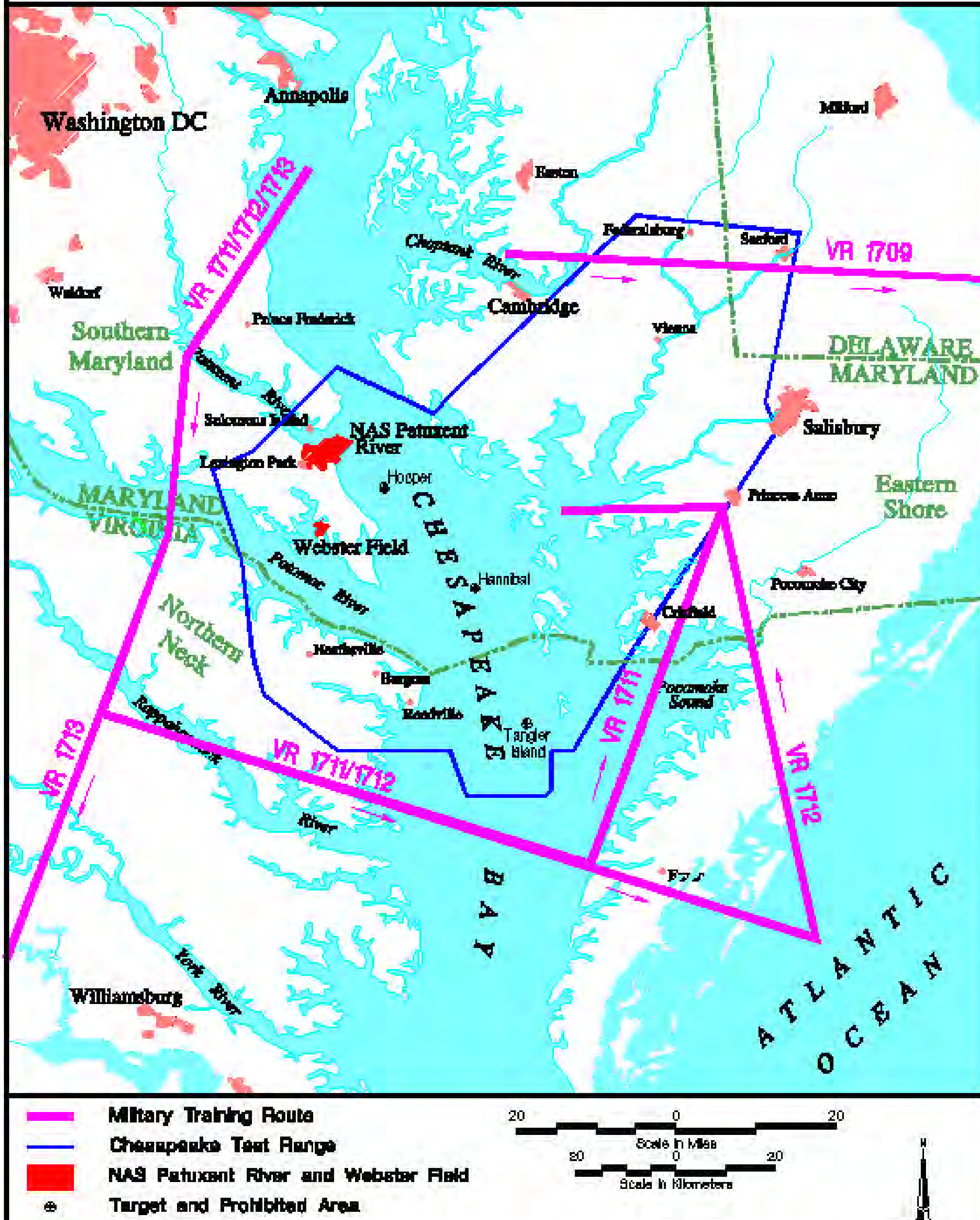


Figure 3.14-2

daily. The route width along the MTR varies from three nautical miles to 7.5 nautical miles along either side of the center line and is divided into eight segments. Aircraft are allowed to fly between 150 m (500 ft) to 450 m (1,500 ft) AGL along most of the route, and between 30 m (100 ft) and 450 m (1,500 ft) AGL along two segments.

3.14.5 Navy Occupational Safety and Health

NAS Patuxent River maintains comprehensive OSHA standards, using the Navy's own version of OSHA specifications. These are referred to as Navy Occupational Safety and Health (NAVOSH), and include numerous protocols, among them:

- Compliance with applicable standards;
- Annual OSHA inspections of all workplaces conducted at least once a year by qualified OSHA inspectors;
- Procedures for all personnel to report suspected hazards to their supervisors;
- Prompt abatement of identified hazards;
- Thorough investigations of mishaps;
- Comprehensive occupational health surveillance programs; and
- Integration of the various medical and industrial hygiene specialties into a team approach.

Chapter 4

Impacts of the Proposed Action and Alternatives

4 IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES

This chapter presents a discussion of the potential environmental impacts that would result from increasing flight and related operations in the Patuxent River Complex. A useful synonym for the term "impact" is "effect." In other words, an analysis of the environmental impacts of an action identifies the "effects" that the action has upon various components of the environment.

Once impacts are identified, a determination is made regarding their significance. "Significance," as used in NEPA, requires the dual considerations of context and intensity. With respect to context, "the significance of an action must be analyzed in several contexts such as society as a whole (human and national), the affected region, the affected interests, and the locality" (40 CFR 1508.27). Significance varies with the setting of the proposed action and the processes affected. For example, the more resources affected, either individually or cumulatively, the more significant the impact is likely to be considered. Furthermore, the more widespread the effect of an impact, proceeding from local to global, the more likely the impact is significant.

The intensity of an impact is measured by its magnitude (how large or noticeable is the change or disparity), frequency (what is the probability of the impact occurring and duration and rate of occurrence), potential for controversy or establishing a precedent, or for violating laws imposed to protect the environment. Obviously, the more intense the identified impact, the more significant it can be considered to be.

As further stated by the Council on Environmental Quality (CEQ), the discussion of the environmental consequences associated with a proposed project and its alternatives should be in comparative form. This technique allows issues to become sharply defined and provides "a clear basis for choice among options by the decision maker and the public" (40 CFR 1502.16). Accordingly, the impact analysis provides a comparative discussion of the No Action Alternative and the three Operational Workload Alternatives. The implications of the No Action Alternative are examined at the beginning of each subchapter and an analysis of the Operational Workload Alternatives follows. Operational Workload Alternative III is the Navy's Preferred Alternative.

The basic organization of Chapter 4 is in a manner similar to Chapter 3. Subchapters 4.1 through 4.14 address the environmental impacts of each proposed project component. Where the potential impacts of Operational Workload Alternatives I, II, and III were similar, these alternatives were discussed together. Further, where appropriate, the differences in the alternatives due to the varying operational levels are addressed in this joint discussion. Subchapter 4.15 discusses cumulative impacts.

4.1 Land Use and Coastal Zone Management

This subchapter discusses the potential land use impacts of implementing the proposed action or its alternatives on the areas underlying the footprint of the CTR, NAS Patuxent River, and Webster Field and their surrounding environs, and the localized target areas. Potential impacts of the proposed project on the coastal zone management programs of Delaware, Maryland, and Virginia are also discussed.

4.1.1 No Action Alternative

4.1.1.1 Chesapeake Test Range

Land Use

Under the No Action Alternative, the portions of the Delaware, Maryland, and Virginia counties that underlie the CTR would continue to experience growth, principally due to their proximity to the Baltimore-Washington, DC Metropolitan Area. The following summarizes likely future land use changes by major geographical area:

- **Southern Maryland** - Since the mid-1970s, the northern portions of Calvert County lying outside of the CTR have been the focus of a significant increase in land development, with new low-density suburban residential and commercial development steadily moving outward from Washington, DC and Baltimore (Maryland Office of Planning, October 1991). With the recent BRAC-related expansion of NAS Patuxent River, it is anticipated that new growth will occur in the southern portions of Calvert County and western St. Mary's County over the next ten years.

  Growth management plans adopted by Calvert and St. Mary's counties are based on the visions of the Maryland Economic Growth, Resource Protection, and Planning Act of 1992. This state law calls for: all development to be concentrated in suitable areas; the protection of sensitive areas; the direction of growth in rural areas toward existing population centers (i.e., Solomons Island and Lexington Park); the protection of resource areas; the stewardship of all land areas and the Chesapeake Bay; and the conservation of all resources (Calvert County Department of Planning and Zoning, April 1997; St. Mary's County Planning Commission, July 1997). Based on this information, it is expected that the areas surrounding Solomons Island and Lexington Park may transform from a more rural agricultural/residential area into a more densely-populated suburban village.

- **Maryland's Eastern Shore** - Much like the counties of Southern Maryland, Maryland's Eastern Shore counties wish to concentrate future growth in areas surrounding existing villages (i.e., Seaford, Vienna, Crisfield, and Princess Anne), make the existing towns more attractive in all aspects, and reduce the costs of supplying government services, such as water and sewer lines, by discouraging sprawl/strip growth (Dorchester County Department of Planning and Zoning, September 1996; Planning and Zoning Commission of Somerset County, Maryland, December 1991).

- **Virginia's Northern Neck** - The primarily rural residential/agricultural character of these counties is not expected to change in the next ten years. The pattern of suburbanization in the portions of these counties underlying the CTR is less pronounced than in Southern Maryland or the Eastern Shore counties, primarily due to the distance of the Northern Neck counties from major metropolitan centers. The counties, through their comprehensive plans, have established land use goals that promote the preservation of natural resource areas/agricultural areas, stimulate tourism and the development of retirement communities, and encourage growth in established villages (i.e., Heathsville, Burgess, and Reedville) and their surroundings where adequate water and sewer resources already exist (Northumberland County Planning Commission, October 1996; Lancaster County Planning Commission, June 1992).

Coastal Zone Management

As required by Section 307(c)(1) of the Coastal Zone Management Act (CZMA), the consistency determination for a proposed federal action affecting a state's coastal zone should be based on whether that action would be consistent with the state's enforceable CZM policies. Consistency should be to the maximum extent practicable. In its current operations in the CTR, the Navy is consistent with the CZM policies of Delaware, Maryland, and Virginia and would continue to be so under the No Action Alternative:

- **Delaware** - Since aircraft overflights, at minimum altitudes of 1,067 m (3,500 ft), would represent the only area of potential impact to the Delaware coastal zone, the No Action Alternative would have no effect on coastal waters management, natural areas management, woodlands and agricultural lands, and living resources. With respect to air quality, emission rates would be less than the applicability rates for nitrogen oxides (NO_x) or volatile organic compounds (VOCs), and thus a formal conformity analysis would not be required (see Subchapter 4.5).

- **Maryland** - The No Action Alternative would not require construction of any facilities in the CTR; therefore, tidal wetlands would not be affected nor would the discharge of dredged or fill material occur. Also, the No Action Alternative would generate neither additional stormwater nor increase erosion and sedimentation into the waters of the Chesapeake Bay. Further, aircraft overflights in the CTR would have no impact on plant or wildlife habitats considered significant under the Critical Area Program (see Subchapter 4.12). With respect to submerged aquatic vegetation (SAV), the targets and associated stores impact areas are located outside areas of SAV concentrations (see Subchapter 4.11).

- **Virginia** - Three coastal zone policies would be applicable to the No Action Alternative -- fisheries, subaqueous land management, and air quality:

  -- Fisheries - Potential impacts to finfish and shellfish resources from implementing the No Action Alternative would be minimal since only inert (nonexplosive) stores would be used in the CTR and the potential for mortality from direct impact of a store would be unlikely.

  -- Subaqueous land management - As the No Action Alternative would have no effect on activities regulated under this policy, including the construction of marinas or other structures in the Bay, nor involve the discharge of dredged or fill material, its implementation would be consistent with subaqueous land management policies.

  -- Air Quality - With respect to air quality, emission rates would be less than the applicability rates for NO_x or VOCs, and thus a formal conformity analysis would not be required (see Subchapter 4.5).

In summary, the Department of the Navy has determined that the flight and related operations that would be conducted under the No Action Alternative would, to the maximum extent practicable, comply with and be carried out in a manner consistent with the coastal zone management programs of Delaware, Maryland, and Virginia.

4.1.1.2 NAS Patuxent River and Webster Field

Land Use

Under the No Action Alternative, NAS Patuxent River and Webster Field would maintain current functions and levels of operational activity. At the Patuxent River Complex, the Navy would continue to "promote the restoration, development, and maintenance of balanced ecosystems" in order to support multiple uses while fulfilling military objectives (Draft INRMP, Undated). Additionally, both installations would continue to be situated on predominantly developed and forested land. With respect to NAS Patuxent River, the development intensity of adjacent Lexington

Park would most likely increase, but continue the pattern of mixed office and retail/commercial and low-density residential and commercial uses.

Land uses at Webster Field, under the No Action Alternative, would continue the existing blend of forests, open fields, wetlands, open waters, agriculture areas, and wildlife areas. Rural low-density residential use would likely continue in the surrounding environs.

Coastal Zone Management

There would be no coastal zone management impacts with continued adherence to environmental protection programs already in place at NAS Patuxent River and Webster Field.

4.1.1.3 Localized Target Areas

Land Use

The three exclusive-use target areas in the CTR are wholly surrounded by the waters of the Chesapeake Bay. The nearest habitable area to any of the targets (Hooper) is 4.8 km (2.6 nautical miles [nm]). There would be no change in this land use pattern under the No Action Alternative.

4.1.2 Operational Workload Alternatives I, II, and III

Operational Workload Alternatives I, II, and III are similar in scope; therefore, they are discussed together. Differences in the alternatives due to varying levels of operations are addressed.

4.1.2.1 Chesapeake Test Range

Land Use

The implementation of the three Operational Workload Alternatives would have no impact on land use in the portions of Southern Maryland, the Eastern Shore, or the Northern Neck of Virginia that underlie the CTR. Future land use development patterns would be similar to the descriptions provided in the discussion of the No Action Alternative.

Coastal Zone Management

The impacts of those coastal zone management policies applicable to operations in the CTR and the localized target areas under the Operational Workload Alternatives would be the same as described for the No Action Alternative. Therefore, the Department of the Navy has determined that the flight and related operations that would be conducted in the CTR and at the localized target areas under any of the Operational Workload Alternatives would, to the maximum extent practicable, comply with and be carried out in a manner consistent with the coastal zone management programs of Delaware, Maryland, and Virginia.

4.1.2.2 Patuxent River and OLF Webster Field

Land Use

Land use patterns at both NAS Patuxent River and Webster Field would remain unchanged under the Operational Workload Alternatives, as no new construction would be required to support increased flight and related operations. Furthermore, since the permanent employment base at NAS Patuxent River and Webster Field would be expected to remain the same as under the current level of operations (i.e., full post-BRAC employment) and the number of transient workers that would be associated with specific test programs would also remain unchanged from current levels, there would be no significant land use impacts on the areas surrounding both facilities (the environmental effects of the BRAC realignment and consolidation were assessed in two EISs finalized in 1993 and 1994).

Coastal Zone Management

There would be no impacts to coastal zone resources under the Operational Workload Alternatives for NAS Patuxent River and Webster Field as no action conditions would continue. Therefore, implementation of any of those alternatives would be considered consistent with the coastal zone management programs of Delaware, Maryland, and Virginia.

4.1.2.3 Localized Target Areas

Land Use

Under this alternative, the targets would continue to be wholly surrounded by water, isolated from populated land areas. Therefore, there would be no impacts to land use.

Coastal Zone Management

There would be no impacts to coastal zone resources at the localized target areas under the Operational Workload Alternatives and thus the implementation of any of the alternatives would be considered consistent with the coastal zone management programs of Delaware, Maryland, and Virginia.

4.2 Socioeconomics

The socioeconomic baseline (demographics, employment, and housing) shows the land areas surrounding the Chesapeake Bay to be growing in population and level of development, particularly to the north and west of the CTR. The proposed action would involve the enhanced use of existing personnel and facilities within the Patuxent River Complex. Therefore, the permanent employment base of NAS Patuxent River and Webster Field would remain the same as under the current level of operations (e.g., full post-BRAC employment, or 16, 600 persons). The number of transient workers that would be associated with specific test programs would also remain the same as described for current operational levels. In addition, no new facilities are planned beyond those constructed under BRAC realignment. (BRAC realignment impacts were discussed in EISs finalized in 1993 and 1994.)

4.2.1 No Action Alternative

4.2.1.1 Chesapeake Test Range and Localized Target Areas

Demographics and Employment

Projected future population and employment data are presented to characterize conditions in the CTR in the future recognizing that the potential for increased impacts is greater with an increased population. However, for consistency between the existing environment and the environment under the proposed alternatives, the noise analysis in this EIS relies on 1990 Census data since the 1990 Census data provide population statistics on a census tract basis. More recent census tract population data for the complex will not be available until the publication of 2000 Census results.

The Maryland Office of Planning (1998) has projected that by the year 2005 (the proposed action's full implementation year), the populations of Calvert and St. Mary's Counties will increase by 65 and 29 percent, respectively. The population of Maryland's Eastern Shore counties (Dorchester, Somerset, and Wicomico) and Sussex County in Delaware is expected to increase by an average of approximately 11 percent during the same period. The majority of the growth would likely occur in Wicomico and Caroline Counties. On the Northern Neck of Virginia (Lancaster and Northumberland Counties and Tangier Island), population growth is primarily occurring in the senior citizen age group as this area is becoming increasingly attractive to retirees.

Concurrent with population growth, employment in the counties underlying the CTR has also been projected to increase by 2005. Specifically, employment in Southern Maryland and on Maryland's Eastern Shore is projected to increase by 13 and 27 percent, respectively. In Virginia's Northern Neck, job growth is estimated to increase at a rate of two percent annually. These increases will occur principally in the service, wholesale and retail trade, and government sectors. Future declines are anticipated in agriculture-related jobs.

The primary socioeconomic issues associated with the No Action Alternative are related to airfield noise impacts (discussed below for NAS Patuxent River and Webster Field and in Subchapter 4.6) and aircraft overflights (no lower than 1,050 m [3,500 ft] over land areas), and the aircraft noise that would be generated. Overall noise levels and impacts on residents of the counties underlying the CTR are discussed in Subchapter 4.6.

Aircraft overflights in the CTR would involve no on-ground disturbances, no planned construction projects for military facilities, nor changes to the configuration of the special use airspace comprising the CTR that could result in potential socioeconomic impacts. In addition, the No Action Alternative would cause no changes in employment or related shifts in spending, housing, or population distribution within the CTR. Therefore, the No Action Alternative would have no significant impact on population or employment conditions in the CTR when compared with existing (1996) conditions.

The target areas are completely surrounded by water and the nearest inhabited areas are: the Southern Maryland coastline between Cedar Point and Point Lookout (4.8 km [2.6 nm] from Hooper target), Smith Island (13 km [7.2 nm] from Hannibal target), and Tangier Island (six km [3.5 nm] from Tangier Island target). The low level of aircraft noise that would be generated by operations at the targets, particularly in the vicinity of Hooper target (the target closest to inhabited land), would have no effect on demographics or employment under the No Action Alternative.

Poultry Farming

The CTR extends over land areas within Delaware, Maryland, and Virginia where poultry production is an important sector of the economy and where concern has been expressed regarding the impact of aircraft overflights on poultry. A literature review on the relationship between aircraft noise and poultry was conducted by the US Air Force (October 1994). This study found that, in general, noise generated by low-altitude, high-speed aircraft overflights (i.e., flights below 300 m [1,000 ft] above ground level [AGL], and faster than 250 knots [indicated airspeed]) would normally have an insignificant effect on domestic fowl. However, in the presence of certain conditions (e.g., speeds exceeding 250 knots [indicated airspeed], flights below 300 m [1,000 ft] AGL, shadows, or sonic booms), aircraft overflights can cause adverse effects on poultry. The most important factors affecting the potential for impact are sound level, duration of exposure, previous experience of animals with noise and disturbance, breed temperament, genetic disposition, group size, and the management system employed (i.e., animal husbandry practices).

Adverse impacts are most likely to occur in situations where “naive” or unacclimated animals are exposed to noise levels of 90 decibels (dB) or more. Losses of or damage to animals could occur as a result of panic reactions, when animals pile or crowd together, or run or jump without concern for their safety. Such responses were noted in animals unacclimated to the noise generated by aircraft overflights, but these animals were also found to have the capacity to quickly acclimate to the noise stimulus (usually within one to five exposures).

In the CTR, low-level flights would only occur over water (which would have no impacts on poultry farming), or along VR 1711/VR 1712, two military training routes (MTRs) which converge on and enter the CTR from Maryland's Eastern Shore in the vicinity of Princess Anne and Deale Island, Maryland. Aircraft participating in activities conducted in support of military training in the Patuxent River Complex could use VR 1711/1712 to enter the CTR. Under the No Action Alternative, only about one flight or less would be likely to use VR 1711/1712. This infrequency of use would not allow poultry in farms underlying the CTR to become sufficiently acclimated to overflight noise given the fact that a chicken is ready for slaughter as a broiler in five to 12 weeks and as a roaster in four to six months. Consequently, aircraft noise from overflights could cause panic reactions among unacclimated poultry in farms underlying the route of VR 1711/1712.

On the basis of public comments that have been received on this issue, NAWCAD has implemented a management initiative to advise the US Air Force (the scheduling authority for VR 1711/1712 is the Air National Guard's 113th Fighter Wing at Andrews Air Force Base) of the potential problems associated with low level, high speed flights along these MTRs and has requested that:

- The routes be restructured to avoid impacts to the farms; and/or
- A Route Brief be prepared that informs pilots filing flight plans that would use VR 1711 or VR 1712 of the existence of the poultry farms and provide guidance for minimizing impacts to the farms.

The adoption of these requests by the US Air Force would help to minimize the potential for panic reactions in poultry in farms underlying VR 1711/1712.

Commercial Fishing

Overflights of the water areas within the footprint of the CTR would have no significant impact on commercial fishing activities as there would be no disturbances to the water surface or subsurface. Also, overflights would cause no change in access to certain fishing areas.

The localized target areas would continue to be used in the same capacity as in previous years. The targets and their immediate vicinity would be cleared for Navy RDT&E test/training exercises on average for three operations per week for a duration of three hours each. These operations could take place at any one of the target areas, although about 75 percent of operations, primarily RDT&E testing, would take place at Hooper target due to its extensive instrumentation coverage. Further, about 85 percent of those RDT&E tests are conducted strictly within the prohibited area surrounding the target (Draft IMP, March 1997). Military training activities are more likely to occur at tactical targets like Hannibal and Tangier Island

The area to be cleared would include the 915-m (1,000-yd) prohibited area surrounding each target (which is closed to all public use at all times) and could range in size from less than 2.6 sq km (one sq mi) to the full size of the prohibited area, and upwards to 7.8 sq km (three sq mi). The need to clear smaller or larger areas of the Bay for Navy exercises would depend on the nature of the test/exercise to be undertaken and the hazard pattern of the ordnance to be used.

The frequency and duration of target clearance under the No Action Alternative would average 36 hours per month (Table 4.2-1). There would be no anticipated nighttime operations as RDT&E test activities require sufficient light to videotape and/or make other visual observations of the test for evaluation at a later date. As shown in Table 4.2-1, this level of activity would close portions of the Bay to commercial fishing activities for about 13 percent of weekly daylight hours from June through September, when fishing yields are the most productive. This same level of closure is occurring in the CTR now and does not appear to have a significant impact on commercial fishing activity. In fact, range closure "will have a negligible effect [on the commercial fishing industry]...if one section of the range is closed off, fishermen can move out of that area and fish in another. The crabs will move around, too. If the crabs are in the area that is closed off one day, they will be caught in some other area on another day" (Lipton, August 22, 1997).

Environmental Justice

About 26 percent of the population residing in the land area underlying the CTR belongs to minority groups. About nine percent of families and 12 percent of persons residing within the footprint of the CTR had incomes below the poverty level in 1989. These statistics are comparable to state-level data for Delaware, Maryland, and Virginia. There are no discernable concentrations of minority or low- income individuals within the footprint of the CTR that would be adversely affected by noise from aircraft overflights. Under the No Action Alternative, therefore, as evaluated in accordance with Executive Order 12898, Environmental Justice, overflights of the land and water areas underlying the CTR would not cause any disproportionately high and adverse environmental or health impacts specific to any groups or individuals residing within Southern Maryland, Eastern Shore, or Northern Neck communities, including those from minority or low-income populations. Furthermore, no persons would be displaced.

4.2.1.2 NAS Patuxent River and OLF Webster Field

Demographics and Employment

Impacts to socioeconomic resources in the vicinity of NAS Patuxent River and Webster Field as a result of the No Action Alternative would be limited as this alternative would involve no new permanent or temporary personnel at either installation and there is no planned construction of new military facilities. On a historical basis, the immediate area surrounding these installations has experienced aircraft operations since 1942. As recently as the 1970s, operational levels at NAS Patuxent River were about 28,000 to 30,000 flight hours per year, which is greater than the operational levels that would occur under any of the alternatives. The impact of aircraft noise levels

Table 4.2-1

Estimated Average Hours Target Areas Cleared Per Month for RDT&E and Military Training Exercises

Alternative	Average Hours Target Cleared Per Month	Hours Individual Targets Cleared Per Month		
		Hooper	Hannibal	Tangier Island
Existing (1996) Conditions[1]	36	27	8	1
No Action	36	27	8	1
Operational Workload I Alternative	58	32	22	4
Operational Workload II Alternative	64	37	23	4
Operational Workload III Alternative	70	42	24	4

Notes: 1. Estimates for existing (1996) conditions provided by CDR Graham.

Table 4.2-2

Estimated Monthly Number of CTR Operations by Alternative

Alternative	Number of Monthly Operations by Type			Percent Monthly Summer Daylight Hours[3]
	RDT&E Operations[1]	Support of Military Training[2]		
		Day	Night	
No Action	12	>1	0	13
Operational Workload I Alternative	12	8	3	18
Operational Workload II Alternative	14	8	3	22
Operational Workload III Alternative	16	8	3	24

Notes:
1. Duration of RDT&E operations would average two to three hours.
2. Duration of operations in support of military training would average two hours each.
3. Summer daylight hours available for commercial fishing based on Maryland regulations governing commercial crabbing activities in the main stem of the Chesapeake Bay -- six days per week for 12 hours per day or a total of 288 hours per month.

in the vicinity of both NAS Patuxent River and Webster Field under the No Action Alternative are discussed in Subchapter 4.6.

Environmental Justice

The minority population accounts for about 5,000 persons, or about 19 percent, of persons residing in proximity to NAS Patuxent River and Webster Field. About two percent of the resident population identify themselves as of Hispanic origin. Less than three percent of the families in this area had incomes below poverty level in 1989. Therefore, as evaluated in accordance with Executive Order 12898, Environmental Justice, airfield operations at NAS Patuxent River and Webster Field and aircraft overflights in proximity to these installations under the No Action Alternative would not cause any disproportionately high and adverse environmental or health impacts specific to any groups or individuals, including those from minority or low-income populations. Furthermore, no persons would be displaced as a result of this alternative.

4.2.2 Operational Workload Alternatives I, II, and III

4.2.2.1 Chesapeake Test Range

Demographics and Employment

Implementation of any of the three Operational Workload Alternatives would involve no on-ground disturbances or planned military construction projects. Furthermore, implementation of any of these alternatives would cause no direct changes in employment or related shifts in spending, housing, or population distribution within the CTR. Also, there would be no changes to the configuration of CTR's special use airspace. Consequently, there would be no direct socioeconomic impacts on persons residing within the footprint of the CTR. However, CTR residents would experience aircraft overflights and related noise. The noise impacts of the proposed action are discussed in Subchapter 4.6.

Impacts to the population and economy of the inhabited areas nearest the targets would be the same as described for the No Action Alternative.

Poultry Farming

The impacts to poultry farming in the areas underlying the CTR would be the same as described for the No Action Alternative. Based on this analysis, it is unlikely that poultry could become sufficiently acclimatized to the occasional noise associated with aircraft overflights along VR 1711/1712 (average number of overflights estimated at three per month or about one-third of all military traffic not originating from or based at NAS Patuxent River) to prevent panic reactions. The

NAWCAD management initiative already undertaken, if adopted by the US Air Force, would help to reduce the potential for low-level, high-speed aircraft overflights in the future.

Commercial Fishing

Similar to no action conditions, overflights of the Bay within the footprint of the CTR would continue. As well, these overflights would have no significant impact on commercial fishing activities as there would be no disturbances to the water surface or subsurface or change in access.

As shown in Table 4.2-2, the targets in the Bay would be cleared to accommodate Navy tests/exercises for an average of 58 to 70 hours per month, depending on the Operational Workload Alternative that is implemented. This equates to about 22 to 34 more hours per month for Navy tests/exercises than occurs now. As can be seen in the table, target uses in support of military training would be of shorter duration than those for RDT&E testing (an average of one to two hours instead of three). This is because the intent of military training activities is to mimic a wartime situation by delivering ordnance to the target and then exiting the area as quickly as possible. This type of operation contrasts significantly with the more detailed planning and test execution time needed for a typical RDT&E activity.

The relative use of the targets under the Operational Workload Alternatives would also differ from the No Action Alternative (Table 4.2-1). Hooper would no longer be the primary target, and use of Hannibal and Tangier Island targets would increase. Hannibal and Tangier Island targets are both tactical targets (scuttled ships) that are more attractive for military training purposes than Hooper target, which is a "billboard."

The area of the Bay that would be cleared to safely accommodate each Navy operation would be the same as required under the No Action Alternative. Nighttime clearance procedures that would be used are described in Subchapter 4.14.

During June through September, implementation of the Operational Workload Alternatives would result in the closure of a portion of the Bay to commercial fishing activities for about 18 to 24 percent of weekly daylight hours. This level of closure would be of greater duration than presently occurs but would not pose a significant limitation to commercial fishing activities since:

- The area to be cleared (between 2.6 km [one sq mi] and 7.8 sq km [three sq mi]) would only restrict from 0.1 to 0.3 percent of the Bay from fishing activities;
- The duration of Navy tests/exercises would be of short duration -- one to three hours per operation; and
- Watermen could fish in other areas of the Bay during Navy operations and return after the tests/exercises were completed.

Environmental Justice

As evaluated in accordance with Executive Order 12898, Environmental Justice, the direct and indirect effects of the proposed action would not cause disproportionately high and adverse environmental or health impacts specific to any groups or individuals residing in the Southern Maryland, Maryland's Eastern Shore, or Virginia's Northern Neck communities underlying the CTR, including those from minority or low-income populations. Furthermore, no persons would be displaced.

4.2.2.2 NAS Patuxent River and OLF Webster Field

Demographics and Employment

The amount of permanent and transient employment at NAS Patuxent River or Webster Field under any of the three Operational Workload Alternatives would be the same as projected for the No Action Alternative. Impacts to socioeconomic resources in the vicinity of NAS Patuxent River and Webster Field would, therefore, have no significant population or employment impacts on the nearby communities of Lexington Park and Solomons Island. Similarly, the impacts of aircraft noise levels in the vicinities of both NAS Patuxent River and Webster Field are discussed in Subchapter 4.6.

Environmental Justice

Potential impacts related to environmental justice would be the same as described for the No Action Alternative.

4.3 Community Facilities and Services

4.3.1 No Action Alternative

4.3.1.1 Chesapeake Test Range and Localized Target Areas

Emergency Services

Under the No Action Alternative, there would be no significant changes to existing (1996) conditions for community facilities and services for residents in the eleven counties underlying the CTR. NAS Patuxent River would continue to provide hazardous materials spill prevention and search and rescue (SAR) services for all aircraft in the local flight operations areas.

NAS Patuxent River also has a mutual aid support agreement with its host community of St. Mary's County for sharing assets in response to fire and police incidents and to hazardous material incidents which are beyond the capability of the local community. The air station's Public Safety System is capable of integrating data from multiple sources to satisfy the many requirements.

Open Space Resources

As described in Subchapter 3.3.2, the CTR overlies one of the nation's major recreation areas, the Chesapeake Bay, and many open space resources are found within its footprint and many of the counties surrounding the Chesapeake Bay promote eco-tourism. Open space resources located within the CTR include: National Wildlife Refuges (NWRs); state wildlife management and natural areas; state- and locally-designated nature and historic parks; beaches; harbors and marinas; regional recreation areas; and dozens of landings and wharves. Under the No Action Alternative, these resources would continue to experience aircraft overflights. However, the use and availability of these open space resources would not be anticipated to change under the No Action Alternative, as increased flight and related operations would not affect users or uses of those open space resources.

The NWRs, the WMAs on Maryland's Eastern Shore, and the Natural Area in Virginia are within R-4006 and R-4008; flights within these restricted areas are subject to a minimum altitude of 1,067 m (3,500 ft) and 7,620 m (25,000 ft), respectively. Overflights of the NWRs and WMAs at this minimum altitude would be 450 m (1,500 ft) greater than allowed by a Federal Aviation Administration (FAA) interagency agreement with the US Department of the Interior (FAA Advisory Circular 91-36C). This restriction would protect the NWRs and WMAs from annoyance and, during migratory season, minimize the potential for BASH problems. Consequently, there would be no significant impacts to these open space resources under the No Action Alternative.

Several other open space and recreational resources are located within R-4005 and R-4007, including The Elms WMA, several Maryland state parks, and local recreational facilities. In R-4005 and R-

4007, there is no minimum altitude, although most flights are usually routed over the Bay rather than land areas to avoid potential noise or other impacts. The nearest open space resource to the target areas is The Elms WMA, which is located about 4.8 km (2.6 nm) to the west of Hooper target. This distance, coupled with over-the-water routing of aircraft (weather conditions permitting), would be sufficient to avoid potential impacts to the WMA. As a result, there would be no significant impacts to these open space and recreational resources under the No Action Alternative.

Recreational Boating and Fishing

Fishing and boating are permitted within the aerial and surface firing range and the Tangier Island target danger zone (but not prohibited areas) when not in use. Under the No Action Alternative, fishing and boating would continue to be allowed in those areas when range clearance requirements do not apply. As described in Subchapter 4.2, it has been estimated that these areas would be restricted to recreational boating and fishing activities about 36 hours per month, the same as for existing (1996) conditions. In other words, Navy exercises requiring clearance of recreational boating and fishing activities within small portions of the Bay in the vicinity of the targets would average about nine hours a week or approximately 9 percent of summer daylight hours, as shown in Table 4.3-1. This level of restriction, the same as is occurring presently, would not have significant impacts on either recreational boaters or fishermen given the duration of the exercises and the limited portion of the Bay that would be closed. In fact, the Navy has, in the past, accommodated large scale regattas and/or boat races (Graham, November 1997).

Table 4.3-1

Estimated Average Hours Target Areas Cleared Per Week

Alternative	Average Hours Target Cleared Per Week	Percent of Summer Daylight Hours[1]
Existing (1996) Conditions[1]	9	9
No Action	9	9
Operational Workload I Alternative	13	13
Operational Workload II Alternative	15	15
Operational Workload III Alternative	16	16
Notes: 1. Summer daylight hours available for recreational boating/fishing based on 14.5 hours of daylight per day, seven days per week, for a total of 101.5 hours per week.		

4.3.1.2 NAS Patuxent River and OLF Webster Field

Emergency Services

There would be no change to emergency services at either NAS Patuxent River or Webster Field under the No Action Alternative.

Open Space Resources

No construction activities at either NAS Patuxent River or Webster Field would be associated with the No Action Alternative. Employment at either location would also remain unchanged. Therefore, there would be no change or increase in demand for open space resources on- or off-base.

4.3.2 Operational Workload Alternatives I, II, and III

4.3.2.1 Chesapeake Test Range and Localized Target Areas

Emergency Services

There would be no anticipated changes to no action conditions for community facilities and services under any of the Operational Workload Alternatives. NAS Patuxent River would continue to provide SAR services for all aircraft in the local flight operations areas. Although the potential for aircraft mishaps would increase with increased flight operations, no significant impacts on emergency services would be anticipated with implementation of any of these alternatives given the safeguards built into the planning and execution of each test flight and the use of the "ten aircraft rule" for air traffic control in the CTR (see Subchapter 3.14).

Open Space Resources

Impact to open space resources related to implementation of any of the Operational Workload Alternatives would be the same as described for the No Action Alternative.

Recreational Boating and Fishing

As shown in Table 4.3-1, it has been estimated that portions of the aerial and surface firing range in the vicinity of the targets would be restricted from use by recreational boating and fishing activities for between 13 and 16 hours a week to accommodate Navy activities depending on the alternative. This would require the clearance of recreational boating and fishing activities in the vicinity of the targets for approximately 13 to 16 percent of summer daylight hours, the preferred hours for these uses in the Bay. However, this period of restriction would not have significant impacts on either recreational boaters or fishermen for the following reasons:

- The area to be cleared (approximately 7.8 sq km [three sq mi]) would be unchanged from no action conditions and restrict only a small portion of the of the Bay underlying the CTR from recreational boating/fishing use (0.1 to 0.3 percent of the surface water area);
- Navy tests/exercises would occur for only short periods ranging from one to three hours per operation; and
- Other areas underlying the CTR or the Bay, in general, would be available for recreational fishing/boating activities during the period of Navy operations.

4.3.2.2 NAS Patuxent River and OLF Webster Field

Impacts to emergency services and open space resources at either NAS Patuxent River or Webster Field for any of the three Operational Workload Alternatives would be the same as described for the No Action Alternative.

4.4 Transportation

4.4.1 No Action Alternative

4.4.1.1 Chesapeake Test Range and Localized Target Areas

Vehicular Network

Under the No Action Alternative, there would be no changes to the roadway network serving the communities underlying the CTR as these communities would only experience aircraft overflights.

Since the targets are entirely surrounded by water, there would be no impacts to the mainland roadway network with use of the targets as projected under the No Action Alternative. In addition, ferries providing transportation between the mainland and Smith and Tangier Islands use routes that avoid entering the boundaries of the prohibited and restricted areas surrounding the targets. Thus, no impacts would be anticipated to the ferry routes under the No Action Alternative.

Commercial Shipping

The distance of the shipping lanes traversing the Chesapeake Bay from the targets, in combination with the shallow surrounding water averaging about 5.1 m (17 ft) in depth, would limit the potential for impacts to commercial shipping in the CTR under the No Action Alternative. Furthermore, the regulations governing use of the targets by the Navy, published in 33 CFR 334.210(6), provide for minimizing or eliminating disruption to commercial shipping by allowing commercial vessels traversing the aerial and surface firing range, when in “established steamer lanes,” to “proceed on their normal course through the area with all practicable speed” if the Navy will be, or soon will be, initiating an exercise. Therefore, no impacts to commercial shipping due to use of the CTR or target areas are anticipated under the No Action Alternative.

Commercial and General Aviation

When the special use airspace comprising the CTR is activated (i.e., under Navy control), NAS Patuxent River Air Operations Division provides radar air traffic control services and approach control services to commercial and general aviation flights using the 29 airports located within the CTR. This service to commercial and general aviation traffic within the CTR would be maintained under the No Action Alternative, even with a scheduled increase in commercial flights from St. Mary’s County Airport; therefore, no impacts are anticipated.

4.4.1.2 NAS Patuxent River and OLF Webster Field

Vehicular Network

There would be no changes in the employment base of either NAS Patuxent River or Webster Field under the No Action Alternative. Therefore, there would be no impact to the existing roadway network in the immediate areas of NAS Patuxent River and Webster Field. The impacts of BRAC-related growth in Southern Maryland were previously addressed in two EISs finalized in 1993 and 1994.

Commercial Shipping

Activities occurring at either NAS Patuxent River or Webster Field would be land-based and therefore would have no effect on commercial shipping under the No Action Alternative.

Commercial and General Aviation

Under the No Action Alternative, activities occurring at either NAS Patuxent River or Webster Field would have no effect on commercial and general aviation activities.

4.4.2 Operational Workload Alternatives I, II, and III

4.4.2.1 Chesapeake Test Range and Localized Target Areas

Vehicular Network

There would be no changes to the roadway network serving the communities underlying the CTR under any of the Operational Workload Alternatives, as these communities would only experience aircraft overflights.

Since the targets are entirely surrounded by water, there would be no impacts to the mainland roadway network with use of the targets as projected under any of the Operational Workload Alternatives. In addition, ferries providing transportation between the mainland and Smith and Tangier Islands use routes that avoid entering the boundaries of the prohibited and restricted areas surrounding the targets. Thus, there would be no impacts to the ferry routes.

Commercial Shipping

While use of the targets in the Chesapeake Bay would increase (Table 4.2-1), the distance of the shipping lanes from the targets, in combination with the shallow surrounding water averaging about

5.1 m (17 ft) in depth, would limit the potential for impacts to commercial shipping in the CTR under the three Operational Workload Alternatives. Furthermore, as mentioned under the No Action Alternative, the regulations governing use of the targets by the Navy, published in 33 CFR 334.210(6), provide for minimizing or eliminating disruption to commercial shipping by allowing commercial vessels traversing the aerial and surface firing range, when in "established steamer lanes," to "proceed on their normal course through the area with all practicable speed" if the Navy will be, or soon will be, initiating an exercise. Therefore, there would be no impacts to commercial shipping under any of the Operational Workload Alternatives.

Commercial and General Aviation

NAS Patuxent River Air Operations Division would continue to maintain existing air traffic control services and approach control services to the 29 commercial and general aviation airports within the CTR when the special use airspace comprising the CTR is activated. Current hours of activation are normally from 7:00 am to 11:00 pm. Proposed future operating hours under any of the three Operational Workload Alternatives would be essentially the same. Therefore, there would be no significant impacts to commercial and general aviation in the CTR.

4.4.2.2 NAS Patuxent River and OLF Webster Field

Vehicular Network

The purpose of the proposed action is to enhance the use of taxpayer-funded facilities. To achieve this, the existing permanent and transient employment base of both NAS Patuxent River and Webster Field would be maintained at current levels, although hours of operation would be increased between one and three hours per day. The effect of this on the vehicular network would be dependent on shift hours, although it would be expected that the morning rush hour would remain the same as under the No Action Alternative. The evening rush hour would likely be later in the afternoon and somewhat longer, but less intensive, than currently occurs. Therefore, there would be no significant impact to the existing roadway network.

Commercial Shipping

Activities occurring at either NAS Patuxent River or Webster Field would be land-based and therefore would have no effect on commercial shipping under any of the Operational Workload Alternatives.

Commercial and General Aviation

Activities occurring at either NAS Patuxent River or Webster Field would have no effect on commercial and general aviation.

4.5 Air Quality

The three Operational Workload Alternatives considered in this FEIS involve increased aircraft operations and related operations that would result in changes in air pollutant emission levels within the CTR. The CTR is located in the northeast Ozone Transportation Region (OTR), which faces a pervasive problem in its efforts to attain the National Ambient Air Quality Standards (NAAQS) for ozone. In accordance with the Clean Air Act Amendments (CAAA), representatives of 12 northeastern states (including Maryland), the District of Columbia, and the USEPA formed the Ozone Transport Commission (OTC) to assess this regional ozone problem. In general, the OTC has concluded that reducing ozone precursors -- NO_x and volatile organic compounds (VOCs) -- is desirable in order to improve regional ozone conditions within the OTR.

Control of NO_x emissions in the Chesapeake Bay airshed could also have potential regional benefits by addressing coastal atmospheric concerns about deposition of nitrogen compounds into downwind areas. However, since both ozone and NO_x deposition are problems of regional concern and subject to air transport phenomena under different weather conditions, their impacts are generally evaluated on a regional basis using regional ozone airshed model(s). This type of analysis is generally not conducted on a project-by-project basis and will not be assessed in this EIS. Rather, this analysis of proposed action air quality impacts in the Patuxent River Complex was conducted for the following reasons:

- To evaluate the impact of air pollutant emissions from airfield and airspace operations within the CTR on a regional basis from a NEPA perspective; and

- To make an applicability determination pursuant to the general conformity rule, focusing on aircraft operations within airspace R-4007A that could potentially impact the ozone nonattainment area in Calvert County, Maryland.

Steps for Performing the Air Quality Analysis

- Estimate total operational emissions within the CTR and net emissions changes within the nonattainment area;

- Evaluate potential regional impact from total project emissions; and

- Make a general conformity applicability determination based on net emissions changes within the ozone nonattainment area.

Emission Estimates

In this EIS, air emissions determined from operations in the Patuxent River Complex include:

- Aircraft engine emissions that are below 915 m (3,000 ft), pursuant to USEPA guidance (USEPA, March 1992);

- Other mobile source emissions from ground support equipment (GSE), auxiliary power units (APU), and maintenance runups at NAS Patuxent River; and

- Stationary source emissions from boilers, jet engine test cells, etc. at NAS Patuxent River and Webster Field.

Air emissions related to the proposed action would occur primarily in an area designated as being in *attainment* for ozone. However, a small portion of aircraft flight emissions would occur over Calvert County, Maryland, which is part of the Washington, DC-MD-VA *serious ozone nonattainment area* in the OTR. Only potential emissions from aircraft flight operations occurring within this serious ozone nonattainment area were considered in the analysis. No other mobile or stationary source emissions were addressed. The procedures and methodologies used for emissions estimates are detailed in Appendix E.

Regional Impact

In order to achieve timely compliance with the ozone NAAQS, the *Final State Implementation Plan Revision, Phase I Attainment Plan for the Washington, DC-MD-VA Nonattainment Area* (MWCOG, October 1997) has been developed. This plan, also referred to as the Metropolitan Washington Area State Implementation Plan (MWASIP), sets forth regional emission budget target levels for NO_x and VOCs. Thus, total proposed action net changes in NO_x and VOC emissions were compared to these nonattainment area emission target levels in order to evaluate regional significance. Based on the criteria in the general conformity rule (40 CFR 51 and 93), a figure of ten percent of the SIP emission target level was used as the measure of significance.

General Conformity Analysis

This analysis was prepared pursuant to the Clean Air Act General Conformity Rule (GCR) using the guidance provided in the *Chief of Naval Operations Draft Interim Guidance Document on Compliance with the Clean Air Act General Conformity Rule* (Department of the Navy, April 26, 1994). In order to determine the applicability of general conformity requirements for a proposed action, the GCR requires that the potential emissions generated from proposed action-related construction activity and increased operational activity be determined on an annual basis and compared to the annual de minimis levels for those pollutants (or their precursors) for which the area is classified as being in nonattainment.

In other words, from a regulatory perspective, an analysis of construction and operational period emissions related to a proposed action is conducted to ascertain if the de minimis emission levels would be exceeded. Furthermore, the annual emission levels are compared to the SIP regional emission target level to determine regional significance. If emission levels associated with the proposed action are determined to be below de minimis and less than ten percent of the regional emission budget target level, no further analyses would be necessary and a Record of Non-Applicability (RONA) is prepared. If de minimis levels are exceeded or emission levels are more than ten percent of regional budget target levels, a more detailed formal general conformity analysis is required.

Although there would be a change in emissions associated with ground-based operations at NAS Patuxent River and Webster Field, these emissions would not occur in nonattainment areas. Furthermore, most aircraft emissions would not occur in the nonattainment area. Therefore, for general conformity determination purposes, only engine emissions attributable to aircraft in-flight/circle operations that would occur below 915 m (3,000 ft) over Calvert County were considered in the analysis.

Calvert County is located approximately 1.6 km (one mi) north of NAS Patuxent River. Depending on aircraft type and the operation being performed, the time needed to enter or leave the county when using Patuxent River Complex airfields would vary. The aircraft emissions that could potentially be emitted in Calvert County were conservatively estimated by including all in-flight emissions (takeoff, climb-out, approach, and in-flight/circle) for every aircraft type that would operate over Calvert County. The procedures used for emission estimates are detailed in Appendix E.

4.5.1 No Action Alternative

Approximately 18,200 annual flight hours would occur under the No Action Alternative. The expected changes from the existing (1996) conditions described in Subchapter 3.5 include an increase in V-22 flights, the phasing out of several aircraft (such as A-6E), and reduced flights of the T-45. Additionally, operational levels for certain aircraft, particularly the F/A-18E/F, would increase. Thus, there would be a change in emission levels from mobile sources (aircraft, GSE, APU, maintenance, and pre-flight runups) when compared to existing (1996) conditions. However, given the similar total annual flight hours, no change in stationary source operations were projected to occur.

Table 4.5-1 summarizes the total estimated emissions for the criteria pollutants. These emission levels were compared to the existing conditions, finding that approximately 12 percent of NO_x reductions and 19 percent of VOC increases are predicted to occur within the CTR area under the No Action Alternative.

Table 4.5-1

Patuxent River Complex Total Emissions Inventory (No Action)

Source Category	Emission Level (tpy)[1]				
	VOCs	NO_x	CO	SO_2	PM10
Mobile Source					
Aircraft Flight Operation	94.3	171.6	481.5	7.3	95.9
-- ozone attainment area	94.1	169.9	479.4	7.2	95.2
-- ozone nonattainment area	0.2	1.7	2.1	0.1	0.7
GSE and APU	0.4	5.2	1.9	0.4	0.3
Maintenance and Pre-flight Runups	64.1	51.9	308.6	2.3	31.9
Mobile Source Subtotal	158.8	228.7	792.0	10.0	128.1
Stationary Source Subtotal[2]	26.6	77.5	20.8	37.8	7.8
Grand Total (tpy)	185.4	306.2	812.8	47.8	135.9
Grand Total (metric tpy)	168.2	277.8	737.4	43.4	123.3
Existing Conditions (tpy)	153.5	348.6	717.5	49.3	152.8
Total Net Change from Existing Conditions (tpy)	31.5	-42.4	95.3	-1.5	-16.9

Notes: 1. tpy = tons per year
2. Stationary source emissions for No Action Alternative are the same as for existing conditions.
Sources: Aircraft emissions obtained from AESO (Coffer, 1998).

4.5.2 Operational Workload I Alternative

An estimated 20,700 annual flight hours would occur under the Operational Workload I Alternative. Operational differences between the No Action Alternative and this alternative would include the additional operations of several fixed-wing aircraft types (e.g., C-5A, C-135, and F-15) and one rotary-wing aircraft (AH-64). The GSE and APU operating levels would increase in proportion to the change in aircraft flight operations for those aircraft that use GSEs and APUs. Changes in maintenance and pre-flight runup operating levels were obtained from Wyle Research (January 1998). There would be no increase in stationary source operations. Table 4.5-2 summarizes the total estimated emissions for all the criteria pollutants and the total net emission changes compared to the No Action Alternative. Note that as described in Subchapter 3.5, air emissions around the target areas due to ordnance release (missiles, practice bombs, flares, or chaff) or gunfire would be negligible.

4.5.2.1 Regional Impact

Projected emission increases for the Operational Workload I Alternative would total approximately 35.0 metric tons per year (mtpy) (38.6 tons per year [tpy]) of NO_x and 16.5 mtpy (18.2 tpy) of VOCs. More than 99 percent of these emission increases would occur within the CTR ozone attainment area. Provided in Table 4.5-2 are changes in emissions from the proposed action to the SIP regional emission budget target levels set forth for nonattainment area in the MWASIP. Additional emissions that would result from implementation of the Workload I Alternative would represent less than 0.02 percent of the available nonattainment area emission target levels, even if 100 percent of these emissions were transported to the nonattainment area (which would not be the case). When the emission levels for the proposed action are compared with the regional significance criterion (ten percent of regional emission budget target levels as established in the general conformity rule for a proposed action in a nonattainment area), the regional ozone impact from the Operational Workload I Alternative would not be significant.

4.5.2.2 General Conformity Analysis

The Operational Workload I Alternative would result in a net change in emissions of approximately 0.2 mtpy (0.2 tpy) of NO_x and a negligible amount of VOCs when compared to the No Action Alternative in the Calvert County serious ozone nonattainment area. These net changes would be less than the de minimis levels of 45 mtpy (50 tpy) for each of NO_x or VOCs (Table 4.5-3). Furthermore, net change in emissions would be less than ten percent of the regional NO_x and VOC target levels specified in the MWASIP. Therefore, a formal general conformity determination would not be required for the Operational Workload I Alternative.

Table 4.5-2

Patuxent River Complex Total Emissions Inventory (Workload I Alternative)

Source Category	Emission Level (tpy)				
	VOCs	NO_x	CO	SO_2	PM10
Mobile Source					
Aircraft Flight Operation	109.9	210.0	524.7	8.7	109.1
-- ozone attainment area	109.7	208.1	522.5	8.6	108.3
-- ozone nonattainment area	0.2	1.9	2.2	0.1	0.8
GSE and APU	0.4	5.3	1.9	0.4	0.3
Maintenance and Pre-flight Runups	66.7	52.0	314.5	2.3	32.7
Mobile Source Subtotal	177.0	267.3	841.1	11.4	142.1
Stationary Source Subtotal[1]	26.6	77.5	20.8	37.8	7.8
Grand Total (tpy)	203.6	344.8	861.9	49.2	149.9
Grand Total (mtpy)	184.7	312.8	781.9	44.6	136.0
No Action Alternative (tpy)	185.4	306.2	812.8	47.8	135.9
Total Net Change from No Action Alternative	18.2	38.6	49.1	1.4	14.0
Washington, DC-MD-VA Ozone Nonattainment Area 1999 Target Emissions[2] (tpy)	132,459	232,542	--	--	--

Notes: 1. Operational Workload I Alternative stationary sources emissions were assumed to be the same as the No Action Alternative.
2. Sources: Aircraft emissions obtained from AESO (Coffer, 1998); MWCOG, October 1997 and January 1998.

Table 4.5-3

Total Aircraft Emissions in the Calvert County Ozone Nonattainment Area for All Alternatives

Alternative	Emission Level (tpy)				
	VOCs	NO_x	CO	SO_2	PM10
Total Emissions					
Existing Conditions	0.2	2.4	2.3	0.1	1.1
No Action Alternative	0.2	1.7	2.1	0.1	0.7
Operational Workload I Alternative	0.2	1.9	2.2	0.1	0.8
Operational Workload II Alternative	0.2	2.1	2.4	0.1	0.9
Operational Workload III Alternative	0.2	2.4	2.5	0.1	1.0
Net Emission Change from No Action Alternative					
Operational Workload I Alternative	0.0	0.2	0.1	0.0	0.1
Operational Workload II Alternative	0.0	0.4	0.3	0.0	0.2
Operational Workload III Alternative	0.0	0.7	0.4	0.0	0.3
Serious Ozone Nonattainment Area De minimis Level[1] (tpy)	50	50	--	--	--
Washington, DC-MD-VA Ozone Nonattainment Area 1999 Target Emissions[2] (tpy)	132,459	232,542	--	--	--

Notes: 1. 40 CFR 93
2. Source: MWCOG, October 1997.

4.5.3 Operational Workload II Alternative

An estimated 22,600 annual flight hours would occur under the Operational Workload II Alternative. Other mobile source operating levels would increase in proportion to changes in aircraft operations. Stationary source operations were projected increase approximately ten percent over the No Action Alternative operating levels in order to support the increased operations under the Operational Workload II Alternative, a highly conservative assumption. Table 4.5-4 summarizes the total estimated emissions for the criteria pollutants and the total net emission changes compared to the No Action Alternative. Note that as described in Subchapter 3.5, air emissions around the target areas due to ordnance release (missiles, practice bombs, flares, or chaff) or gunfire would be negligible.

4.5.3.1 Regional Impact Analysis

Projected emission increases for the Operational Workload II Alternative would total approximately 68.4 mtpy (75.3 tpy) of NO_x and 35.0 mtpy (38.5 tpy) of VOCs. A comparison of these emission changes and the SIP regional emission budget target levels is provided in Table 4.5-4. The additional emissions resulting from implementation of the Operational Workload II Alternative would represent less than 0.04 percent of the available nonattainment area emission target levels, even if 100 percent of these emissions were transported to the nonattainment area (which would not be the case). Based on the regional significance criterion (ten percent of regional emission budget target levels) established in the general conformity rule, for projects in nonattainment areas the regional ozone impact from the Operational Workload II Alternative would not be significant.

4.5.3.2 General Conformity Analysis

Under the Operational Workload II Alternative, the net change in emissions relative to the No Action Alternative would be approximately 0.4 mtpy (0.4 tpy) of NO_x and a negligible amount of VOCs in Calvert County. These net changes in emissions would be less than the de minimis values specified for a serious ozone nonattainment area, and would also be less than ten percent of the MWASIP emission target levels (Table 4.5-3). Thus, a more formal general conformity analysis would not be required for the Operational Workload II Alternative.

4.5.4 Operational Workload III Alternative

An estimated 24,400 annual flight hours would occur under the Operational Workload III Alternative. Operating levels of other mobile sources would increase accordingly. Stationary source operations were projected to increase by approximately 20 percent over the No Action Alternative

Table 4.5-4

Patuxent River Complex Total Emissions Inventory (Workload II Alternative)

Source Category	Emission Level (tpy)				
	VOCs	NO_x	CO	SO_2	PM10
Mobile Source					
Aircraft Flight Operation	119.4	232.7	557.7	9.6	118.2
-- ozone attainment area	119.2	230.6	555.3	9.5	117.3
-- ozone nonattainment area	0.2	2.1	2.4	0.1	0.9
GSE and APU	0.5	6.2	2.3	0.4	0.3
Maintenance and Pre-flight Runups	74.7	57.3	348.3	2.5	36.1
Mobile Source Subtotal	194.6	296.2	908.3	12.5	154.6
Stationary Source Subtotal[1]	29.3	85.3	22.9	41.6	8.6
Grand Total (tpy)	223.9	381.5	931.2	54.1	163.2
Grand Total (metric tpy)	203.1	346.1	844.8	49.1	148.1
No Action Alternative (tpy)	185.4	306.2	812.8	47.8	135.9
Total Net Change from No Action Alternative(tpy)	38.5	75.3	118.4	6.3	27.3
Washington, DC-MD-VA Ozone Nonattainment Area 1999 Target Emissions[2] (tpy)	132,459	232,542	--	--	--

Notes: 1. Operational Workload II Alternative stationary sources emissions were assumed to increase ten percent from the No Action Alternative.
2. Sources: aircraft emissions obtained from AESO (Coffer, 1998); MWCOG, October 1997 and January 1998.

Table 4.5-5

Patuxent River Complex Total Emissions Inventory (Workload III Alternative)

Source Category	Emission Level (tpy)				
	VOCs	NO_x	CO	SO_2	PM10
Mobile Source					
Aircraft Flight Operation	128.8	255.3	590.6	10.6	128.1
-- ozone attainment area	128.6	252.9	588.1	10.5	127.1
-- ozone nonattainment area	0.2	2.4	2.5	0.1	1.0
GSE and APU	0.5	7.1	2.6	0.5	0.4
Maintenance and Pre-flight Runups	79.9	62.0	375.7	2.7	38.7
Mobile Source Subtotal	209.2	324.4	968.9	13.8	167.2
Stationary Source Subtotal[1]	31.9	93.0	25.0	45.4	9.4
Grand Total (tpy)	241.1	417.4	993.9	59.2	176.6
Grand Total (mtpy)	218.8	378.6	901.6	53.7	160.2
No Action Alternative (tpy)	185.4	306.2	812.8	47.8	135.9
Total Net Change from No Action Alternative (tpy)	55.7	111.2	181.1	11.4	40.7
Washington, DC-MD-VA Ozone Nonattainment Area 1999 Target Emissions[2] (tpy)	132,459	232,542	--	--	--

Note:
1. Operational Workload III Alternative stationary sources emissions were assumed to increased 20 percent from the No Action Alternative.
2. Sources: Aircraft emissions obtained from AESO (Coffer, 1998); MWCOG, October 1997 and January 1998.

operating levels, a highly conservative assumption. Table 4.5-5 summarizes the total estimated emissions for the criteria pollutants and the total net emission changes from the Operational Workload III Alternative when compared to the No Action Alternative. Note that as described in Subchapter 3.5, air emissions around the target areas due to ordnance release (missiles, practice bombs, flares, or chaff) or gunfire would be negligible.

4.5.4.1 Regional Impact Analysis

Projected emission increases for the Operational Workload III Alternative would total approximately 50.6 mtpy (55.7 tpy) of VOCs and 101.0 mtpy (111.2 tpy) of NO_x . A comparison of these emission changes to the SIP regional emission budget target levels is provided in Table 4.5-5. The additional emissions resulting from implementation of the Operational Workload III Alternative would represent less than 0.05 percent of the available nonattainment area emission target levels, even if 100 percent of these emissions were transported to the nonattainment area (which would not be the case). Based on the regional significance criterion (ten percent of regional emission budget target levels) established in the general conformity rule, for projects in nonattainment areas the regional ozone impact from the Operational Workload III Alternative would not be significant.

4.5.4.2 General Conformity Analysis

The Operational Workload III Alternative would result in a net change in emissions of approximately a negligible amount of VOCs 0.5 and metric tpy (0.6 tpy) of NO_x in Calvert County. These net changes in emissions would be less than the de minimis values specified for a serious ozone nonattainment area, and would also be less than ten percent of the designated target levels (Table 4.5-3). Thus, a more formal general conformity analysis would not be required for the Operational Workload III Alternative.

4.6 Noise

The effects of noise on human health can be considered from both physiological and behavioral perspectives. Historically, physiological hearing loss was considered the most serious effect of exposure to excessive or prolonged noises, with such effects largely related to human activities in the workplace (i.e., manufacturing) and near construction activities. With efforts by the manufacturing and construction industries and regulatory agencies having successfully lessened the likelihood of physical hearing damage from noise exposure, the analysis of environmental noise effects from such sources as aircraft has shifted to behavioral (or nuisance) effects -- annoyance, speech interference, and sleep disturbance. The extent of these effects varies among individuals and is a function of the characteristics of the noise source (e.g., overall loudness, duration of exposure, time distribution of occurrence, and sound frequency). The potential for the following types of noise effects has been considered in this EIS:

- Hearing loss;
- Nonauditory health effects;
- Annoyance;
- Speech interference;
- Sleep disturbance;
- Noise effects on domestic animals and wildlife;
- Effects of noise-induced vibrations on structures and humans; and
- Noise effects on historical and archaeological sites.

Based on the review presented in the text boxes on the following pages, the following effects are not considered further in this EIS: hearing loss, nonauditory health effects, and noise-induced vibrations on structures and humans.

Analytical Framework

The analysis of the noise impacts of the No Action Alternative and the three Operational Workload Alternatives includes the following elements:

- **Subsonic operations in the CTR** - using the MR_NMAP model, L_{dnmr} noise contours were developed.

- **Supersonic operations in the CTR** - using the BOOMAP3 model, L_{Cdn} contours were developed.

- **Airfield operations in the vicinity of NAS Patuxent River and Webster Field** - DNLs for both airfields were determined using the NOISEMAP model and results

Analysis of Noise Effects

Hearing Loss - Noise-induced hearing loss is probably the best defined of the potential effects of human exposure to excessive noise. Federal workplace standards that protect individuals from on-the-job hearing losses allow a time-averaged level of 90 dB over an 8-hour work period, or 85 dB over a 16-hour period. Even the most protective criterion (no measurable hearing loss for the most sensitive portion of the population at the ear's most sensitive frequency, 4000 hertz, after a 40-year exposure) suggests a time-average sound level of 70 dB over a 24-hour period. This means that for even the possibility of hearing loss to occur, airfield neighbors have would to remain outside their homes 24 hours per day for an extended time exposed to a daily noise level (DNL) of 75+ dB, an extremely conservative and unlikely situation. Thus, hearing loss effects are not considered further in this EIS.

Nonauditory Health Effects - Nonauditory health effects of long-term noise exposure include stress, hypertension, and other nervous disorders. While noise may act as a risk factor, most studies of such health effects have found that regulatory standards established for hearing protection also protect against potential nonauditory health effects, at least in workplace conditions. Thus, there is no scientific basis for a claim that potential health effects exist for aircraft time-average sound levels below 75 dB and nonauditory health effects are not considered further in this EIS.

Annoyance - The primary effect of aircraft noise on communities is annoyance. The USEPA (1972) defines noise annoyance as “any negative subjective reaction of an individual or group.” The best measure of community annoyance is the DNL metric and the criterion of 65 DNL is used. The public, however, has suggested that a DNL of 60 or 55 dB be adopted as the threshold for community noise annoyance in airport environmental impact analyses. While there is no technical reason that a lower level could not be measured or calculated for comparison purposes, a DNL of 65 dB:

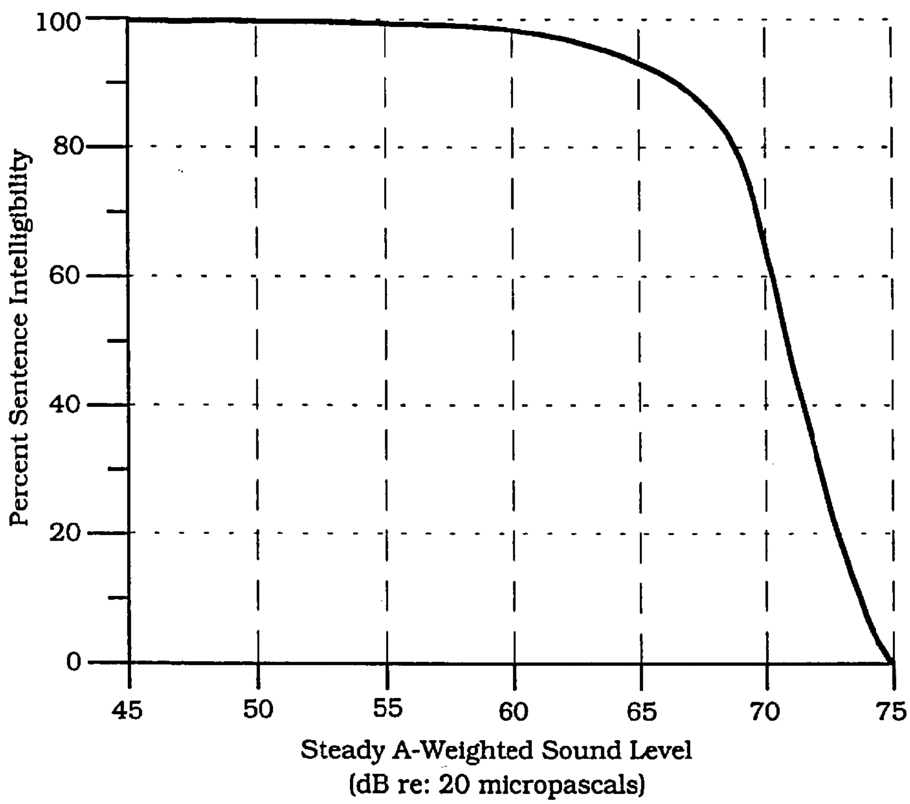
- Provides a valid basis for comparing and assessing community noise effects;
- Represents a noise exposure level normally dominated by aircraft noise; and
- Reflects the FAA's threshold for grant-in-aid funding of airport noise mitigation projects.

Speech Interference - Speech interference associated with aircraft noise is a primary cause of annoyance to exposed individuals. The disruption of routine activities such as radio or television listening, telephone use, or family conversation gives rise to frustration and aggravation. The quality of speech communication is also important in classrooms, offices, and industrial settings and those who attempt to communicate over the noise can experience fatigue and vocal strain. Research has shown that “whenever intrusive noise exceeds approximately 60 dB indoors, there will be interference with speech communication” (FICON, 1992).

Indoor speech interference can be expressed as a percentage of “Sentence Intelligibility” among two people speaking in relaxed conversation approximately one meter (three feet) apart in a typical living room or bedroom. In technical terms, the percentage of Sentence Intelligibility is a non-linear function of the (steady) indoor background A-weighted sound level. The curve shown in Figure 4.6-1 (Percent Sentence Intelligibility) indicates that Sentence Intelligibility is 100 percent when background levels are below 57 dB; Sentence Intelligibility is less than 10 percent when background levels are above 73 dB.

The analysis of Sentence Intelligibility in this document is based on a minimum acceptable outdoor L_{Amax} (for daytime only events) of 82 dB, corresponding to a Sentence Intelligibility of 90 percent. An outdoor noise level of 82 dB also equates to an indoor level of 66 dB, assuming an average of 16 dB of noise level reduction (=66+16). Closer inspection of Figure 4.6-1 reveals that changes in sound levels below 66 dB gain little Sentence Intelligibility as compared to the loss of Sentence Intelligibility for changes in sound levels above 66 dB.

Percent Sentence Intelligibility



Source: USEPA, March 1972.

Figure 4.6-1

Sleep Disturbance - Sleep disturbance is another source of annoyance associated with aircraft noise, especially given its intermittent nature and content. Sleep disturbance can be measured in either of two ways: “arousal” or awakening from sleep, or a change in “sleep stage,” which represents a shift from one of four sleep stages to another stage of lighter sleep without awakening. In general, arousal requires a higher noise level than does a change in sleep stage.

In terms of average DNL, some guidance is available to judge sleep disturbance. The USEPA (1972) has identified an indoor DNL of 45 dB as necessary to protect against sleep interference. Assuming a conservative structural noise insulation of 20 dB for a typical dwelling, 45 dB would correspond to an outdoor DNL of 65 dB as minimizing sleep interference. The Federal Interagency Committee on Aviation Noise (FICAN) has also reviewed the sleep disturbance issue (1997) and has recommended use of a sleep disturbance dose-response prediction curve for the analysis of potential sleep disturbance for residential areas (Figure 4.6-2, Sleep Disturbance Dose-Response Relationship). This curve shows, for example, that where the indoor sound exposure level (SEL) is measured at 60 dB, a maximum of approximately five percent of the exposed residential population would be expected to be behaviorally awakened. However, FICAN cautions that this curve should only be applied to long-term adult residents.

Noise Effects on Domestic Animals and Wildlife - Animal species differ in their responses to noise. Each species has adapted, physically and behaviorally, to fill its ecological role in nature and its hearing ability reflects that role. Animals rely on their hearing to avoid predators, obtain food, and communicate with and attract other members of their species. Aircraft noise may mask or interfere with these functions. Secondary effects may include non-auditory impacts similar to those exhibited by humans. Tertiary effects may include interference with mating and resultant population declines.

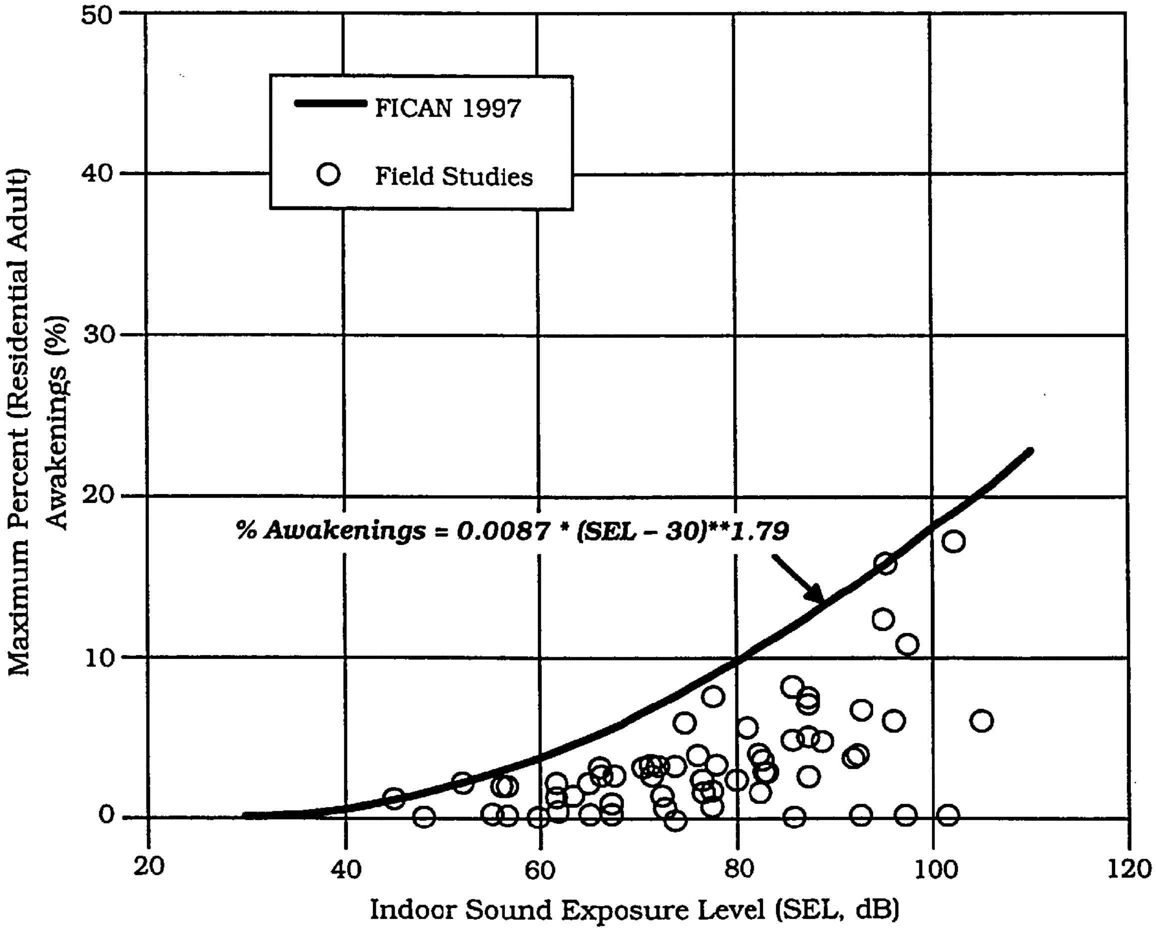
Many scientific studies are available regarding the effects of noise on wildlife as are some anecdotal reports of wildlife "flight" due to noise. However, few of these studies include any reliable measures of the actual noise exposure levels. In the absence of definitive data on the effect of noise on animals, the Committee on Hearing, Bioacoustics, and Biomechanics of the National Research Council proposed that protective noise criteria for animals be the same as identified for humans (National Academy of Sciences, 1977). This topic is addressed in more detail in Subchapter 4.12.

Effects of Noise-Induced Vibrations on Structures and Humans - The sound from an aircraft travels from the exterior to the interior of a structure through the solid structural elements and directly through the air. The most sensitive components of a structure to airborne noise are normally windows and, infrequently, plaster walls and ceilings. An evaluation of peak sound pressures impinging on the structure is normally sufficient to determine the possibility of damage. In general, sound levels above 130 dB can result in possible structural damage. While certain frequencies (such as 30 hertz for window breakage) may be of more concern than others, conservatively, only sounds lasting more than one second above a sound level of 130 dB are potentially damaging to structural components (von Gierke and Ward, 1991).

Noise-induced structural vibration may also cause annoyance to dwelling occupants because of induced secondary vibrations or “rattle” of objects (hanging pictures, dishes, plaques, and bric-a-brac) within the dwelling. Window panes may also vibrate when exposed to high levels of airborne noise, causing homeowners to fear breakage. In general, noise-induced vibrations occur at sound levels above those considered normally incompatible with residential land use. Thus, assessments of noise exposure levels for compatible land use should also be protective of noise-induced secondary vibrations, and this topic is not considered further in this EIS.

Noise Effects on Historical and Archaeological Sites - Because of the potential for increased fragility of structural components of historical buildings and other historical sites, aircraft noise may affect such sites more severely than newer, modern structures. Noise impacts on historical and archaeological sites are

Sleep Disturbance Dose-Response Relationship



Source: FICAN, June 1997.

Figure 4.6-2

are expressed in terms of land area, dwellings, and population within specific noise contours. No Action Alternative noise contours are provided in the form of plastic overlays to facilitate comparison to each of the Workload Alternative contours.

- **Overall noise levels for all flight operations in the CTR** - DNLs developed using the NOISEMAP model are presented for specific sensitive receptor locations.

- **Potential for indoor speech interference** - outdoor single-event L_{Amax} levels were calculated using the NOISEMAP model. These values were then used to determine Sentence Intelligibility expressed as a percent.

- **Potential for indoor sleep disturbance** - SELs were calculated using the NOISEMAP model. These values were then used to determine sleep disturbance expressed as maximum percent awakened.

Factors Affecting Analysis of Alternatives

The modeling of noise levels from subsonic and supersonic flight operations in the Patuxent River Complex for the No Action and three Operational Workload Alternatives is based on consideration of the following factors:

- Number of flight operations (which vary by workload alternative); and
- Aircraft type, speed, and altitude (which do not vary by workload alternative).

The modeling of noise levels from operations at NAS Patuxent River Airfield and Webster Field for the No Action and the three Operational Workload Alternatives is also based on consideration of:

- Airfield flight operations;
- Runway and flight tract utilization;
- Aircraft flight profiles;
- Climate data; and
- Pre-flight and maintenance runups.

The operational assumptions by factor that were used in the noise modeling for this EIS are summarized in Table 4.6-1.

Table 4.6-1

Operational Assumptions for Operational Workload Alternatives

Parameter	No Action	Workload I Alternative	Workload II Alternative	Workload III Alternative
CTR				
Number of Subsonic Operations[1]	15,600	18,000	19,400	20,500
Number of Supersonic Operations[1]	245	247	272	296
NAS Patuxent River Airfield				
Airfield Flight Operations[1]	71,000	77,500	86,000	94,300
Runway and Flight Track Utilization	Same as existing (1996) conditions	Same as No Action	Same as No Action	Same as No Action
Aircraft Flight Profiles	Same as existing (1996) conditions	Same as No Action	Same as No Action	Same as No Action
Climate Data	Same as existing (1996) conditions	Same as No Action	Same as No Action	Same as No Action
Pre-flight and Maintenance Runups	All pre-flight runups on active runway before brake release and all hush house and test cell runup operations (in- and out-of-frame) unchanged from existing conditions. Pre-flight runup operations on flight lines of the respective squadrons would change relative to the annual number of sorties.	All pre-flight runups on active runway before brake release and all hush house and test cell runup operations (in- and out-of-frame) unchanged. Pre-flight runup operations on flight lines of the respective squadrons would change relative to the annual number of sorties.	All pre-flight runups on active runway before brake release would remain unchanged. All hush house and test cell runup operations (in- and out-of-frame) would increase by 10 percent from No Action. Pre-flight runup operations on flight lines of the respective squadrons would change relative to the annual number of sorties.	All pre-flight runups on active runway before brake release would remain unchanged. All hush house and test cell runup operations (in- and out-of-frame) would increase by 20 percent from No Action. Pre-flight runup operations on flight lines of the respective squadrons would change relative to the annual number of sorties.
Webster Field				
Airfield Flight Operations[1]	58,200	58,200	64,000	69,800
Runway and Flight Track Utilization	Same as existing (1996) conditions	Same as No Action	Same as No Action	Same as No Action
Aircraft Flight Profiles	Same as existing (1996) conditions	Same as No Action	Same as No Action	Same as No Action
Climate Data	Same as existing (1996) conditions	Same as No Action	Same as No Action	Same as No Action
Pre-flight and Maintenance Runups	None	None	None	None

Notes:
1. It important to understand that one operation does NOT equal one flight; one flight may contain multiple operations. Rather, an operation as used in this noise analysis is a single departure or arrival/approach of an aircraft. Therefore, a touch-and-go consists of two operations -- an arrival (touch) and a departure (go).
2. Flight tracks and profiles contained in Wyle Research (1998).

Impact Summary

Table 4.6-2 provides a "quick look" summary of potential aircraft-related noise impacts that would be associated with the No Action and implementation of the three Operational Workload Alternatives. This table only addresses key impact parameters using a simplified numerical approach. To understand the full range of aircraft noise-related impacts associated with the proposed action, the complete Subchapter 4.6 must be read.

4.6.1 No Action Alternative

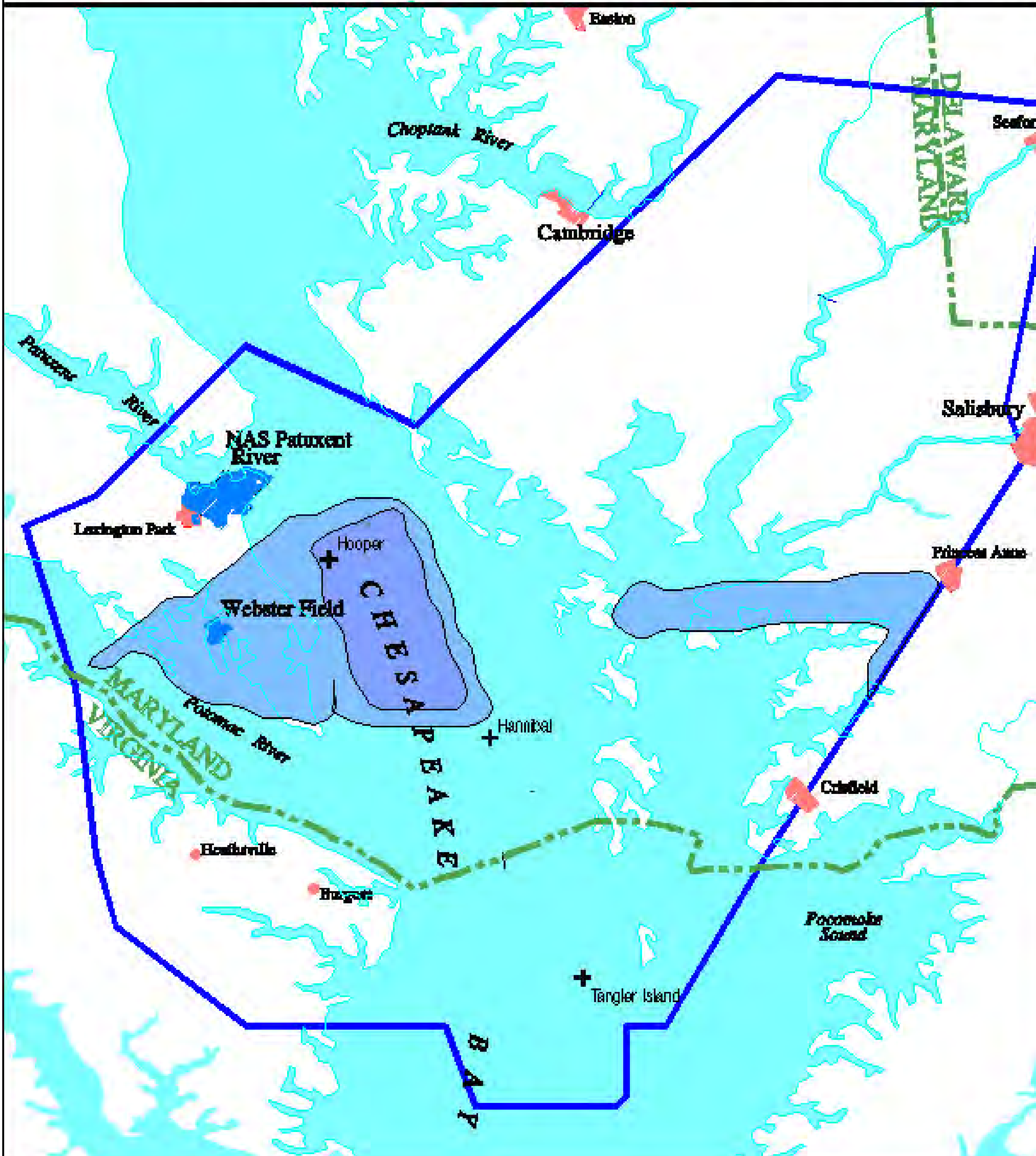
The No Action Alternative conditions (annual flight hour total) for all flight operations within the Patuxent River Complex, including airfield operations at both NAS Patuxent River and Webster Field as well as flights conducted within the CTR's restricted areas were based on the NASMOD study as refined by Eagan, McAllister Associates, Inc. (January 1998). A total of 18,200 annual flight hours were analyzed under the No Action Alternative. These hours were slightly less than existing conditions (18,400) for the reasons outlined in Subchapter 2.3.1.

4.6.1.1 Chesapeake Test Range and Localized Target Areas (No Action Alternative)

Figure 4.6-3 (L_{dnmr} Contours Within Affected Airspace Components for No Action Alternative) presents the L_{dnmr} noise contours for all subsonic flight operations conducted in the CTR under the No Action Alternative. Noise contours representing L_{dnmr} noise levels of 45 dB and greater are shown. The overall noise levels produced by subsonic flight operations in the CTR would be highest in the vicinity of the target areas, primarily Hooper. These levels are primarily attributable to both the lower altitude structure of operations conducted on the targets as well as the overlapping of all of the individual airspace components in these areas. Noise levels would also be greater on the east side of the CTR where two MTRs (VR 1711 and VR 1712) enter the range boundary. This contour would extend off-range to the south following the path of the two MTRs as delineated in Figure 3.14-2. Other military aircraft operations utilizing these MTRs to gain access to the CTR, in addition to flight operations in R-4006 and R-4008, would contribute to this increase in noise level in this area. It is significant to note that these subsonic flight operations noise contours also reflect the areas where aircraft disturbance reports concerning low flying aircraft have originated as described in Subchapter 3.6.

L_{Cdn} contours were plotted for all supersonic events (Figure 4.6-4, L_{Cdn} Contours for No Action Supersonic Flight Operations). This figure shows a single L_{Cdn} 40 dB contour due to the small number of supersonic operations that are conducted in the Patuxent River Complex. When this contour is evaluated based on equal annoyance percentages (Table 3.6-2), it would correspond approximately to a DNL 42 dB contour (covering an area of approximately 119 sq km [46 sq mi]).

Ldnmr Contours Within Affected Airspace Components for No Action Alternative



45-50 Ldnmr
50 and over Ldnmr
Chesapeake Test Range (CTR)
NAS Patuxent River and Webster Field
+ Target

10 0 10
Scale in Miles
15 0 15
Scale in Kilometers

N

Figure 4.6-3

Table 4.6-2

Numerical Snapshot Comparison of Noise Impacts

Impact Parameter	As a function of:	No Action	Workload Alternative		
			I	II	III
CTR Subsonic Operations	Area of the 45 dB L_{dnmr} Contour in: sq km/(sq mi)	925/(375)	1,472/(568)	1,537/(594)	1,743/(673)
CTR Supersonic Operations	Area of the 40 dB L_{Cdn} Contour in: sq k/(sq mi)	119/(46)	122/(47)	156/(60)	190/(73)
NAS Pax River Airfield Operations	Area of the 60 dB Contour in: hectares/(acres)	776/(1,918)	875/(2,163)	949/(2,345)	1,023/(2,527)
	Number of People within the 60 dB Contour	2,750	3,007	3,219	3,439
Webster Field Operations	Area of the 60 dB Contour in: hectares/(acres)	21/(51)	21/(51)	23/(56)	25/(61)
	Number of People within the 60 dB Contour	6	6	6	6
Sensitive Receptor Locations (22)	Number of Locations with DNL <45 dB	16	10	10	10
	Range of DNLs at Remaining Locations (in dB)	45 to 64	45 to 64	45 to 64	45 to 65
Indoor Speech Interference	Range of L_{Amax} in dB	<50 to 91	<50 to 90	<50 to 90	<50 to 90
	Number of Locations with Sentence Intelligibility Less than 100%	4	5	5	4
	For R-4007A and at Hooper Target, No Events Occur at Greater than this dB Level	87	92	92	92
	For VR-1711, No Events Occur at Greater than this dB Level	95	99	99	99
Indoor Sleep Disturbance	Range of SEL in dB	<50 to 94	<50 to 94	<50 to 94	<50 to 98
	Number of sensitive receptor locations experiencing Maximum Percent Awakenings no greater than this percent	8 no more than 9%	8 no more than 9%	8 no more than 9%	8 no more than 11%
	For subsonic operations, no nighttime events with SEL greater than this dB level	57	57	58	58
	For supersonic operations, maximum overpressure of this psf level	1.7	1.7	1.7	1.7

However, the impact at ground level would be negligible, and even if these noise contours were located over a populated land area (which they are not), less than one percent of the affected population would be expected to be highly annoyed.

In the past, aircraft disturbance reports concerning sonic booms had been regularly filed by residents of both Smith Island, Maryland and Smith Point, Virginia, generally to the east and west of the single L_{Cdn} contour shown on Figure 4.6-4. In response to the frequency of reports, air operations personnel visited residents and reviewed the flight tracks being used by aircraft in the area. Air Operations personnel were able to determine that noise disturbances in that area were caused by aircraft deviating slightly from approved existing procedures. Since that time, with reinforcement of existing procedures, there have been few aircraft disturbance reports regarding sonic booms (Riley, 1998).

In addition, the procedures under which supersonic flights are conducted in the CTR further reduces the potential for ground impacts from sonic booms. Specifically, in accordance with Chapter 3 of the NAS Patuxent River Air Operations Manual, supersonic flights:

- Must have an approved flight plan;
- Are only authorized during daylight hours under optimum VFR conditions;
- Must be flown in accordance with the restrictions of the NATOPS General Flight and Operating Instructions (OPNAVINST 3710.7 Series); and
- Require a sound focusing report for the day (sound focusing, also referred to as sound ducting, is a process used to greatly decrease the ground effects of sonic booms).

4.6.1.2 NAS Patuxent River and OLF Webster Field (No Action Alternative)

The 60 dB through 85 dB DNL average-day noise contours shown in Figures 4.6-5 (DNL Contours for No Action Operations at NAS Patuxent River) and 4.6-6 (DNL Contours for No Action Operations at OLF Webster Field) are based on the annual operations presented in Appendix C. In general, the No Action Alternative noise impacts due to airfield operations at NAS Patuxent River would be less than for existing (1996) conditions as the number of No Action airfield operations would be less than existing airfield operations for the reasons outlined in Subchapter 2.3.1. In summary, the following impacts would occur due to NAS Patuxent River airfield operations (Table 4.6-3):

- The total area within the 60 dB DNL contour would be 776 hectares (1,918 acres) compared to 970 hectares (2,397 acres) for existing (1996) conditions;

LCdn Contours for No Action Supersonic Flight Operations

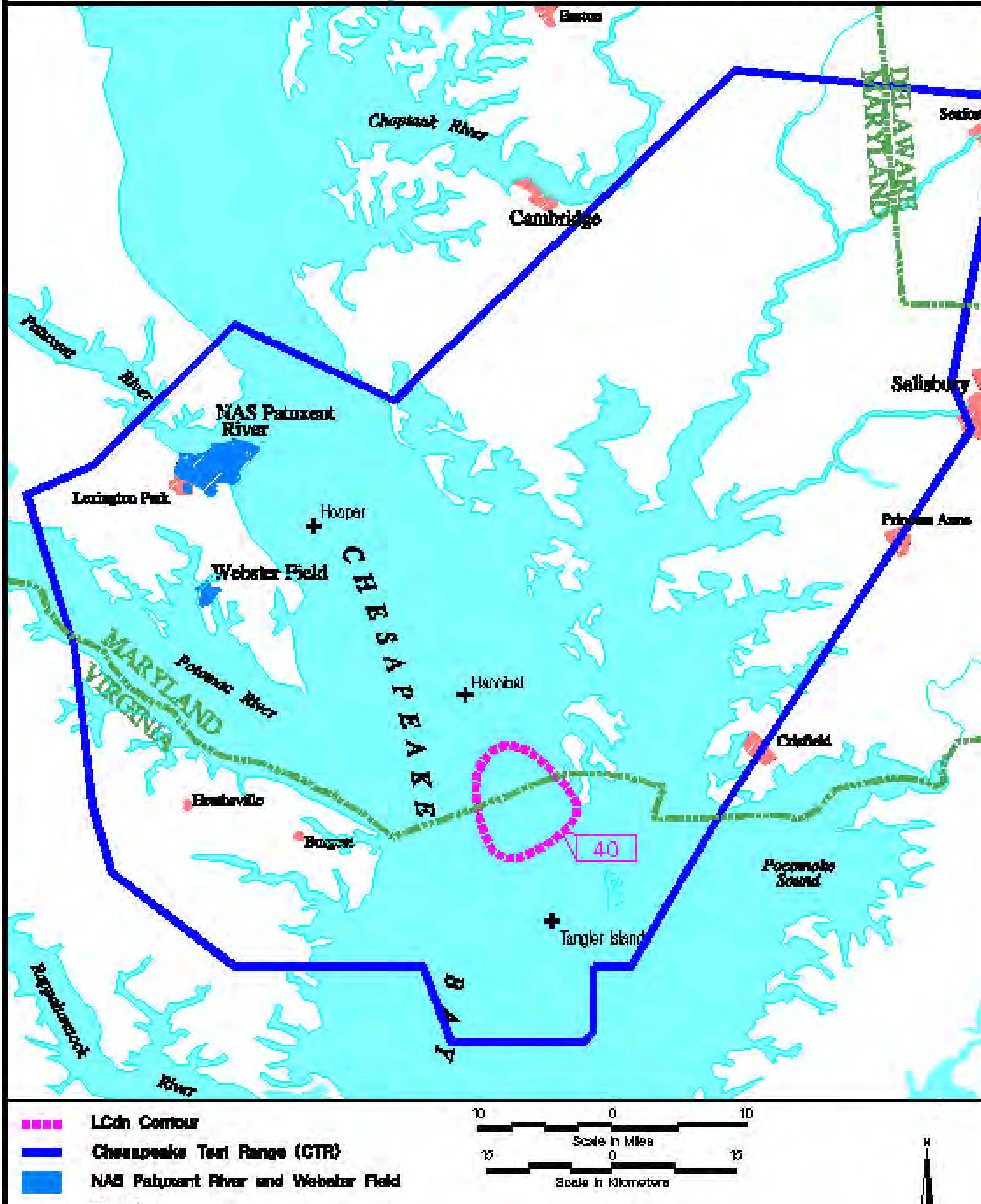


Figure 4.6-4

DNL Contours for No Action Operations at NAS Patuxent River

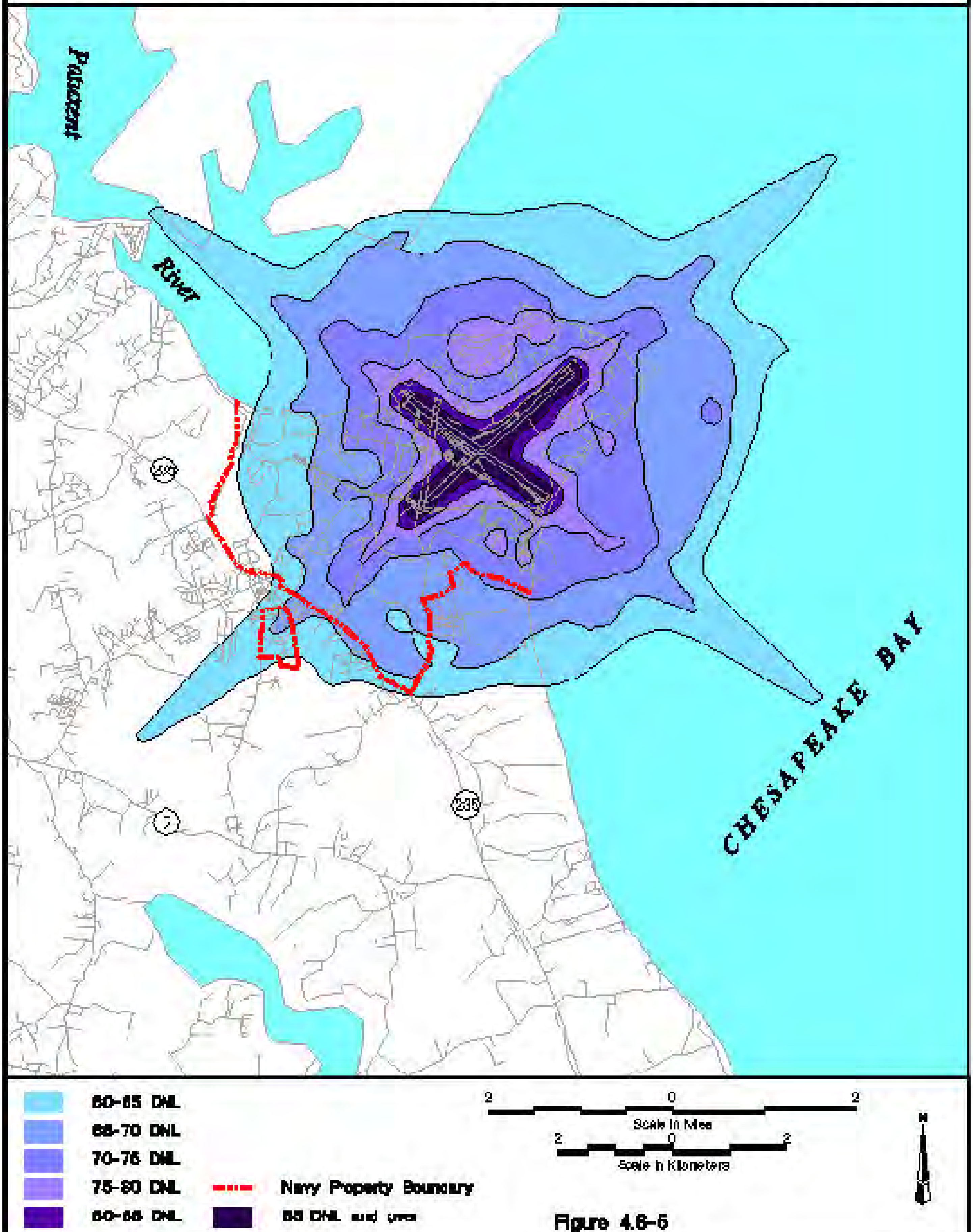


Figure 4.6-5

DNL Contours for No Action Operations at OLF Webster Field

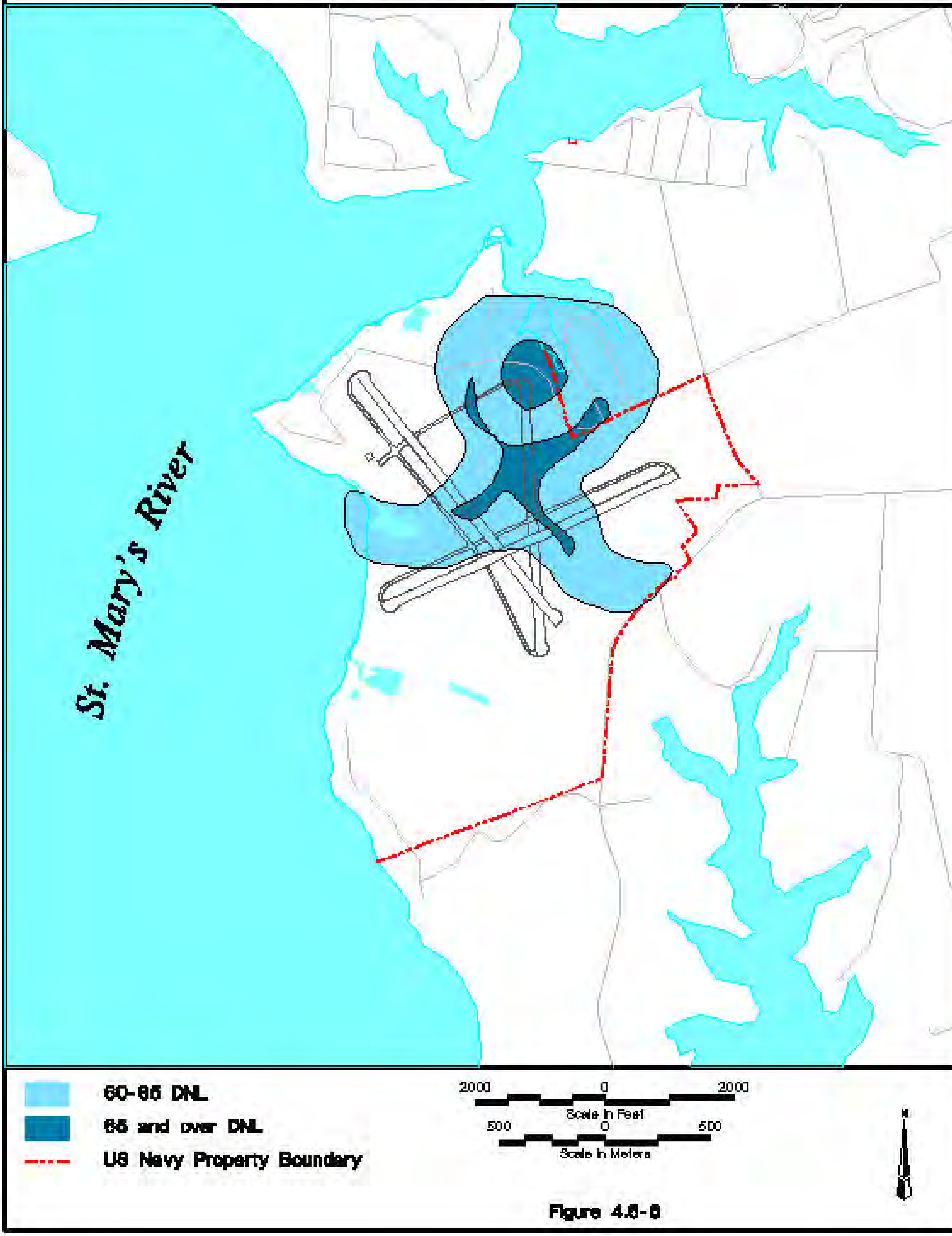


Figure 4.6-6

Table 4.6-3

No Action Noise Impact for NAS Patuxent River Airfield

DNL Contour Bands	Area		Estimated	
	Hectares	Acres	Dwellings	Population
60–65 dB	505	1,248	790	1,944
65–70 dB	261	646	312	791
70–75 dB	10	24	6	15
75–85+ dB	0	0	0	0
Total	776	1,918	1,108	2,750
Notes: Estimates based on 1990 US Census using population density methodology. Does not include on-base areas and bodies of water.				

Table 4.6-4

No Action Noise Impact for Webster Field

DNL Contour Bands	Area		Estimated	
	Hectares	Acres	Dwellings	Population
60–65 dB	19	47	2	6
65–70 dB	2	4	0	0
70–85+ dB	0	0	0	0
Total	21	51	2	6
Notes: Estimates based on 1990 US Census using population density methodology. Does not include on-base areas and bodies of water.				

- The estimated off-base population within the 60 dB contour would be 2,750 compared to 3,138 for existing (1996) conditions; and

- The 75+ dB DNL contour area does not extend over land areas beyond the NAS Patuxent River property line.

The noise impacts due to airfield operations at Webster Field (Table 4.6-4) would be as follows:

- The total area within the 60 dB DNL contour would be about 21 hectares (51 acres), the same as for existing (1996) conditions;

- The estimated off-base population within the 60 dB contour would be 6, the same as for existing (1996) conditions; and

- The 70+ dB DNL contour area (within the 65 dB DNL contour shown on Figure 4.6-6) would not extend beyond the Webster Field property line.

4.6.1.3 Noise Impact at Sensitive Receptor Locations (No Action Alternative)

Table 4.6-5 presents total DNLs for the locations that have been identified as representative sensitive receptors. Noise levels at all but six of these locations would be less than 45 dB DNL. Noise levels at the remaining locations would range from 45 to 64 dB DNL. All levels would be below the 65 dB DNL guideline used by the DoD and FAA as the measure for assessing noise impacts. Further, there would be no significant difference between existing noise levels and No Action noise levels at these locations as they differ by only one or two decibels. In fact, No Action total DNLs at some sites would be less than existing conditions because there would be fewer No Action airfield operations at NAS Patuxent River than identified for existing conditions. In addition, the noise exposure generated by range operations would have a negligible effect on noise contours associated with airfield operations.

Potential for Indoor Speech Interference (No Action Alternative)

Outdoor single-event L_{Amax} values due to airfield operations would range from less than 50 dB to 91 dB at the 20 sensitive receptor locations for which the potential for indoor speech interference was analyzed (Table 4.6-5). Four of the 20 representative locations (residential location 20 and education locations 6, 7, and 8) would have indoor windows-open Sentence Intelligibility of less than 100 percent. Furthermore, Location 8 (Great Mills High School) would have an indoor windows-closed Sentence Intelligibility of 96 percent. Sensitive receptor locations 21 (Lexington Park Elementary) and 22 (Carver Elementary) were added at a later date, thus, noise modeling to determine Sentence Intelligibility was not performed. However, since these locations are closer to

Table 4.6-5
No Action Noise Impact at Sensitive Receptor Locations

Receptor ID	Type	Name	Total Noise Exposure DNL (dB)[1]		% Sentence Intelligibility			Maximum % Awakenings		
			Existing (1996)	No Action	Average Outdoor Single Event Max A-Weighted Noise Level (dB)[2]	% for Windows Open	% for Windows Closed	Average Outdoor Nighttime Single Event Sound Exposure Level (dB)[3]	% for Windows Open	% for Windows Closed
1	Open Space	Blackwater National Wildlife Refuge	<45	<45	68	100	100	71	3	1
2		Point Lookout State Park	<45	<45	<50	100	100	<50	0	0
3		Westmoreland State Park	<45	<45	<50	100	100	n/a	0	0
4	Education	Chesapeake Bay Foundation	<45	<45	<50	100	100	n/a	0	0
5		Tangier Combined School	<45	<45	<50	100	100	<50	0	0
6		Tylerton School	<45	<45	73	99	100	81	5	2
7		Piney Point Elementary School	50	50	79	95	100	86	7	3
8		Great Mills High School	57	58	91	<10	96	94	9	5
9		Calvert Library	<45	<45	<50	100	100	n/a	0	0
21		Lexington Park Elementary[4]	57	57	--	--	--	--	--	--
22		Carver Elementary[4]	66	64	--	--	--	--	--	--
10	Civic	Fairfields Baptist Church	<45	<45	<50	100	100	n/a	0	0
11		Dorchester General Hospital	<45	<45	58	100	100	61	1	0
12		Glasgow Nursing Home	<45	<45	56	100	100	59	1	0
13	Other	Lewisetta Marina	<45	<45	52	100	100	55	0	0
14	Residential	Elliott Island, MD	<45	<45	56	100	100	62	1	0
15		Fishing Creek, MD	50	48	69	100	100	n/a	0	0
16		Lusby, MD	<45	<45	73	100	100	n/a	0	0
17		Westover, MD	45	45	<50	100	100	<50	0	0
18		St. Inigoes, MD	48	47	56	100	100	n/a	0	0
19		Heathsville, VA	<45	<45	<50	100	100	n/a	0	0
20		Solomons Island, MD	51	50	79	96	100	83	5	3

Notes:
1. Total noise exposure is based on airfield and airspace operations. Sentence intelligibility and percent awakenings based on airfield operations only.
2. Based on weighted (by the number of average daily daytime flights) average SEL of the top ten contributors to the total DNL.
3. Based on weighted (based on the number of average daily nighttime flights) average SEL of the top ten contributors to the total DNL.
4. These sensitive receptors (21 and 22) were added at a later date after noise study had been developed.

n/a = not applicable; no nighttime contributors. -- = no analysis done

the airfield than location 8, it is anticipated that Sentence Intelligibility would also be lower at these locations than at location 8.

Only three of the modeled airspaces of the CTR would experience any daytime events producing L_{Amax} above 82 dB (which corresponds to an indoor Sentence Intelligibility of 90 percent):

- For R-4007A (overlying the NAS Patuxent River airfield and Solomons Island, Maryland), on average, two daytime events every ten days would be above 82 dB, and for Hooper target, one daytime event every ten days, on average, would be above 82 dB. Affected by these events would be Locations 8 and 20 within R-4007A and Locations 1 and 2 in the vicinity of Hooper target. No events in R-4007A or Hooper target would be above 87 dB (indoor Sentence Intelligibility of 49 percent). The term "no events," as used in this context throughout this document actually corresponds to a frequency of less than five events every 100 days on average as the computer model does not deal with a frequency of zero events.

- Along VR 1711/1712 (overlying the Princess Anne/Deale Island, Maryland area), two daytime events every ten days, on average, would have an L_{Amax} of 82 dB or above and no daytime events would be above 95 dB (indoor Sentence Intelligibility of less than 10 percent). The affected locations would be 9 (Calvert Library) and 17 (residential in Westover, Maryland), which are closest to the centerline of these routes.

Potential for Indoor Sleep Disturbance (No Action Alternative)

Overall, 12 of the 20 modeled sensitive receptor locations were predicted to experience no awakenings due to proposed flights associated with the NAS Patuxent River airfield for the windows-open condition. While the other eight locations could experience windows-open awakenings due to airfield sources, sleep disturbance impacts would only be applicable to the two residential locations (Location 20 [Solomons, Maryland] and Location 14 [Elliott Island, Maryland]. In fact, location 20 could experience a maximum percent awakenings of 5 for the windows-open condition and a three maximum percent awakenings for the windows-closed condition. Sleep disturbance impacts would not be applicable to four of the other locations as they consist of one open space (Blackwater NWR) and three schools (which would not be occupied during the nighttime).

With respect to the two civic locations (hospital and nursing home), the FICAN methodology used to assess the potential for indoor sleep disturbance is geared toward the analysis of residential bedroom noise environments. The residential bedroom environment could significantly differ from the noise environments of hospitals and nursing homes. Since there is no methodology or criterion suitable to the specific analysis of hospitals and nursing homes, and since the assessment of a hospital and a nursing home was required, the residential bedroom methodology was applied and the noise level reductions of the hospital and nursing home structures were estimated to be same as a cold-climate residence (17 dB-27 dB).

During periods of busy monthly subsonic operations, none of the modeled airspaces of the CTR were predicted to experience nighttime events (frequency of less than five every 100 days on average) with SELs higher than 57 dB. This means that the maximum percent awakened on a regional basis would be less than one percent.

Regarding supersonic operations, the maximum overpressure of the nighttime supersonic events would be 1.7 pounds per square foot (psf). Less than one percent of the 247 proposed supersonic operations would occur during the nighttime period. Since nighttime sonic booms in the CTR would occur very infrequently and would be of low overpressures, their potential for sleep disturbance would be minimal at best. The potential for sleep disturbance caused by supersonic flight operations under the No Action Alternative would be the same as that under existing (1996) conditions.

4.6.2 Operational Workload I Alternative

A total of 20,700 annual flight hours were analyzed under the Operational Workload I Alternative. This total, as well as conditions for all flight operations within the Patuxent River Complex (airfield operations at both NAS Patuxent River and Webster Field, and flights conducted within the restricted areas of the CTR) were based on the NASMOD study as refined by Eagan, McAllister Associates, Inc. (January 1998).

4.6.2.1 Chesapeake Test Range and Localized Target Areas (Workload I Alternative)

The L_{dnmr} noise contours, 45 dB and greater, for all subsonic flight operations conducted in the CTR under Workload I Alternative conditions are shown in Figure 4.6-7 (L_{dnmr} Contours Within Affected Airspace Components for Alternative I). The overall noise levels produced by these flight operations would be highest in the vicinity of the target areas (primarily Hooper) and on the east side of the CTR where VR 1711/1712 enter the range boundary for the same reasons discussed under the No Action Alternative.

L_{Cdn} contours were plotted for all supersonic operations (Figure 4.6-8, L_{Cdn} Contours for Alternative I Supersonic Flight Operations). The single L_{Cdn} 40 dB contour shown (corresponding approximately to a DNL 42 dB contour) does not vary significantly from that shown under the No Action Alternative (122 sq km [47 sq mi] for the No Action Alternative versus 119 sq km [46 sq mi] for the Workload I Alternative) due to the small number of supersonic operations that would occur under the Workload I Alternative. The impact at ground level would be negligible, and even if these noise contours were located over a populated land area (which they are not), less than one percent of

Ldnmr Contours Within Affected Airspace Components for Alternative I

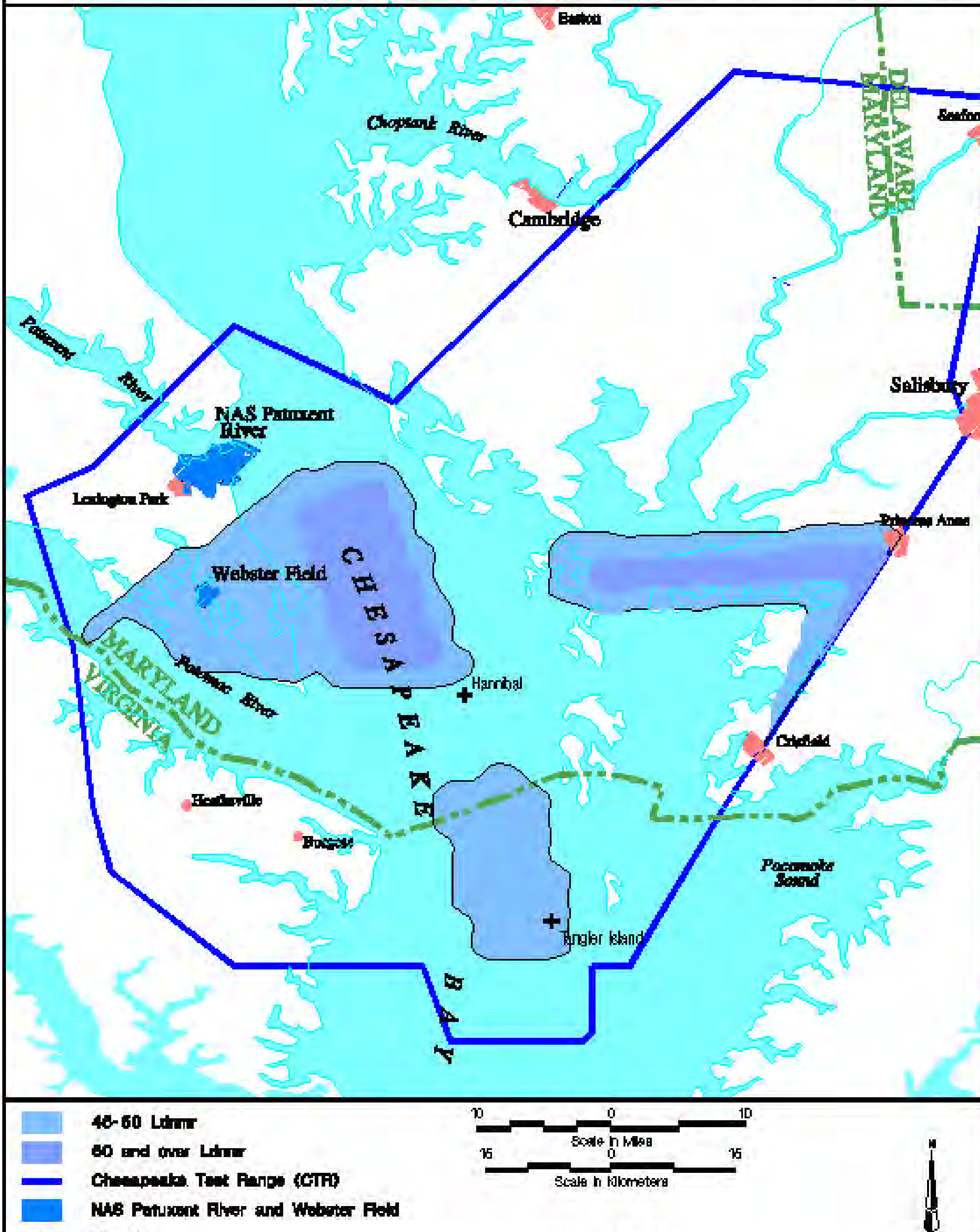


Figure 4.6-7

LCdn Contours for Alternative I Supersonic Flight Operations

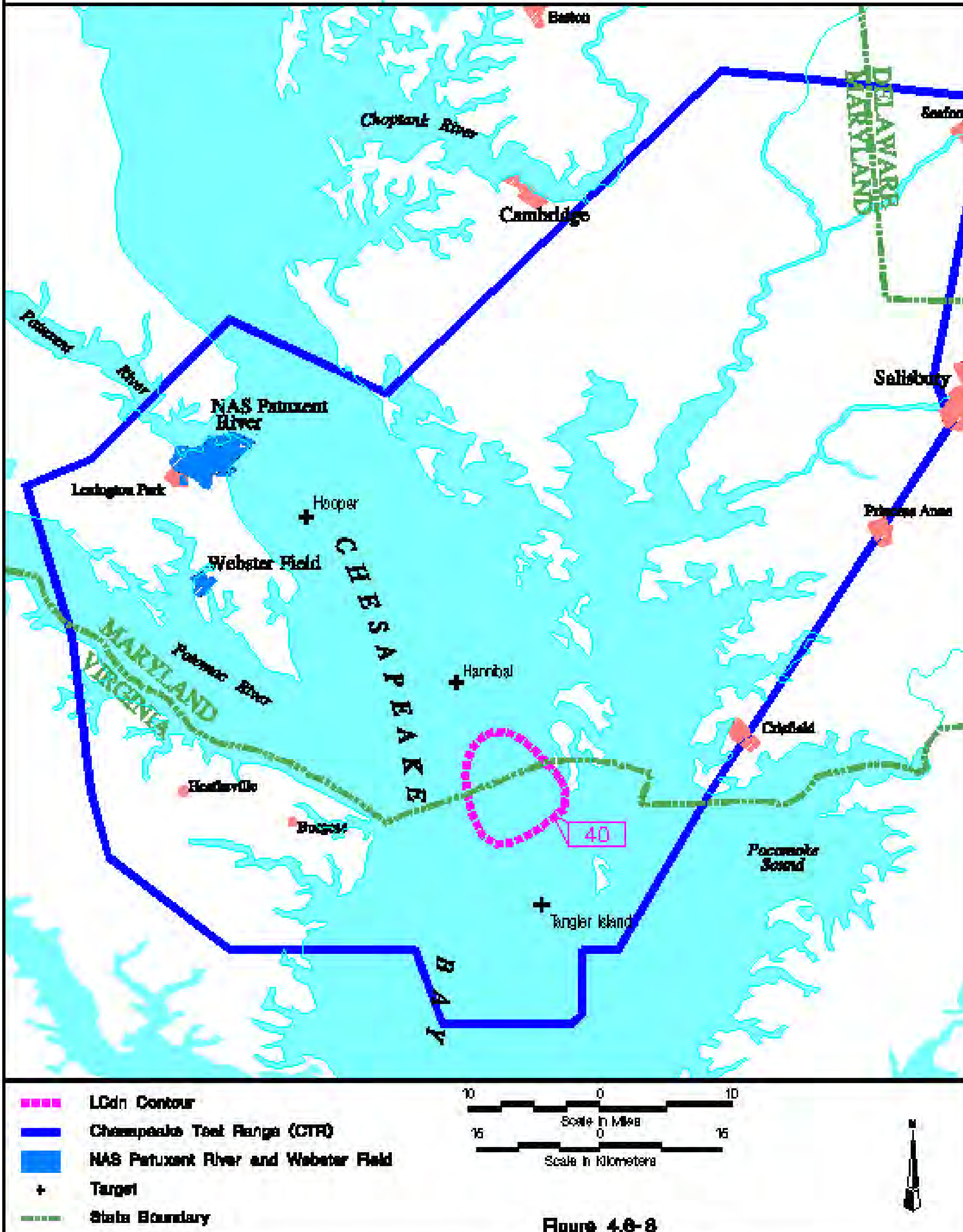


Figure 4.6-8

affected population would be expected to be highly annoyed. The same sound ducting practices described under the No Action Alternative would continue to be in effect under the Workload I Alternative to reduce potential ground impacts of RDT&E tests involving sonic booms.

4.6.2.2 NAS Patuxent River and OLF Webster Field (Workload I Alternative)

The 60 dB through 85 dB DNL average-day contours shown in Figures 4.6-9 (DNL Contours for Alternative I Operations at NAS Patuxent River) and 4.6-10 (DNL Contours for Alternative I Operations at OLF Webster Field) were based on the annual operations presented in Appendix C. Potential impacts due to airfield operations at NAS Patuxent River (Table 4.6-6), would be as follows:

- The total area within the 60 dB DNL contour would be 875 hectares (2,163 acres), compared to 776 hectares (1,918 acres) for the No Action Alternative (the difference between the Workload I Alternative and No Action contours can be seen by using the contour overlay);
- The estimated affected off-base population within the 60 dB contour would be 3,007, compared to 2,750 for the No Action Alternative; and
- The 75+ dB DNL contour area would not extend over land areas beyond the NAS Patuxent River property line.

The noise impacts due to airfield operations at Webster Field (Table 4.6-7) would be as follows:

- The total area within the 60 dB DNL contour would be about 21 hectares (51 acres), the same as for the No Action Alternative;
- The estimated affected off-base population would be six; and
- The 70+ dB DNL contour area would not extend beyond the Webster Field property line.

There would be no significant difference in area impacted between the No Action and Workload I Alternative contours for NAS Patuxent River and Webster Field. (Workload I and No Action Alternatives can be compared through use of the contour overlay.)

DNL Contours for Alternative I Operations at NAS Patuxent River

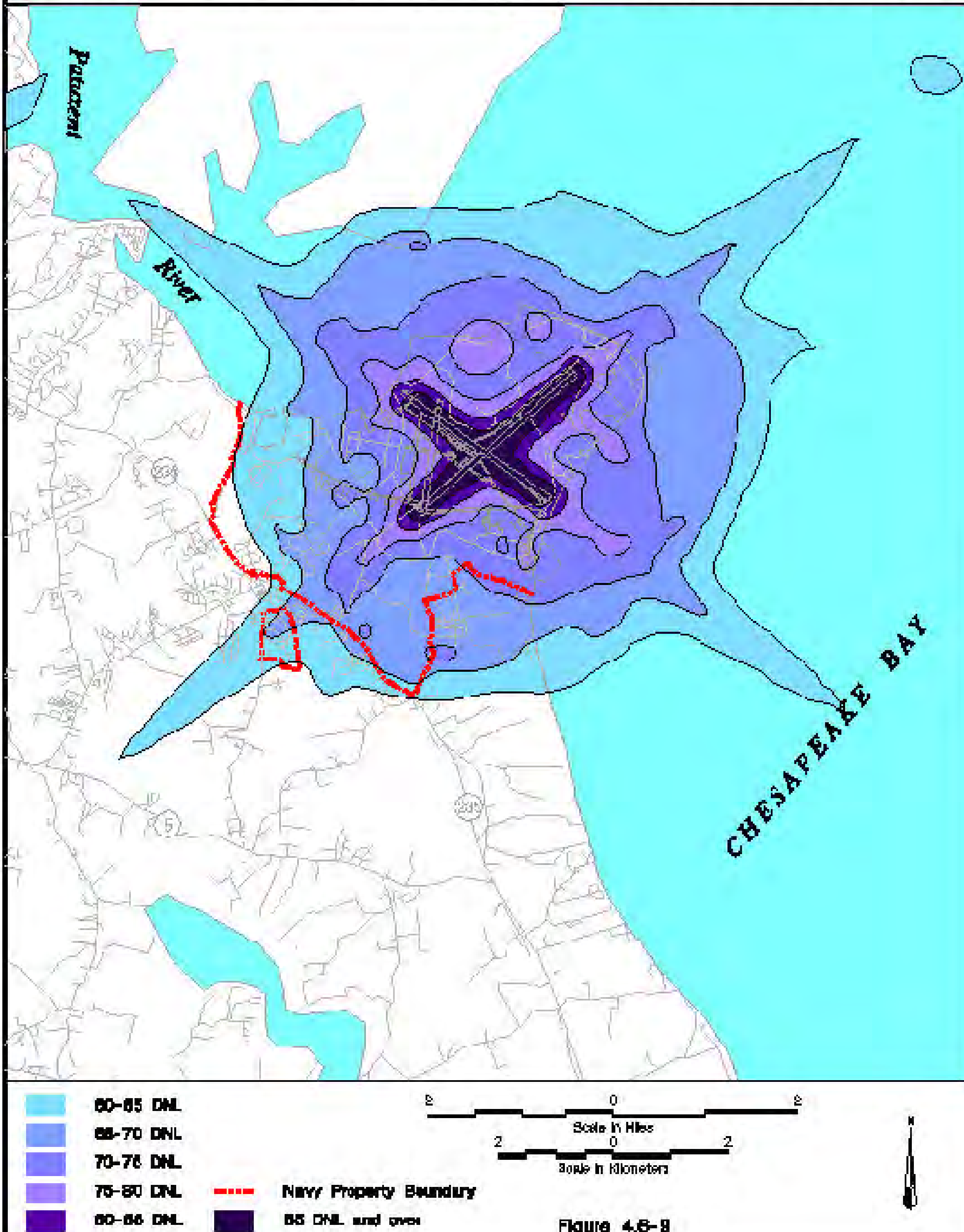


Figure 4.6-9

DNL Contours for Alternative I Operations at OLF Webster Field

Figure 4.6-10

Table 4.6-6

Workload I Alternative Noise Impacts for NAS Patuxent River Airfield

DNL Contour Bands	Area				Estimated			
	Hectares		Acres		Dwellings		Population	
	Workload I Alternative	No Action	Workload I Alternative	No Action	Workload I Alternative	No Action	Workload I Alternative	No Action
60–65 dB	565	505	1,397	1,248	840	790	2,046	1,944
65–70 dB	293	261	724	646	364	312	935	791
70–75 dB	17	10	42	24	11	6	26	15
75–85+ dB	0	0	0	0	0	0	0	0
Total	875	776	2,163	1,918	1,215	1,108	3,007	2,750

Notes: Estimates based on 1990 US Census using population density methodology.
Does not include on-base areas and bodies of water.

Table 4.6-7

Workload I Alternative Noise Impacts for Webster Field

DNL Contour Bands	Area				Estimated			
	Hectares		Acres		Dwellings		Population	
	Workload I Alternative	No Action	Workload I Alternative	No Action	Workload I Alternative	No Action	Workload I Alternative	No Action
60–65 dB	19	19	47	47	2	2	6	6
65–70 dB	2	2	4	4	0	0	0	0
70–85+ dB	0	0	0	0	0	0	0	0
Total	21	21	51	51	2	2	6	6

Notes: Estimates based on 1990 US Census using population density methodology.
Does not include on-base areas and bodies of water.

4.6.2.3 Noise Impact at Sensitive Receptor Locations (Workload I Alternative)

The total DNL noise levels at the 20 modeled sensitive receptor locations are presented in Table 4.6-8. Levels at these 12 locations would be between 45 and 64 dB DNL with noise levels at the remaining sites less than 45 dB DNL. All levels would be below the 65 dB DNL guideline used by DoD and the FAA as the measure for assessing noise impacts. As well, exterior noise levels at school locations would be within compatibility guidelines. Except for Locations 9 (Calvert Library) and 17 (residence in Westover), there would be no significant difference between No Action noise levels and Workload I Alternative noise levels since the levels differ by three decibels or less. However, at Locations 9 and 17 the differences would be four to five decibels, which would be noticeable.

Potential for Indoor Speech Interference (Workload I Alternative)

Outdoor single-event L_{Amax} values due to operations in the Patuxent River Complex would range from less than 50 dB to 90 dB at the 20 modeled sensitive receptor locations (Table 4.6-8). Five of the 20 modeled representative locations (Residential Locations 16 and 20 and Education Locations 6, 7, and 8) would have indoor windows-open sentence intelligibility of less than 100 percent (this situation would likely be similar for unmodeled Education Locations 21 and 22). Furthermore, Location 8 (Great Mills High School), with an indoor windows-closed sentence intelligibility of 97 percent, would have an indoor windows-closed sentence intelligibility of less than 100 percent.

With respect to speech interference impacts in the CTR's airspaces, there would be no events in R-4007A or at Hooper target that would exceed 92 dB (indoor sentence intelligibility of less than 10 percent), about 5 dB higher than would occur under no action conditions. Affected locations (8 and 20 within R-4007A and 1 and 2 in the vicinity of Hooper target) would be the same as described for the No Action Alternative. In addition, noise levels for operations along VR 1711/1712 under the Operational Workload I Alternative would increase by four decibels (to 99 dB) when compared to no action conditions.

Potential for Indoor Sleep Disturbance (Workload I Alternative)

The potential for indoor sleep disturbance under the Operational Workload I Alternative would be the same as described for the No Action Alternative for both subsonic and supersonic operations.
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4.6.3 Operational Workload II Alternative

A total of 22,600 annual flight hours were analyzed under the Operational Workload II Alternative. This total, which includes airfield operations at both NAS Patuxent River and Webster Field, as well as flights conducted within the restricted areas of the CTR, was based on the NASMOD study as refined by Eagan, McAllister Associates, Inc. (January 1998).

4.6.3.1 Chesapeake Test Range and Localized Target Areas (Workload II Alternative)

The L_{dnmr} noise contours (45 dB and greater) for all subsonic flight operations conducted in the CTR under Workload II Alternative conditions are presented in Figure 4.6-11 (L_{dnmr} Contours Within Affected Airspace Components for Alternative II). The overall noise levels produced by subsonic flight operations in the CTR would be greater than the No Action Alternative and similar to the Operational Workload I Alternative. The highest noise levels would be in the vicinity of Hooper target and on the east side of the Bay where VR 1711/1712 enter the CTR.

Similarly, Figure 4.6-12 (L_{Cdn} Contours for Alternative II Supersonic Flight Operations) shows a single L_{Cdn} 40 dB contour (corresponding approximately to a DNL 42 dB contour) that does not vary significantly from that shown under the No Action Alternative (again, due to the small number of supersonic operations projected under the Workload II Alternative). Total area covered by this contour under the Workload II Alternative would be about 156 sq km (60 sq mi) as compared with 119 sq km (46 sq mi) for the No Action Alternative. The same sound ducting practices described under the No Action Alternative would continue to be in effect under the Workload II Alternative to reduce potential ground impacts of RDT&E tests involving sonic booms.

4.6.3.2 NAS Patuxent River and OLF Webster Field (Workload II Alternative)

The 60 dB through 85 dB DNL average-day contours shown in Figures 4.6-13 (DNL Contours for Alternative II Operations at NAS Patuxent River) and 4.6-14 (DNL Contours for Alternative II Operations at OLF Webster Field) are based on the operations presented in Appendix C. The impacts in terms of area and estimated population due to airfield operations at NAS Patuxent River (Table 4.6-9) would be as follows:

- The total area within the 60 dB DNL contour would be about 949 hectares, (2,345 acres) compared to 776 hectares (1,918 acres) for the No Action Alternative (the difference between the Workload II Alternative and No Action Alternative contours can be seen by using the contour overlay);

- The estimated affected off-base population would be 3,219, compared to 2,750 for the No Action Alternative; and

- The 75+ dB DNL contour area would not extend to land areas beyond the NAS Patuxent River property line.

The noise impacts due to airfield operations at Webster Field (Table 4.6-9) would be as follows:

- The total area within the 60 dB DNL contour would be about 23 hectares (56 acres), compared to 21 hectares (51 acres) for the No Action Alternative (the difference

Ldnmr Contours Within Affected Airspace Components for Alternative II

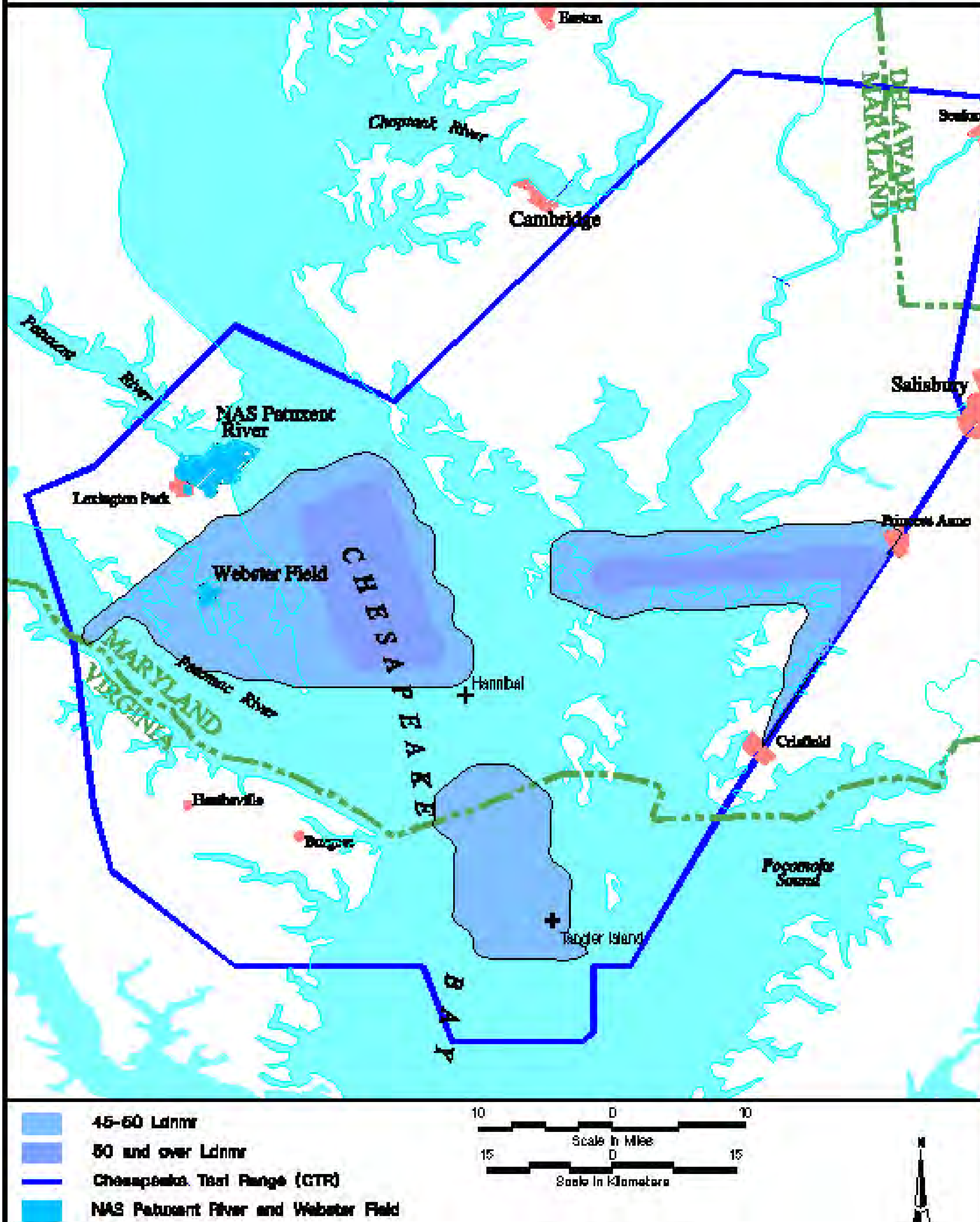

Figure 4.6-11

DNL Contours for Alternative II Operations at NAS Patuxent River

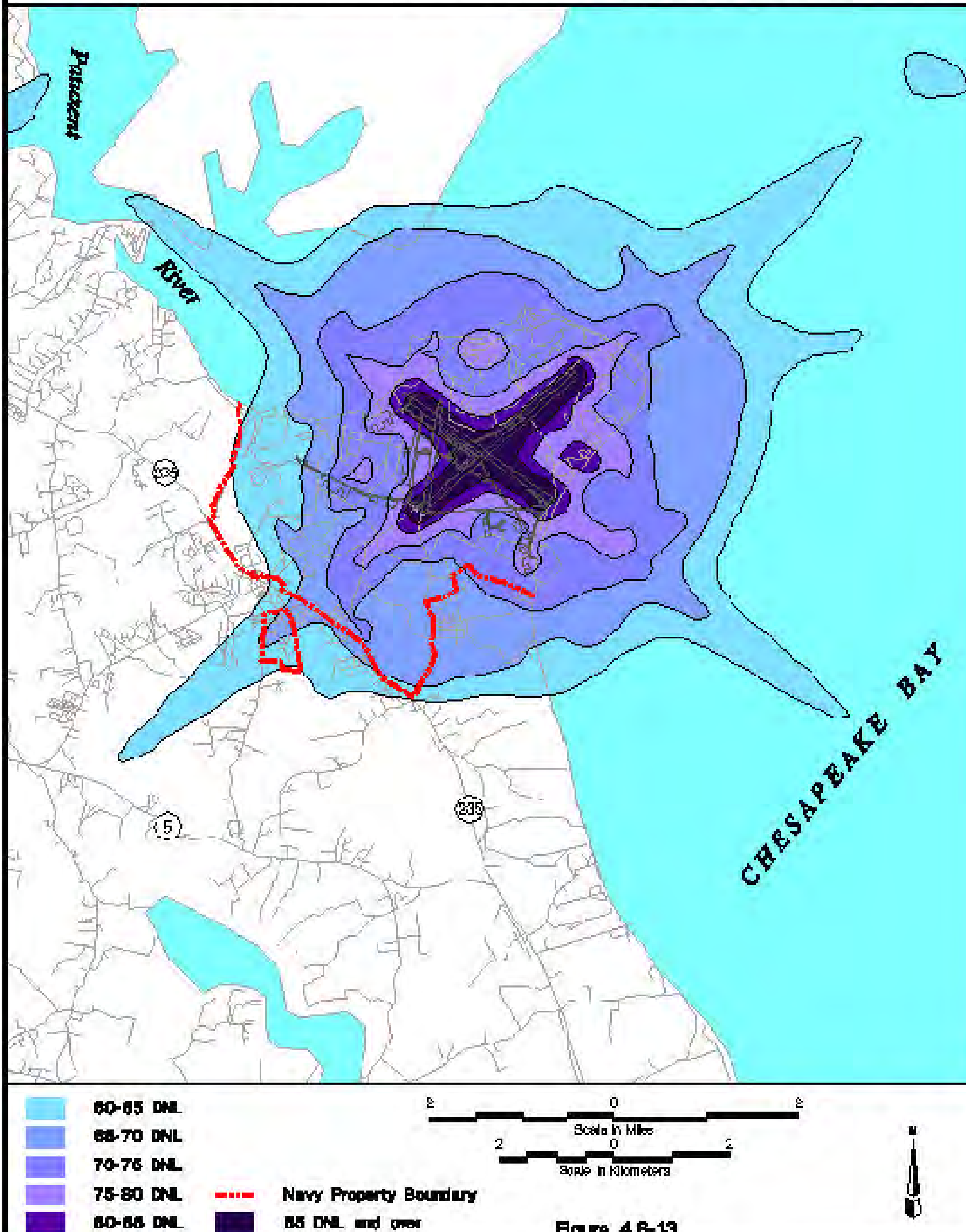

Figure 4.6-13

DNL Contours for Alternative II Operations at NAS Patuxent River

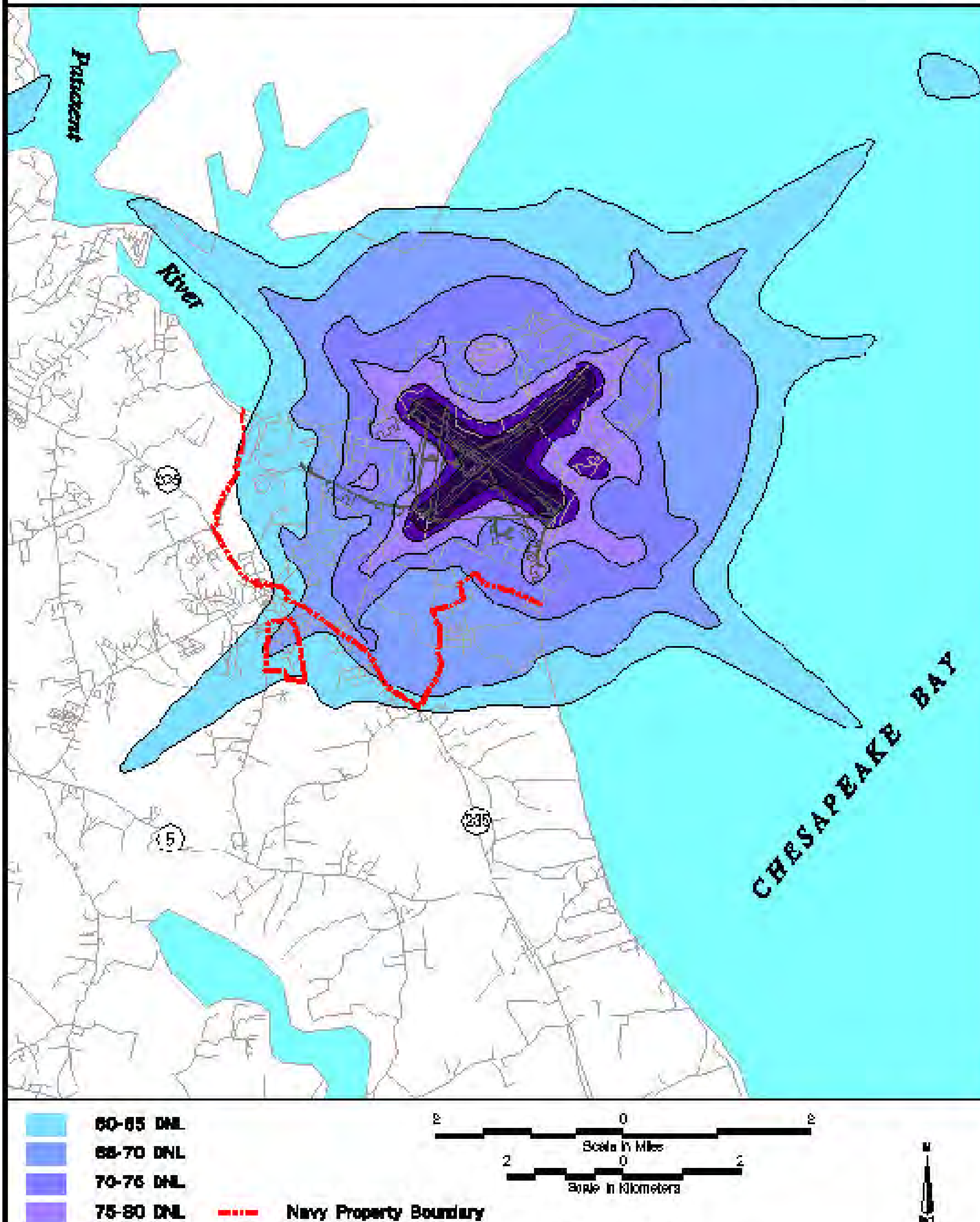

Figure 4.6-13

DNL Contours for Alternative II Operations at OLF Webster Field

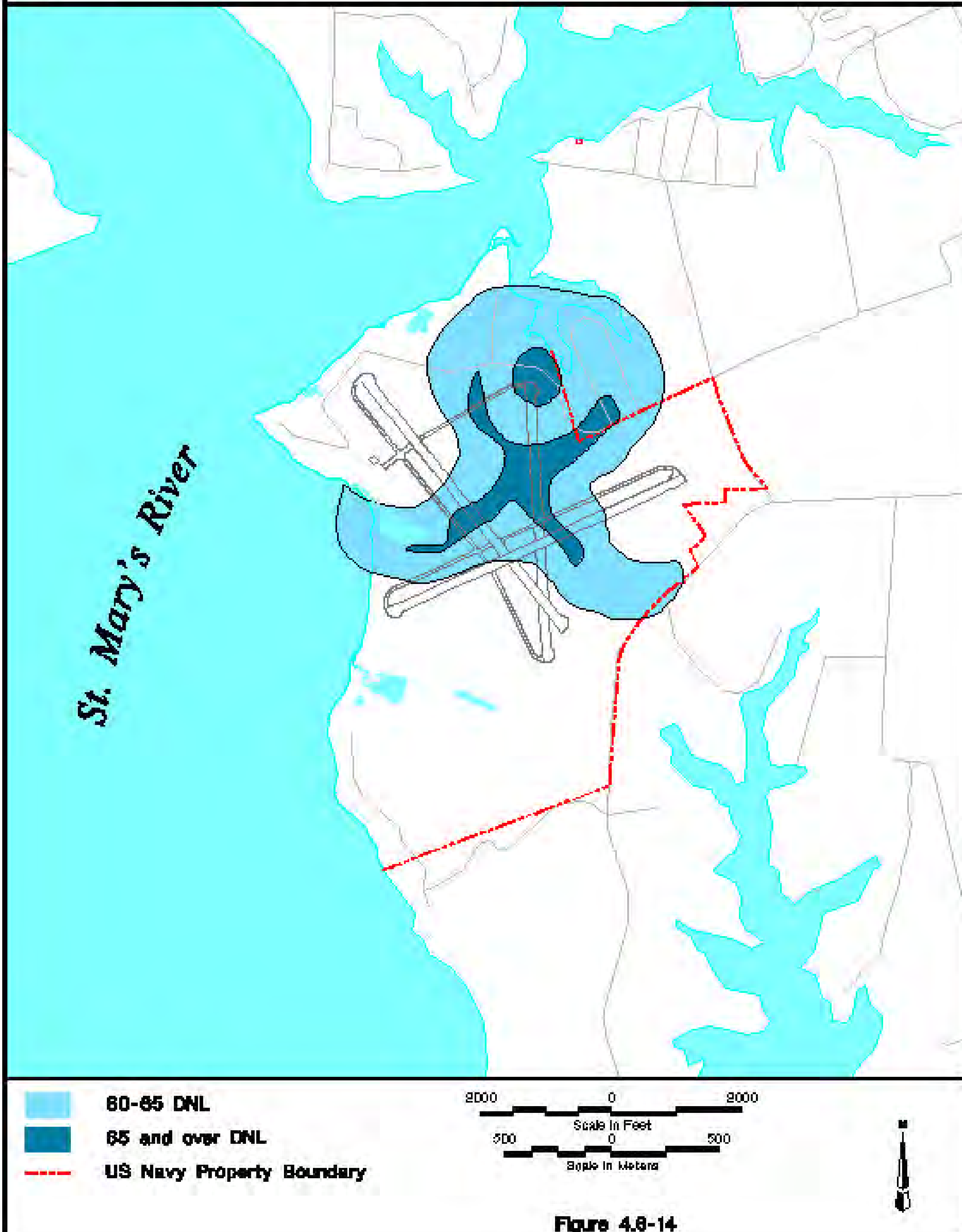

Figure 4.8-14

Table 4.6-9

Workload II Alternative Noise Impact for NAS Patuxent River Airfield

DNL Contour Bands	Area				Estimated			
	Hectares		Acres		Dwellings		Population	
	Workload II Alternative	No Action	Workload II Alternative	No Action	Workload II Alternative	No Action	Workload II Alternative	No Action
60–65 dB	596	505	1,472	1,248	892	790	2,115	1,944
65–70 dB	324	261	800	646	411	312	1,057	791
70–75 dB	30	10	73	24	19	6	47	15
75–85+ dB	0	0	0	0	0	0	0	0
Total	949	776	2,345	1,918	1,302	1,108	3,219	2,750

Notes: Estimates based on 1990 US Census using population density methodology.
Does not include on-base areas and bodies of water.

Table 4.6-10

Workload II Alternative Noise Impact for Webster Field

DNL Contour Bands	Area				Estimated			
	Hectares		Acres		Dwellings		Population	
	Workload II Alternative	No Action	Workload II Alternative	No Action	Workload II Alternative	No Action	Workload II Alternative	No Action
60–65 dB	20	19	50	47	3	2	5	6
65–70 dB	2	2	6	4	0	0	1	0
70–85+ dB	0	0	0	0	0	0	0	0
Total	23	21	56	51	3	2	6	6

Notes: Estimates based on 1990 US Census using population density methodology.
Does not include on-base areas and bodies of water.

between the Workload II Alternative and No Action Alternative contours can be seen by using the contour overlay);

- The estimated affected off-base population would be six, the same as for the No Action Alternative; and

- The 70+ dB DNL contour area would not extend beyond the Webster Field property line.

4.6.3.3 Noise Impacts at Sensitive Receptor Locations (Workload II Alternative)

The total DNL noise levels at the 20 modeled sensitive receptor locations are shown in Table 4.6-11. Generally, although noise levels would be somewhat higher than the No Action Alternative at several of the receptor locations, these increases would be less than three decibels and not be perceptible. However, differences at Locations 9 and 17 would be four to five decibels, which would be noticeable. Exterior noise levels at school locations would be within compatibility guidelines.

Potential for Indoor Speech Interference (Workload II Alternative)

Due to airfield operations, outdoor single-event L_{Amax} values would range from less than 50 dB to 90 dB at the 20 modeled sensitive receptor locations (Table 4.6-11). Five of the representative locations (Residential Locations 16 and 20 and Education Locations 6, 7, and 8), would have indoor windows-open sentence intelligibility of less than 100 percent (this situation would also be similar for Education Locations 21 and 22). Furthermore, only Location 8 (Great Mills High School), with an indoor windows-closed sentence intelligibility of 97 percent, would have an indoor windows-closed sentence intelligibility of less than 100 percent. Speech interference impacts in the CTR’s airspaces would be similar to those described for the Operational Workload I Alternative.

Potential for Indoor Sleep Disturbance (Workload II Alternative)

The potential for indoor sleep disturbance under the Operational Workload II Alternative would be similar to that described for the Workload I Alternative for both subsonic and supersonic operations.

4.6.4 Operational Workload III Alternative

A total of 24,400 annual flight hours were analyzed under Workload III Alternative conditions. All flight operations within the Patuxent River Complex, including airfield operations at both NAS Patuxent River and Webster Field, as well as flights conducted within the CTR’s restricted areas were based on the NASMOD study as refined by Eagan, McAllister Associates Inc. (January 1998).

Table 4.6-11
Workload II Alternative Noise Impact at Sensitive Receptor Locations

Receptor ID	Type	Name	Total Noise Exposure DNL (dB)[1]		% Sentence Intelligibility			Maximum % Awakenings		
			Workload II Alternative	No Action	Average Outdoor Single Event Max A-Weighted Noise Level (dB)[2]	% for Windows Open	% for Windows Closed	Average Outdoor Nighttime Single Event Sound Exposure Level (dB)[3]	% for Windows Open	% for Windows Closed
1	Open Space	Blackwater National Wildlife Refuge	<45	<45	67	100	100	71	3	1
2		Point Lookout State Park	45	<45	<50	100	100	<50	0	0
3		Westmoreland State Park	<45	<45	<50	100	100	n/a	0	0
4	Education	Chesapeake Bay Foundation	45	<45	<50	100	100	n/a	0	0
5		Tangier Combined School	<45	<45	<50	100	100	<50	0	0
6		Tylerton School	45	<45	73	99	100	81	5	2
7		Piney Point Elementary School	51	50	79	95	100	86	7	3
8		Great Mills High School	58	58	98	<10	97	94	9	5
9		Calvert Library	48	<45	<50	100	100	n/a	0	0
21		Lexington Park Elementary[4]	58	57	--	--	--	--	--	--
22		Carver Elementary[4]	64	64	--	--	--	--	--	--
10	Civic	Fairfields Baptist Church	<45	<45	<50	100	100	n/a	0	0
11		Dorchester General Hospital	<45	<45	57	100	100	61	1	0
12		Glasgow Nursing Home	<45	<45	55	100	100	59	1	0
13	Other	Lewisetta Marina	<45	<45	52	100	100	55	0	0
14	Residential	Elliott Island, MD	<45	<45	56	100	100	62	1	0
15		Fishing Creek, MD	50	48	71	100	100	n/a	0	0
16		Lusby, MD	<45	<45	75	99	100	n/a	0	0
17		Westover, MD	50	45	<50	100	100	<50	0	0
18		St. Inigoes, MD	48	47	55	100	100	n/a	0	0
19		Heathsville, VA	<45	<45	<50	100	100	n/a	0	0
20		Solomons Island, MD	51	50	79	96	100	83	5	3

Notes:
1. Total noise exposure is based on airfield and airspace operations. Sentence intelligibility and percent awakenings based on airfield operations only.
2. Based on weighted (by the number of average daily daytime flights) average SEL of the top ten contributors to the total DNL.
3. Based on weighted (based on the number of average daily nighttime flights) average SEL of the top ten contributors to the total DNL.
4. These sensitive receptors (21 and 22) were added at a later date after noise study had been developed.

n/a = not applicable; no nighttime contributors. -- = no analysis done

4.6.4.1 Chesapeake Test Range and Localized Target Areas (Workload III Alternative)

The L_{dnmr} noise contours for all subsonic flight operations conducted in the CTR under Workload III Alternative conditions are presented in Figure 4.6-15 (L_{dnmr} Contours Within Affected Airspace Components for Alternative III). The overall noise levels produced by subsonic flight operations in the CTR would be the same as described for both the No Action and Operational Workload Alternatives I and II. The highest noise levels would be in the vicinity of Hooper target and on the east side of the Bay where VR 1711/1712 enter the CTR.

Similarly, Figure 4.6-16 (L_{Cdn} Contours for Alternative III Supersonic Flight Operations) shows a single L_{Cdn} 40 B contour (corresponding approximately to a DNL 42 dB contour). The area covered by this contour (190 sq km [73 sq mi]) would be somewhat larger than for the No Action Alternative (119 sq km [46 sq mi]) and covers a small portion of southwestern Smith Island. The same sound ducting practices described under the No Action Alternative would continue to be in effect under the Workload III Alternative to reduce potential ground impacts of RDT&E tests involving sonic booms.

4.6.4.2 NAS Patuxent River and OLF Webster Field (Workload III Alternative)

The 60 dB through 85 dB DNL average-day contours shown in Figures 4.6-17 (DNL Contours for Alternative III Operations at NAS Patuxent River) and 4.6-18 (DNL Contours for Alternative III Operations at OLF Webster Field) were based on the annual flight operations presented in Appendix C. The impacts due to airfield operations at NAS Patuxent River (Table 4.6-12) would be as follows:

- The total area within the 60 dB DNL contour would be about 1,023 hectares (2,527 acres), compared to 776 hectares (1,918 acres) for the No Action Alternative (the difference between the Workload III Alternative and No Action contours can be seen by using the contour overlay);
- The estimated affected off-base population within the 60 DNL contour would be 3,439, compared to 2,750 for the No Action Alternative; and
- The 75+ dB DNL contour area would not extend to land areas beyond the NAS Patuxent River property line.

The noise impacts due to airfield operations at Webster Field (Table 4.6-13) would be as follows:

- The total area within the 60 dB DNL contour would be about 25 hectares (61 acres), compared to 21 hectares (51 acres) for the No Action Alternative (Workload III

Ldnmr Contours Within Affected Airspace Components for Alternative III

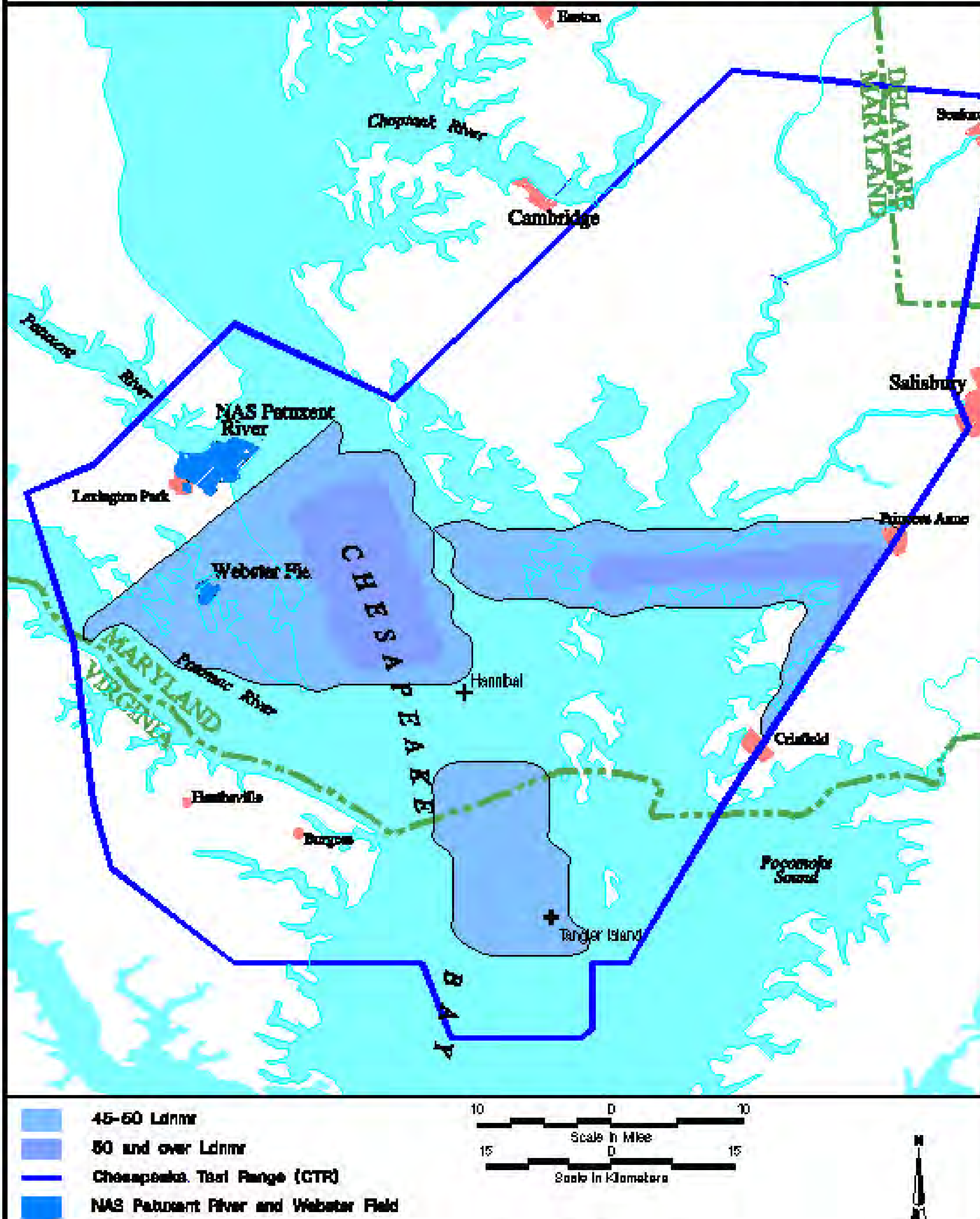

Figure 4.6-15

LCdn Contours for Alternative III Supersonic Flight Operations

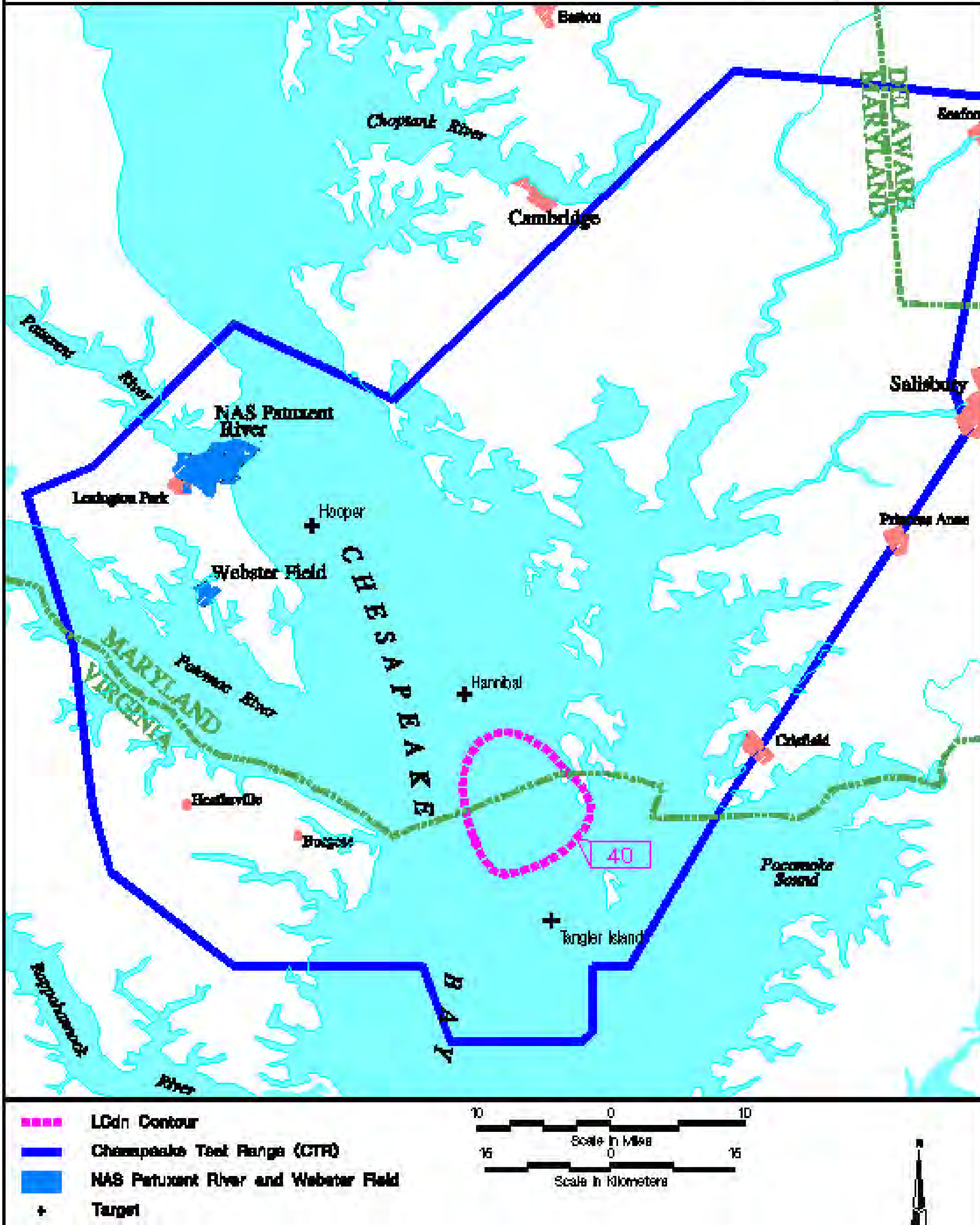

Figure 4.8-16

DNL Contours for Alternative III Operations at NAS Patuxent River

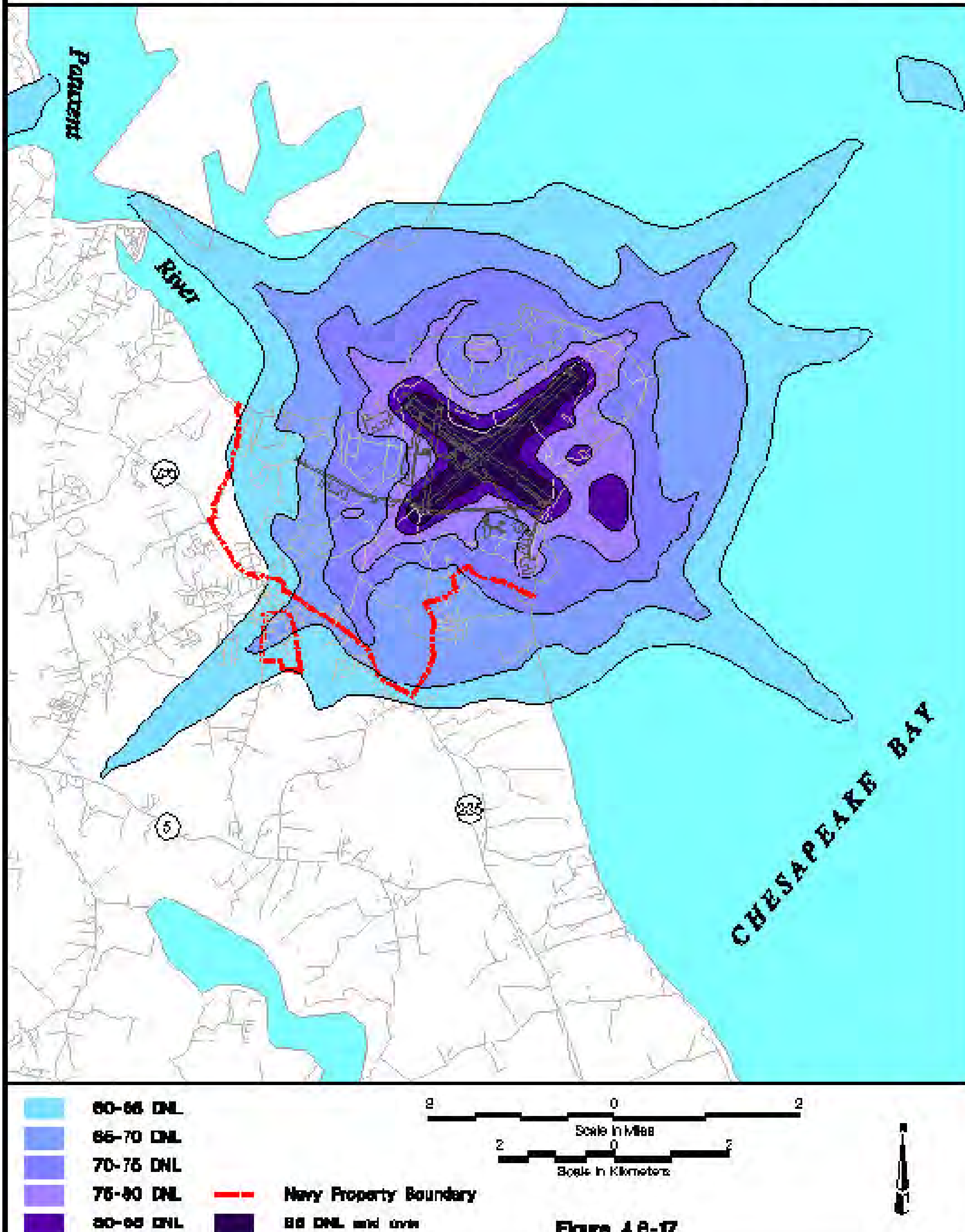

Figure 4.6-17

DNL Contours for Alternative III Operations at OLF Webster Field

Figure 4.6-16

Table 4.6-12

Workload III Alternative Noise Impact for NAS Patuxent River Airfield

DNL Contour Bands	Area				Estimated			
	Hectares		Acres		Dwellings		Population	
	Workload III Alternative	No Action	Workload III Alternative	No Action	Workload III Alternative	No Action	Workload III Alternative	No Action
60–65 dB	641	505	1,585	1,248	924	790	2,234	1,944
65–70 dB	346	261	854	646	448	312	1,149	791
70–75 dB	36	10	88	24	23	6	56	15
75–85+ dB	0	0	0	0	0	0	0	0
Total	1,023	776	2,527	1,918	1,395	1,108	3,439	2,750

Notes: Estimates based on 1990 US Census using population density methodology.
Does not include on-base areas and bodies of water.

Table 4.6-13

Workload III Alternative Noise Impact for Webster Field

DNL Contour Bands	Area				Estimated			
	Hectares		Acres		Dwellings		Population	
	Workload III Alternative	No Action	Workload III Alternative	No Action	Workload III Alternative	No Action	Workload III Alternative	No Action
60–65 dB	21	19	53	47	3	2	6	6
65–70 dB	3	2	8	4	0	0	0	0
70–85+ dB	0	0	0	0	0	0	0	0
Total	25	21	61	51	3	2	6	6

Notes: Estimates based on 1990 US Census using population density methodology.
Does not include on-base areas and bodies of water.

Alternative and No Action contours can be compared through use of the contour overlay);

- The estimated affected off-base population would be six, the same as for the No Action Alternative; and

- The 70+ dB DNL contour area does not extend beyond the Webster Field property line.

4.6.4.3 Noise Impacts at Sensitive Receptor Locations (Workload III Alternative)

Table 4.6-14 presents the total DNL noise levels at the 20 modeled sensitive receptor locations. Generally, although noise levels would be somewhat higher than the No Action Alternative at several of the receptor locations, these increases would be less than three decibels and not be perceptible. At two locations (9 and 17), the differences would be four to five decibels, which would be noticeable. Exterior noise levels at school locations would be within compatibility guidelines.

Potential for Indoor Speech Interference (Workload III Alternative)

Due to airfield operations, outdoor single-event L_{Amax} values would range from less than 50 dB to 90 dB at the 20 modeled sensitive receptor locations (Table 4.6-14). Five of these locations (Residential Locations 16 and 20 and Education Locations 6, 7, and 8), would have indoor windows-open sentence intelligibility of less than 100 percent (this situation would also be similar for education Locations 21 and 22). Furthermore, Location 8 (Great Mills High School), with an indoor windows-closed sentence intelligibility of 97 percent, would have an indoor windows-closed sentence intelligibility of less than 100 percent. Average outdoor single event L_{Amax} values for Location 16 (Lusby, Maryland) for Workload III Alternative would decrease relative to those for Workload Alternatives I and II due to changes in aircraft mix and operations.

Potential for Indoor Sleep Disturbance (Workload III Alternative)

The potential for indoor sleep disturbance under the Operational Workload III Alternative would be somewhat greater (windows-open awakenings no more than 11 percent due to airfield sources or residences near Great Mills High School) than predicted for the No Action Alternative.

Table 4.6-14
Workload III Alternative Noise Impact at Sensitive Receptor Locations

Receptor ID	Type	Name	Total Noise Exposure DNL (dB)[1]		% Sentence Intelligibility			Maximum % Awakenings		
					Average Outdoor Single Event Max A-Weighted Noise Level (dB)[2]	% for Windows		Average Outdoor Nighttime Single Event Sound Exposure Level (dB)[3]	% for Windows	
			Workload III Alternative	No Action		Open	Closed		Open	Closed
1	Open Space	Blackwater National Wildlife Refuge	<45	<45	67	100	100	71	3	1
2		Point Lookout State Park	45	<45	<50	100	100	<50	0	0
3		Westmoreland State Park	<45	<45	,50	100	100	n/a	0	0
4	Education	Chesapeake Bay Foundation	45	<45	<50	100	100	n/a	0	0
5		Tangier Combined School	<45	<45	<50	100	100	<50	0	0
6		Tylerton School	45	<45	73	99	100	81	5	2
7		Piney Point Elementary School	51	50	79	95	100	86	7	3
8		Great Mills High School	59	58	90	<10	97	98	11	6
9		Calvert Library	48	<45	<50	100	100	<50	0	0
21		Lexington Park Elementary[4]	58	57	--	--	--	--	--	--
22		Carver Elementary[4]	65	64	--	--	--	--	--	--
10	Civic	Fairfields Baptist Church	<45	<45	<50	100	100	n/a	0	0
11		Dorchester General Hospital	<45	<45	57	100	100	61	1	0
12		Glasgow Nursing Home	<45	<45	55	100	100	59	1	0
13	Other	Lewisetta Marina	<45	<45	50	100	100	55	0	0
14	Residential	Elliott Island, MD	<45	<45	56	100	100	61	1	0
15		Fishing Creek, MD	50	48	70	100	100	n/a	0	0
16		Lusby, MD	<45	<45	73	100	100	n/a	0	0
17		Westover, MD	50	45	<50	100	100	<50	0	0
18		St. Inigoes, MD	49	47	55	100	100	n/a	0	0
19		Heathsville, VA	<45	<45	<50	100	100	n/a	0	0
20		Solomons Island, MD	52	50	79	96	100	83	5	3

Notes:
1. Total noise exposure is based on airfield and airspace operations. Sentence intelligibility and percent awakenings based on airfield operations only.
2. Based on weighted (by the number of average daily daytime flights) average SEL of the top ten contributors to the total DNL.
3. Based on weighted (based on the number of average daily nighttime flights) average SEL of the top ten contributors to the total DNL.
4. These sensitive receptors (21 and 22) were added at a later date after noise study had been developed.

n/a = not applicable; no nighttime contributors. -- = no analysis done.

4.7 Infrastructure

This subchapter presents impacts of the proposed action on infrastructure. Increased demand for electrical power, natural gas, water, and sewer would occur at NAS Patuxent River and Webster Field. However, increased operations in the CTR and at the localized target areas would not create a demand for these utilities. Consequently, the focus of this subchapter is on NAS Patuxent River and Webster Field.

4.7.1 No Action Alternative

Under the No Action Alternative, existing employment levels and ground-based operations would remain the same as described for existing (1996) conditions in Chapter 3. Therefore, utility consumption under the No Action Alternative would be the same as described in Subchapter 3.7 and as shown in Table 4.7-1.

4.7.2 Operational Workload Alternatives I, II, and III

Projected utility demand for each of the three Operational Workload Alternatives is shown in Table 4.7-1. These utility demands account for:

- Non-flight and laboratory testing increases for Operational Workload Alternatives II and III (non-flight and laboratory testing under the Operational Workload I Alternative would remain the same as the No Action Alternative); and

- Increases in basekeeping functions to accommodate utility requirements associated with joint task force exercises (JTFEX) or US Army Airborne training exercises. The former would likely require no significant utility consumption. However, the US Army Airborne exercises would involve up to 400 military personnel for two to three training events per year, each lasting approximately ten days. These personnel would bivouac in a hangar at NAS Patuxent River.

The existing utility network would be sufficient to accommodate the projected increased demand for utility use (electrical power, heating oil, natural gas, and potable water). In addition, METCOM's Pine Hill Run Sewage Treatment Plant and the Navy's NOTW at Webster Field have sufficient capacity to treat increased sewage flows. Further, the additional solid waste that would be generated at the air station and Webster Field (less than a three percent increase under the most intense alternative -- Workload Alternative III) would not be significant enough to adversely impact the Navy's goals at the complex to reduce solid waste disposal by 60 percent (over the 1994 rate) by 2000.

Table 4.7-1

Comparison of Annual Utility Demands by Alternative

Utility	No Action Alternative	Operational Workload Alternative		
		I	II	III
Electrical Power	165,000 MWh/yr	165,320 MWh/yr	181,900 MWh/yr	198,400 MWh/yr
Heating Oil	6.7 million liters/yr (1.76 million gal/yr)	6.7 million liters/yr (1.76 million gal/yr)	7.2 million liters/yr (1.9 million gal/yr)	8.0 million liters/yr (2.1 million gal/yr)
Natural Gas	10.76 million cu m (379.7 million cu ft)	10.76 million cu m/yr (379.7 million cu ft/yr)	11.84 million cu m (417.7 million cu ft)	12.91 million cu m (456 million cu ft/yr)
Potable Water	3 million liters/day (800,000 gal/day)	3.04 million liters/yr (806,000 gal/day)	3.1 million liters/yr (818,000 gal/day)	3.2 million liters/day (830,000 gal/day)
Sanitary Sewage	2.5-3 million liter/day (0.65 to 0.8 million gal/day)	2.5 to 3.04 million liters/yr (0.66 to 0.8 million gal/day)	2.5 to 3.1 million liters/yr (0.67 to 0.82 million gal/day)	2.6 to 3.2 million liters/day (0.68 to 0.83 million gal/day)
Solid Waste	6,022 metric tons/year (6,640 tons/year)	6,050 metric tons/yr (6,670 tons/yr)	6,154 metric tons/yr (6,785 tons/yr)	6,215 metric tons/yr (6,852 tons/yr)

Notes:

Assumptions for Alternative I: Increases in demand for electrical power, potable water, and sanitary sewage and increase in generation of solid waste related to US Army Airborne exercises. No increase in laboratory or other non-flight activities.

Assumptions for Alternative II: Ten percent increase in demand for all utilities (except solid waste generation) plus increased demand by US Army Airborne exercises. Solid waste generation rates projected to remain constant.

Assumptions for Alternative III: Twenty percent increase in demand for all utilities (except solid waste generation) plus increased demand by US Army Airborne exercises. Solid waste generation rates projected to remain constant.

4.8 Cultural Resources

Section 106 of the National Historic Preservation Act of 1966 states that federal agencies must take into account the effects of their actions on any district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places. The regulations for Section 106, as stated in 36 CFR 800, *Protection of Historic Properties*, provide specific criteria for evaluating the effects of federal actions and assessing adverse effects on historic resources. In accordance with the regulations, federal agencies, with guidance from the Advisory Council on Historic Preservation and the State Historic Preservation Officer (SHPO), must also actively seek methods to either reduce or avoid adverse effects from the proposed undertakings.

The significant features or distinguishing elements of a historic resource, combined with the design and anticipated results of the proposed action, are examined in order to determine any potential effects. Such effects on cultural resources included in or eligible for inclusion in the National Register are further evaluated with regard to the Advisory Council's *Criteria of Effect and Adverse Effect* (36 CFR 800.9). This regulation states that "an undertaking has an effect on a historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the National Register. For the purpose of determining effect, alteration to features of the property's location, setting, or use may be relevant depending on a property's significant characteristics and should be considered" (36 CFR 800.9[a]). Likewise, an adverse effect on a historic resource "may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association." Examples include, though are not limited to:

- Physical destruction, damage, or alteration of all or part of the property;
- Isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the National Register;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
- Neglect of a property resulting in its deterioration or destruction; and
- Transfer, lease, or sale of the property (36 CFR 800.9[b]).

Thus, in summary, when applying the *Criteria of Effect and Adverse Effect* to historic properties, there are three possible outcomes:

- **No Effect** - no effect of any kind, either harmful or beneficial;

- C **No Adverse Effect -** the effect is not harmful enough to disqualify the resource from inclusion in the National Register; or

- C **Adverse Effect** - the effect is harmful enough to lessen the resource's integrity and its ability to qualify for inclusion in the National Register.

4.8.1 No Action Alternative

4.8.1.1 Chesapeake Test Range

Aircraft overflights (and associated noise) would be the only potential source of impacts to cultural resources in the CTR. Consequently, this analysis examines noise, vibration, and visual impacts as well as how these effects might impact the audio and visual "settings" of cultural resources.

Effects of Noise-Induced Vibrations on Structures

The sound from an aircraft travels from the exterior to the interior of a structure in one of two ways: either through the solid structural elements or directly through the air (Wyle Research, January 1998). Normally, the most sensitive components of a structure to airborne noise are windows and, infrequently, plaster walls and ceilings.

In 1977, sound and structural vibration level measurements were made in a restored plantation house located 450 m (1,500 ft) from the centerline of Runway 19L at Washington Dulles International Airport. Measurements were made at the house (built in 1795) to assess the proposed operation of the supersonic *Concorde* at Dulles (Wyle Research, January 1998). Of special concern was the impact of takeoffs and landings of the *Concorde* on the building's windows. Researchers found no instances of structural damage from the aircraft's operation. Interestingly, despite the high levels of noise that occurred during *Concorde* takeoffs, induced structural vibration levels were actually less than those of touring groups and vacuum cleaning.

Other studies on the nature of subsonic noise-related vibration damage to structures have found that high decibel levels (above 130 dB) must be generated close to a structure (no more than 45 m [150 ft]) and in a low frequency for a structure to be damaged, even a historic building (US Forest Service, 1992, in US Department of the Air Force, January 1998). Neither condition would occur in the Patuxent River Complex. Furthermore, the lowest-level overflights of land areas in the CTR would occur in R-4007A (immediately surrounding the airfield at NAS Patuxent River) during aircraft takeoffs and landings. However, the 75+ dB DNL would not extend beyond the NAS Patuxent River and the Webster Field properties. Furthermore, over other land areas underlying the CTR, the minimum altitude allowable for overflights is 1,050 m (3,500 ft). Therefore, noise from overflights would have a minimal potential to impact cultural resources in the CTR.

Effects of Aircraft Noise on "Setting"

The Advisory Council on Historic Preservation considers "setting" an important factor in maintaining a cultural resource's historic integrity. While aircraft noise and overflights could potentially affect the setting of cultural resources in the CTR, this impact would be brief and transitory in nature. Therefore, the No Action Alternative would not adversely impact qualities of integrity or jeopardize a property's eligibility for listing on the National Register of Historic Places. This finding is supported by the fact that many of the cultural resources identified within the footprint of the CTR were determined to be officially eligible for listing or have been listed in the National Register since 1969, which coincides with the historic high point of Patuxent River Complex flight operations levels.

4.8.1.2 NAS Patuxent River and OLF Webster Field

Implementation of the No Action Alternative would not support any new construction, renovation, or other physical alteration to any structures at NAS Patuxent River or Webster Field. Therefore, the No Action Alternative would have "No Adverse Effect" on historic properties.

4.8.1.3 Localized Target Areas

There is no evidence that historic underwater cultural resources are present in the vicinity of the target areas. Furthermore, this is evidenced by the fact that "operations in the Patuxent River Complex, including underwater surveys, have occurred for several decades and would likely have led to the discovery of such [underwater cultural] resources if present" (ICF Kaiser International, Inc., January 1997).

4.8.2 Operational Workload Alternatives I, II, and III

Operational Workload Alternatives I, II, and III are similar in scope; therefore, they are discussed together. Differences in the alternatives due to varying levels of operations are addressed.

4.8.2.1 Chesapeake Test Range

Under all three Operational Workload Alternatives, the effects of aircraft overflights on cultural resources located within the footprint of the CTR would be the same as described for the No Action Alternative.

4.8.2.2 NAS Patuxent River and OLF Webster Field

Implementation of any of the three Operational Workload Alternatives would maintain existing uses of the historic structures at NAS Patuxent River and Webster Field. No new construction, alteration, or renovation would be undertaken. Further, the Navy will undertake Section 106 consultations should implementation of the proposed action lead to any unscheduled new construction, alteration, or renovation at either NAS Patuxent River or Webster Field. Therefore, the Navy has determined that implementation of the proposed action would be an undertaking as defined in 36 CFR 800.2(o) of the Advisory Council on Historic Preservation's regulations, *Protection of Historic Property*. Further, the Navy has evaluated the area of potential effect of the proposed undertaking (NAS Patuxent River, Webster Field, and the CTR), assessed the effect (36 CFR 800.5[a]), applied the Criteria of Effect (36 CFR 800.9[a]) to the affected resources, and determined that there would be "No Adverse Effect" on historic properties. In a letter dated February 10, 1998, the Navy requested concurrence with this determination from the Maryland Historical Trust. On April 3, 1998, the Maryland Historical Trust provided a concurrence that the proposed action would have "No Effect" on historic properties. Both the Navy letter and the Maryland Historical Trust concurrence are included in Appendix B.

4.8.2.3 Localized Target Areas

There would be no impacts on historic underwater cultural resources for the same reasons discussed under the No Action Alternative.

4.9 Ordnance, Hazardous Materials Management, and Radio Frequency Sources

4.9.1 No Action Alternative

4.9.1.1 Chesapeake Test Range and Localized Target Areas

Ordnance Stores

The implementation of the proposed action (increased flight operations in the Patuxent River Complex) would result in the potential release of stores in the CTR at or in the vicinity of the three target areas. After release from the aircraft, these stores drop into the Chesapeake Bay. Both flight operations associated with RDT&E activities and those conducted in support of military training would involve the release of stores into the Bay. All stores released in the CTR, both for RDT&E activities and in support of military training, are inert (nonexplosive). Under the No Action Alternative, inert ordnance would continue to be deployed in the CTR and in the vicinity of the localized target areas in the quantities as identified in Tables 4.9-1 and 4.9-2.

Other issues associated with the release of stores in the CTR and in the vicinity of the localized target areas would involve hung ordnance and battery use in telemetry units. Hung ordnance is any airborne weapon or store that cannot be released from the aircraft due to a malfunction of the weapon, rack, or circuitry. This situation is important because of the uncertainty about when and where the ordnance could fire or release. However, adherence to air station on-ground precautions and standard operating procedures would minimize the probability for hung ordnance on an aircraft. If such a situation should occur, the aircraft with hung ordnance immediately proceeds to land at NAS Patuxent River. The potential for the hung ordnance to fire or be released over populated areas would be reduced by the requirement that aircraft fly routes over water or sparsely populated areas. After landing, the hung ordnance is removed from the aircraft by authorized Naval personnel.

As described in Appendix I, certain stores (cluster bombs, flares, and chaff) require the use of actuators, ignition cartridges, and primers allow their deployment from an aircraft or to activate. These materials contain minor explosive charges (about the strength of a firecracker). There is a low probability that these materials could fail to function when stores are released in the CTR. A failed actuator, ignition cartridge, or primer could then fall into the waters of the Chesapeake Bay, thereby possibly exposing members of the public (e.g., boater or diver) to a potential hazard. The impact to an exposed individual would depend on whether the charges were still explosive after an indefinite period of submergence in salt water. Records of the DoD Explosives Safety Board show no known accidents involving a member of the public being injured by an unexploded charge that had been submersed in salt water (ICF Kaiser International, Inc., January 1997).

Table 4.9-1
Projected Annual Utilization of Stores for the Patuxent River Complex

Store[1]	No Action[2]	Operational Workload Alternatives		
		I	II	III
Missiles[4]	5	5	6	7
Guided Bombs[4] (Walleye/JSOW)	3	3	4	5
Practice Bombs[3] (BDU, MK-76/106, LGTR)	460	910	960	1,010
General Purpose Bombs (MK-80 Series)[3]	220	220	250	270
Cluster Bombs (Rockeye, CBU-59/72)	60	60	66	72
Rockets (2.75 in and 5 in)	80	80	90	100
Mines[4]	10	10	11	12
Decoys				
Flares	705	705	770	840
Jammers	75	75	80	90
Marine Markers	90	90	100	110

Note:
1. Representative store types shown for certain store categories.
2. Based on 10-year average for NAS Patuxent River ordnance allocations.
3. It is estimated that approximately 1.5 percent of this store type would have telemetry units.
4. Some stores recovered.

Source: NAWCAD, 1997 and Shablack, November 18 and 19, 1997.

Table 4.9-2
Projected Annual Gun Ammunition/Chaff Utilization for the Patuxent River Complex

Ammunition Type	No Action	Operational Workload Alternatives		
		I	II	III
Gun Ammunition (rounds)[1]				
5.56 mm, 7.62 mm, .50 cal[2]	46,010	92,400	101,700	111,900
20 mm, 25 mm	14,400	28,900	31,800	35,000
Chaff (canisters)	575	690	760	835

Notes:
1. Although a significant amount of gun ammunition would be fired in the firing tunnel at NAS Patuxent River, it has been conservatively assumed that all gun ammunition would be fired in the CTR.
2. Lead is a major component of 5.56 mm and 7.62 mm bullets; the major component of all other bullets is steel.

Source: NAWCAD, 1997.

As mentioned in Appendix I, each telemetry unit used in the CTR is battery-powered. In the past, nickel-cadmium (Ni-Cd) batteries were used in telemetry units and some Ni-Cd batteries still exist in the inventory (with a 90 to 95 percent intact recovery rate by NAWCAD) (ICF Kaiser International, Inc., January 1997). However, weapons/stores separation testing being performed in conjunction with the F/A-18E/F program has proved successful in using lithium iron disulfide batteries in the telemetry units as a substitute for the Ni-Cd battery. The lithium iron disulfide battery is considered environmentally friendly. Consequently, NAWCAD has instituted a management initiative whereby through the required environmental reviews conducted by the ERB and OEP for each test or other activity proposed for the CTR, the future use of Ni-Cd batteries in the Patuxent River Complex would be greatly reduced. Their use would only be permitted if lithium iron disulfide or other environmentally-friendly batteries were not available or would not meet technical requirements.

Aviation Fuels

Jet fuel (JP-5, JP-8) and LL 100 (AVGAS) is used by aircraft flying in the CTR and around the targets, but fuel is only stored at the tank farm located at NAS Patuxent River. Jet fuel use for the No Action Alternative is shown in Table 4.9-3. The use of LL 100 (AVGAS) is minimal and would continue to be minimal as it is used mainly by the flying club at NAS Patuxent River. The potential impacts related to any spills that may occur during fuel handling would be controlled and contained through adherence to the USEPA-approved Spill Prevention, Control, and Countermeasures (SPCC) Plan.

Table 4.9-3

Annual Aviation Fuel Use in the Patuxent River Complex

Fuel Type		No Action	Operational Workload Alternative		
			I	II	III
Jet Fuel[1]	Million Liters	78.5	82.5	90.4	98.4
	Million Gallons	20.7	21.7	23.8	25.9

Notes: 1. JP-5 or JP-8 jet fuel.
Source: NAWCAD, February 1998.

Due to Navy policy and concern for the environment, fuel dumping is a rare occurrence in the CTR. In fact, fuel release procedures are governed by FAA and Department of the Navy rules. Navy pilots are prohibited from dumping fuel below 1,800 m (6,000 ft), except in an emergency situation. Above 1,800 m (6,000 ft), the fuel would have enough time to completely vaporize and dissipate and would therefore have a negligible effect on the ground below. In an emergency, a fuel release may be performed to save the pilot and/or the aircraft.

Aviation fuels (JP-5 and JP-8) are complex mixtures of aliphatic and aromatic hydrocarbons composed of approximately 80 to 90 percent alkanes and cycloalkanes; 10 to 20 percent aromatics (benzene and alkylbenzenes); one percent olefins; less than five percent polycyclic aromatic hydrocarbons (PAHs); and small amounts of additives (antioxidants, dispersants, corrosion inhibitors, etc.). Most fuel components, which are quite volatile, readily vaporize to the atmosphere where they degrade. Even when released to surface water or soil, the most volatile components of the jet fuels (low molecular weight alkanes and aromatics) would be expected to evaporate quickly. Less volatile components, which tend to adsorb to soil particles or to sediments in surface water, could persist but would eventually degrade. Due to these factors, the possibility of human contact with fuel or fuel vapors would be considered unlikely given the procedures governing fuel releases and the Air Traffic Control practice to route air traffic over water (weathers conditions permitting).

In some instances, it may appear to a ground observer that an aircraft is dumping fuel, particularly in humid weather. This illusion occurs when normal water vapor condenses at the wingtips of the aircraft. The condensate spray in the atmosphere can cause the appearance of fuel dumping. This phenomenon is particularly common with modern aircraft with highly-efficient wings, such as the F/A-18 that flies out of NAS Patuxent River.

Hazardous Materials and Waste Management

As previously stated in Subchapter 3.9, hazardous materials and hazardous waste are not normally generated in the CTR unless the released stores and related materials are transported off-range for the purpose of storage, reclamation, treatment, disposal, or treatment prior to disposal; are buried or landfilled either on- or off-range; or land off-range and are not promptly rendered safe and/or retrieved (see earlier discussion of the Military Munitions Rule). This does not occur on the active CTR. Spill prevention and control is discussed later in this subchapter.

Radio Frequency Sources

There are no radio frequency sources at the targets in the Chesapeake Bay. Further, at radio frequency sources that exist within the CTR, the Radiation Safety Officer ensures that safe standoff distances are maintained from the equipment in accordance with OPNAVINST 5100.23D.

4.9.1.2 NAS Patuxent River and OLF Webster Field

Ordnance Stores

Under the No Action Alternative, there would be no change in the transport, management, and storage of ordnance at NAS Patuxent River and Webster Field from existing conditions. The transport, management, and storage of ordnance would be performed in accordance with NAS

Patuxent River Ordnance Regulations (NASPAXRIVINST 8000.3B, October 1, 1992) and other applicable DoD directives and instructions, and USDOT regulations (49 CFR 173).

Aviation Fuels

There would be no change in fuel transport, handling, storage, or use at either NAS Patuxent River or Webster Field from existing conditions under the No Action Alternative.

Hazardous Materials and Waste Management

It has been projected that future quantities of hazardous waste generated at NAS Patuxent River and Webster Field will be about 45,000 kg (100,000 lbs) per year (Peterson, October 8, 1997). The Hazardous Materials Control and Management (HMC&M) office would continue to educate air station personnel on ways to reduce hazardous material use and provide for the proper disposal of hazardous waste generated on the air station.

Radio Frequency Sources

Under the No Action Alternative, the nature and type of radio frequency sources at NAS Patuxent River and Webster Field would not change from those identified for existing conditions. To protect human health, the Radiation Safety Officer ensures that safe standoff distances are maintained at both NAS Patuxent River and Webster Field in accordance with OPNAVINST 5100.23D.

4.9.2 Operational Workload Alternatives I, II, and III

4.9.2.1 Chesapeake Test Range and Localized Target Areas

Ordnance Stores

Inert stores would continue to be deployed in the CTR in the vicinity of the localized target areas under the three Operational Workload Alternatives. An estimate of the increase in the quantity and types of stores and ammunition to be released in the CTR and at the targets for each alternative is provided in Tables 4.9-1 and 4.9-2. It is likely that spotting charges would be used with practice bombs released in the CTR during military training activities, as this is common practice.

Aviation Fuels

There would be an increase in fuel use with increased aircraft using the CTR and the target areas over the No Action Alternative conditions as shown in Table 4.9-3, but no difference in fuel dumping policy under any of the Operational Workload Alternatives.

Hazardous Materials and Waste Management

Hazardous materials and hazardous waste are not normally generated in the CTR unless the released stores and related materials are transported off-range for the purpose of storage, reclamation, treatment, disposal, or treatment prior to disposal; are buried or landfilled either on- or off-range; or land off-range and are not promptly rendered safe and/or retrieved (see earlier discussion of the Military Munitions Rule). This does not occur on the active CTR. Spill prevention and control is discussed later in this subchapter.

Radio Frequency Sources

There are no radio frequency sources at the targets in the Chesapeake Bay. Further, at radio frequency sources that exist within the CTR, the Radiation Safety Officer would continue to ensure that safe standoff distances would be maintained from the equipment.

4.9.2.2 NAS Patuxent River and OLF Webster Field

Ordnance Stores

Under the Operational Workload Alternatives, there would be no change from existing conditions in the transport, management, and storage of stores at NAS Patuxent River and Webster Field.

Aviation Fuels

Projected increases in jet fuel and 100 LL (AVGAS) use under the three Operational Workload Alternatives are compared to No Action Alternative conditions as shown in Table 4.9-3. Sufficient capacity exists to store the additional fuel that would be consumed under any of the three Operational Workload Alternatives.

Hazardous Materials and Waste Management

It has been projected that future quantities of hazardous waste generated at NAS Patuxent River and Webster Field under each of the Operational Workload Alternatives would be maintained at about 45,000 kg (100,000 lbs) per year, even with increasing flight and related operations (Peterson, October 8, 1997). This is considered achievable by the HMC&M office for a number of reasons:

- There is a continuing reduction in the quantity of asbestos, lead, and polychlorinated biphenyls (PCBs) that require disposal in USEPA-licensed facilities, as in recent years the sources of these materials are consistently being eliminated from the air station and Webster Field.

- Newer aircraft are being designed to consume fewer hazardous materials and, consequently, generate less hazardous waste. Also, new technologies are being identified that reduce the use of hazardous materials (e.g., paintless aircraft as developed by R&D efforts at the Patuxent River Complex).

- Patuxent River Complex personnel are educated about the environmental hazards posed by the use of certain hazardous and potentially hazardous materials/substances and would continue their conscientious use and/or disposal of those materials/substances.

- Process changes have been implemented to reduce the use of hazardous materials and subsequent generation of hazardous waste.

The HMC&M office would continue to educate air station personnel on ways to reduce hazardous material use and provide for the proper disposal of hazardous waste generated on the air station.

Radio Frequency Sources

Under all of the Operational Workload Alternatives, the nature and type of radio frequency sources at NAS Patuxent River and OLF Webster Field would not change from those identified for existing conditions. To protect human health, the Radiation Safety Officer would ensure that safe standoff distances be maintained at both NAS Patuxent River and Webster Field.

4.10 Topography, Geology, and Soils

The Chesapeake Test Range, NAS Patuxent River, Webster Field, and the localized target areas lie within the physiographic province of the Atlantic Coastal Plain. This subchapter addresses anticipated impacts to topography, geology, and soils.

4.10.1 No Action Alternative

4.10.1.1 Chesapeake Test Range

The CTR would be affected only by aircraft overflights. No construction or other disturbances to surface or subsurface soils would be anticipated under the No Action Alternative.

4.10.1.2 NAS Patuxent River and OLF Webster Field

No additional construction or renovation to facilities would occur under the No Action Alternative. Furthermore, as described in Chapter 2, the impacts of BRAC-related building construction and renovation have already been addressed by EISs finalized in 1993 and 1994.

4.10.1.3 Localized Target Areas

Under the No Action Alternative, inert (nonexplosive) stores would continue to be released in the target areas. Some missile shapes, bombs, mines, fuel tanks, launchers, and racks would be recovered, while other stores would remain unrecoverably buried in Bay sediments. The impact of these stores on sediment quality is discussed in Subchapter 4.13 (Water and Sediment Quality).

The released and unrecovered or unrecoverable stores vary in size, with diameters ranging from ten cm (four in) to 46 cm (18 in) and lengths ranging from 53 cm to 4.5 m (21 in to 14 ft). Over time, the steel comprising the stores would corrode and the stores' contents (sand/vermiculite) would blend with existing Bay sediments. Therefore, the presence of unrecovered or unrecoverable stores buried in the sediments surrounding the targets would cause neither a measurable change to the Bay's bathymetrics nor present a navigation hazard.

4.10.2 Operational Workload Alternatives I, II, and III

Operational Workload Alternatives I, II, and III are similar in scope; therefore, they are discussed together. Differences in the alternatives due to varying levels of operations are addressed.

4.10.2.1 Chesapeake Test Range

Similar to the No Action Alternative, implementation of any of the three Operational Workload Alternatives would involve only aircraft overflights in the CTR, and thus no construction or other disturbances to surface or subsurface soils would occur under this alternative. Therefore, there would be no impacts to existing topography, geology, and soils within the footprint of the CTR.

4.10.2.2 NAS Patuxent River and OLF Webster Field

No additional construction or renovation to facilities at either NAS Patuxent River or Webster Field would be associated with the implementation of any of the three Operational Workload Alternatives. Therefore, there would be no impacts to topography, geology, and soils at either installation.

4.10.2.3 Localized Target Areas

Under any of the three Operational Workload Alternatives, the same types of inert stores as described under the No Action Alternative would continue to be released in the target areas, with some stores recovered by the Navy. Likewise, this alternative would have the same impact on the Bay bottom as described for the No Action Alternative.

4.11 Vegetation and Wetlands

4.11.1 No Action Alternative

4.11.1.1 Chesapeake Test Range and Localized Target Areas

Activities within the CTR would, under the No Action Alternative, continue to be generally limited to aircraft overflights, which would not adversely affect wetlands, submerged aquatic vegetation (SAV), or other vegetation. Certain other activities would have the potential to affect SAV beds:

- Releases of unrecovered or unrecoverable inert stores in the vicinity of the targets;
- Operation of range clearance boats; and
- Discharges of stormwater runoff from the airfield, golf course, and other parts of NAS Patuxent River and Webster Field.

As unrecovered or unrecoverable stores come to rest on the bottom, the potential exists for them to cover biota. However, the release of stores in the Patuxent River Complex is concentrated in the waters surrounding the targets, which are too deep to support SAV growth (see Figure 3.11-2).

Prop wash from range clearance boats could resuspend bottom sediments, which could cause sedimentation of SAV beds. Generally, boats avoid submerged vegetation beds in order to avoid the boat propellers becoming entangled in the grasses. While the size and location of SAV beds varies from year to year, they are generally restricted to areas below the low tide line out to depths of about 2.7 m (8.9 ft). Range clearance boats would have to cross shallow waters as they depart from and return to the air station, but their activities would occur primarily in the deeper waters surrounding the targets, which do not support SAV beds. Therefore, any impact from the operation of range clearance vessels is, and would continue to be, minimal, especially in comparison to overall boat or ship traffic within the Bay.

Also, stormwater runoff could adversely affect SAV by exposing plants to excess nutrients or other pollutants, such as pesticides, that may be used in various areas of the air station. Best Management Practices (BMPs), as required by the air station's stormwater discharge permit, are in place or will be implemented shortly. The purpose of the BMPs is to remove excess nutrients and other pollutants from stormwater runoff before it discharges into the Bay. The Stormwater Management Plan requires that future activities having a potential impact on stormwater quality must have BMPs developed and implemented to prevent or minimize pollutants in runoff. These measures would minimize adverse effects of ongoing activities on waters within the CTR, and may actually promote an increase in SAV by contributing to an improvement in water quality.

4.11.1.2 NAS Patuxent River and Webster Field

No new military construction projects are planned for either NAS Patuxent River or Webster Field in order to support the No Action Alternative. Therefore, plant communities would remain essentially the same as under existing (1996) conditions, with some minor changes occurring over time, due to natural factors.

4.11.2 Operational Workload Alternatives I, II, and III

4.11.2.1 Chesapeake Test Range and Localized Target Areas

Any of the Operational Workload Alternatives would increase overflights of both land and water areas within the CTR. However, increased overflights would not adversely impact terrestrial vegetation or wetlands.

In addition, no new water or land-based facilities are planned for any of the Operational Workload Alternatives. Thus, there would be no disturbance of vegetation due to military construction activities, and no long-term displacement of plant communities by buildings or other infrastructure.

Operations at the surface targets, particularly during weapons/stores separation tests, would increase. As indicated above, the waters surrounding the target areas are too deep to support SAV, so it is unlikely that stores would come to rest on SAV beds. The nearest SAV bed to any of the targets is approximately seven km (four nm) to the southeast of the Tangier Island target (as shown in Figure 3.11-2). Thus, the release of stores would not impact SAV beds in the Chesapeake Bay.

Operations related to range clearance boats would increase, but the limited extent to which these boats would operate in shallow water would continue to minimize their potential effect on SAV beds. Similarly, any pollutants in stormwater discharges would be minimized by BMPs.

4.11.2.2 NAS Patuxent River and Webster Field

None of the Operational Workload Alternatives would involve the construction of new facilities at either NAS Patuxent River or Webster Field. Therefore, none of the proposed Operational Workload Alternatives would adversely affect plant communities, which would remain essentially the same as under no action conditions, with some minor changes occurring over time due to natural factors.

4.12 Wildlife and Fisheries

The Endangered Species Act and the Marine Mammal Protection Act

As part of the assessment of the impacts of the proposed action on wildlife and fisheries in the Patuxent River Complex, the Navy has coordinated with federal and state agencies under the Endangered Species Act (ESA) of 1973 and the Marine Mammal Protection Act (MMPA) of 1972:

- The ESA of 1973, and subsequent amendments, provide for the conservation of threatened and endangered species of animals and plants, and the habitats in which they are found. The Navy ensures that consultations are conducted as required under Section 7 of the ESA for any action which "may affect" a threatened or endangered species according to guidance given in *Real Estate Operations and Natural Resources Management Procedural Manual* (NAVFAC P-73, May 1987) and the *Environmental and Natural Resources Program Manual* (OPNAVINST 5090.1B, November 1994). NAWCAD has coordinated with the US Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), and various concerned state agencies on the current activities (Appendix B contains coordination letters).

- The coordination with NMFS will also provide information on marine mammals within the project area. The MMPA of 1972, most recently reauthorized in 1994, protects certain species and population stocks of marine mammals, that are, or may be, in danger of extinction or depletion as a result of man's activities. The Act stipulates that such species and population stocks not be permitted to diminish beyond the point at which they cease to be a significant functioning element in the ecosystem of which they are part, and not be permitted to diminish below their optimum sustainable population. The Act further states that measures be taken to replenish any species or population stock that has already diminished below its optimal sustainable level. The MMPA established a moratorium, with certain exceptions, on the taking of marine mammals in US waters and by US citizens on the high seas, and on importing marine mammal products into the United States.

Analytical Framework

Aircraft overflights and the release of stores during RDT&E weapons/stores separation testing or during military training activities, depending on where they occur, could potentially contribute the following impacts under the No Action Alternative and the Operational Workload Alternatives:

- Noise disturbance to wildlife;

- Bird/Aircraft Strike Hazards (BASH) (only relevant to the air station and Webster Field);
- Deer/Aircraft Strike Hazards (DASH) (only relevant to the air station and Webster Field);
- Direct contacts or strikes on fish and wildlife; and
- Release of chemicals associated with inert stores (including bombs, small arms ammunition, chaff, and flares).

4.12.1 No Action Alternative

The No Action Alternative would result, over the long term, in approximately the same level of aircraft overflights as under existing (1996) conditions. The actual mix of aircraft may vary, however. Special use airspace would retain its current configuration. In addition, there would be no planned on-ground disturbances (e.g., military construction projects) that could result in potential impacts to wildlife and fisheries.

4.12.1.1 Chesapeake Test Range and the Localized Target Areas

Noise Disturbance to Wildlife

Other than aircraft-related noise, overflights of the land and water areas within the footprint of the CTR would provide few vectors for impacts on fish or wildlife. Of principal concern would be impacts to migratory waterfowl, raptors (e.g., bald eagle, peregrine falcon, and osprey), colonial wading birds (e.g., herons and egrets), and wildlife (e.g., deer and other small animals).

There are presently, and would continue to be, few disturbances to the water surface and there would be no direct effects to land areas from aircraft overflights of the CTR. However, some studies have shown that noise associated with aircraft overflights has the potential to induce stress, interfere with nesting, and create a decrease in production. In summarizing studies on the effects of elevated noise levels on domestic fowl, the US Air Force reported occurrences of startled reactions, reduced egg production, and decreased broodiness (US Department of the Air Force, October 1994).

Other studies have indicated that many raptors and wading birds can utilize habitats associated with civilian and military airfields and low-altitude military training areas, and do so without obvious deleterious impacts to their population dynamics (Wyle Research, October 1997). For example, Kushlan (1979, in Wyle Research, October 1997) studied behavioral responses to helicopter overflights. Generally any bird that left its nest returned within five minutes, and in 92 percent of the 192 observations, birds either showed no reaction or merely looked up. No serious consequences, such as egg loss or nest abandonment, were observed. The results of a study by Black, et al. (1984, in Wyle Research, October 1997) indicate that low-altitude, high-speed flights by military F-16 jets had no demonstrated effects on the establishment, size, or reproductive success of wading bird colonies.

A 1996 study conducted at a Navy training range in North Carolina (Fleming, et. al) found that only a small proportion of wild ducks (2.6 percent) displayed a reaction to aircraft overflights and ducks were observed feeding in bays and ponds directrly in the flight approach path. In fact, the highest numbers of waterfowl observed in the bays under the primary approach and exits occurred during the weekdays when aircraft use of the training range was highest. Furthermore, behaviors of caged American black ducks housed near target areas at the training ranges were found to quickly acclimate to high noise events.

The No Action Alternative is not expected, on average, to increase noise impacts over existing (1996) conditions. Thus, there should be no increase in noise impacts to wildlife within the CTR. Navy aircraft will continue to overfly both Blackwater National Wildlife Refuge (NWR) and Martin NWR and state wildlife management areas (WMAs). These NWRs and state WMAs underlie R-4006 and R-4008. Under FAA regulations, military flights within R-4008 are limited to a vertical space between 7,620 and 25,908 m (25,000 and 85,000 ft). Flights within R-4006 must maintain a minimum altitude of 1,067 m (3,500 ft). This altitude is 450 m (1,500 ft) more than requested by the US Department of Interior (FAA Advisory Circular 91-36C). Restricted airspaces where aircraft overflights can be lower than 600 m (2,000 ft) include: R-4002 (overlying Bloodsworth Island); R-4005 (overlying the aerial and surface firing range and Hooper and Hannibal targets); R-4007A (around the NAS Patuxent River and Webster Field airfields); and R-6609 (around Tangier Island target). However, R-4005 and R-6609 are almost exclusively over water.

Direct Contacts or Strikes on Fish and Wildlife

Under the No Action Alternative, the types and quantity of stores released in the localized target areas during RDT&E and military training activities would be the same as are currently being released in the Bay under existing (1996) conditions (see Table 4.9-1 and 4.9-2). The probability of direct contacts or strikes fish and wildlife by released stores from these activities would continue to be very low, since the velocity of the dropped store decreases considerably on entry into the water and most mobile species (e.g., fish or crabs) are able to move quickly to avoid being crushed or buried by a settling store. Also, the release of stores into the Bay would be at relatively infrequent intervals. However, even if some individuals (fish, shellfish, or other bottom-dwelling organisms) were struck directly by a store, given the abundance and distribution of these animals in the Bay overall, not just in the vicinity of the targets, their mortalities would be unlikely to have a significant impact on populations as a whole.

NMFS has indicated that if stores were to be dropped in areas of SAV, particularly in very shallow water, or in known spawning or nursery areas, they would recommend changing the area of the drop. They would also be concerned if the stores were to be dropped in areas frequently use by commercial bottom trawlers or other fishermen with gear that might snag on any stores left behind (Nichols, September 11, 1998). However, the target areas are not in SAV beds, nursery or spawning habitats, or oyster beds and the shallowest waters that occur near the targets are 3.6 m (12 ft near the Tangier target). Furthermore, the prohibited areas immediately surrounding the targets are closed to commercial fishing and other civilian activities. Therefore, it has been concluded that the release of stores as proposed would not cause a significant impact on fish populations or fishing activities in the Chesapeake Bay.

Concentrations of fish do occur in the vicinity of the targets, apparently attracted to the structures of the targets themselves. The target areas have been identified in Bay charts as popular recreational fishing spots (as mentioned in FEIS Subchapter 3.12). This is occurring even though stores have been released in these areas during the past 50 years.

On the positive side, released stores will provide hard substrate for benthic organisms to attach to and cluster around, hereby increasing the diversity of habitats for the underwater organisms in the vicinity of the targets. This designation of the target areas in Bay charts (ADC of Alexandria, Inc., 1996) as "fishing areas" suggests that the addition of hard substrate has been beneficial.

As described in Subchapter 3.12, some aquatic threatened or endangered species and marine mammal species have been identified in the middle portion of the Chesapeake Bay. An adverse effect on a single individual of a threatened or endangered species, or a marine mammal species, may be sufficient to constitute a "taking" under either the ESA or the MMPA. Most occurrences of marine mammals and sea turtles have been reported as individuals south of the Potomac River in the Virginia portion of the Bay. Individuals of several dolphin, seal, and whale species are also occasional visitors to the middle and northern portions of the Bay (Table 3.12-1). A single West Indian manatee has been known to travel far north into the Bay, but has frequented only the Bay's southern portion in recent years.

Only anecdotal data from strandings and sightings is currently available on the distribution of marine mammals and sea turtles in the Chesapeake Bay. No systematic data has been collected with which to estimate densities, so it is not appropriate to estimate the probability that a store would actually strike a marine mammal or sea turtle. What data is available indicates that densities are very low in the middle portion of the Bay, and that such a strike would be unlikely.

As indicated in Subchapter 3.12.2.1, both shortnose and Atlantic sturgeon are likely present, but in very small numbers, in the Bay. The Atlantic sturgeon is being considered for listing as a threatened or endangered species. The smaller, federally-endangered shortnose sturgeon is now very rare all along the Atlantic Coast. Thus,it would be unlikely that a store would strike an Atlantic or shortnose sturgeon. The Navy has coordinated with the NMFS on this issue, and in its response, NMFS has concurred that while there is a chance for any activity on the Bay to impact on threatened or endangered species, the probability of stores releases impacting the shortnose sturgeon, Atlantic sturgeon, or other listed species present in the Bay is so low that it would be unlikely to have an adverse affect (Rittgers, September 21, 1998).

Chemical Impacts of Release of Inert Stores

The types and quantities of stores that would be released in the Bay during RDT&E weapons/stores separation tests under the No Action Alternative are shown in Tables 4.9-1 and 4.9-2. These stores would include missile shapes, practice bombs, rockets, mines, decoys (chaff, flares, and jammers), and other related equipment. No signal cartridges are currently used in the CTR.

Data collected for the USEPA Environmental Monitoring and Assessment Program (EMAP) provides an opportunity for assessing the impact of past and continued stores release on aquatic biota (Tables 3.12-2 and 3.12-3). However, conclusions from these data must be carefully drawn. Each of the stations was sampled only once, and, in essence, each sample only represents a snapshot in time. Additionally, because the locations of sampling stations differed through the four-year period, they cannot be strictly compared to each other. For example, the diversity and abundance at Station VA90-063 was moderate (ten taxa and 71 organisms per grab), while the diversity of Station VA91-303 nearby was quite low (one taxon, one organism per grab). This is due to the patchy nature of the distribution of both fish and benthic organisms, and the tendency for populations to fluctuate both in terms of time and location.

The EMAP data does not show a pattern in the distribution and abundance of organisms in the vicinity of the targets. For example, diversity and abundance were very low at station VA91-303, about 1.6 km (one mi) from the Hooper target. However, these parameters were also very low at stations VA93-644 and VA93-647, which are about 15 km (9.3 mi) and 26 km (16 mi) from the Hooper target, and even further from the other targets. Stations VA91-295 and VA90-050, each within about five km (3.1 mi) of the Hannibal target, showed moderate diversity and abundance. Station VA93-623, about four km (2.5 mi) from the Tangier Island target, had low abundance and diversity, but Station VA92-478, which is about eight km (five mi) from the Tangier Island target, showed moderate diversity. Thus, the release of stores at the targets has apparently not had a significant effect on biota.

Impacts of Release of Missiles, Bombs, Rockets, and Mines

While some inert stores are recovered from the Bay, most stores are unrecovered or unrecoverable and would settle on the Bay bottom, where they likely displace infaunal (i.e., within the sediment) invertebrates. This displacement would be isolated and affect relatively small areas, with diameters ranging from ten cm (four in) to 46 cm (18 in); lengths range from 53 cm to 4.5 m (21 in to 14 ft). These stores consist primarily of steel casings filled with concrete, wet sand, water, or vermiculite to meet weight requirements. Their presence in Bay sediments would have no significant impact.

Over time, the steel comprising the stores would corrode, and the stores' contents (sand/vermiculite) would blend with existing Bay sediments. Elevated iron concentrations may occur in the sediments surrounding the store as the steel corrodes, but affected areas would be restricted to the immediate vicinity of the store itself. However, the iron-enriched area would be unlikely to adversely affect benthic organisms.

Gun ammunition rounds that would be expended in the Bay are small-caliber rounds. Of these, some use lead core projectiles, while others are mostly steel with small amounts of aluminum. Steel practice bullets may contribute to small, isolated areas of elevated iron and aluminum concentrations in the sediments as bullets corrode. The affected areas would be restricted to the immediate vicinity of the bullets and would be unlikely to adversely affect benthic organisms, as iron and aluminum are widespread in natural environments.

The size of the gun ammunition expended would generally be too large for most fish and wildlife, such as waterfowl, to ingest. It is possible that larger species, such as sea turtles and marine mammals, could ingest bullets from small arms; however, for this to happen, the animal would actually have to encounter the bullet during its descent through the water column. The probability of such an occurrence would be very low.

Manatees are bottom-feeders, and could conceivably ingest bullets from the Bay floor. However, manatees feed almost exclusively close to shore, in shallow waters, particularly at SAV beds, and most small arms ammunition would be discharged in the deeper waters surrounding the targets. Also, the single manatee that has been periodically observed within the Chesapeake Bay has, in recent years, been observed only in the lower Bay.

With respect to the lead component of the spent bullets, it is unlikely that fish or wildlife would be adversely affected. Lead tends to be very insoluble in water at neutral pHs, such as occurs in the middle portion of the Chesapeake Bay. Fish or wildlife would have to actually ingest the projectile to be exposed. Past problems of lead poisoning in waterfowl, for example, have been associated with shotgun pellets embedded in the skin or ingested by waterfowl. Shotgun pellets are much smaller than the munitions that have been used historically in the target areas. Also, the pellets are ground up by the bird's crop, releasing smaller particles of lead which are more easily absorbed by the bird's tissues (Rambo, February 18, 1998). For waterfowl or other animals to ingest such materials, the materials would need to be of a small enough size that they are indistinguishable from the animal's normal food items (Gibbings, November 21, 1996), and the animal would need to have the type of digestive system that includes a crop or similar structure.

Impacts from Release of Chaff

Similarly, chaff would be unlikely to cause significant adverse effects on fish or wildlife. Studies of chaff show that, overall, benthic worms, crabs, and fish species appear to be unaffected by the aluminum-coated and uncoated fiber material (Cataldo, et al., January 1992). There are data to suggest that oysters, specifically at the larval stage, are more sensitive to chaff fibers than other studied marine species (Center for Environmental and Estuarine Studies, October 1977). However, oysters do not generally occur in the deeper waters that are characteristic of the aerial and surface firing range within the CTR (oysters in the Chesapeake Bay live mostly in water depths between two and eight m (eight and 25 ft) (Lippson and Lippson, 1984).

Cataldo, et al. (January 1992) have concluded that any potential effects of chaff fibers in the aquatic environment would be expected to be immediate and short-term. Thus, the release of chaff under No Action Alternative conditions would not likely cause any long-term adverse impact to aquatic fauna.

As a result of concerns over the extensive use of chaff in DoD's western military ranges, investigations are underway to develop, for use in military training exercises, a biodegradable chaff (ultraviolet degradable or digestible) or a chaff that is otherwise harmless to wild and domestic animals. Fiber-forming polymers, including gelatin, polyactic acid, unstabilized polypropylene, cellulose, and wheat starch are being evaluated as substitutes for the metallized fiberglass, aluminum foil, and aluminized nylon fibers that are currently used. NAWCAD would continue to keep apprised of the potential for use of biodegradable chaff in the CTR.

Impacts from Release of Flares

The use of flares in the CTR would also not have an adverse effect on fish or wildlife populations in the Bay. Properly-functioning flares will burn for only a short time (less than ten seconds), at approximately 1,090EC (2,000EF). Under these conditions, all that remains would be incidental debris from flare packaging. Impacts associated with successful deployment of flares would, therefore, be limited to debris scattered into the Chesapeake Bay. This impact would be negligible because the flare debris volume would be small and scattered.

The potential also exists that small pieces of flare packaging (e.g., foil, felt, and plastic) ejected with burning flares could attract and be swallowed by marine mammals, sea turtles, and fish, if they came into contact with the material before it dissolved. There is currently no evidence to indicate that any animals have become ill or died as a result of ingesting this kind of debris in the CTR.

Occasionally flares do not function properly, or are ejected at a low-enough altitude that they enter the water while still burning. In either case, the probability of direct interaction of a burning flare with a marine mammal, turtle, or fish would be remote.

4.12.1.2 NAS Patuxent River and Webster Field

Noise Disturbance to Wildlife

As indicated above, many raptors and wading birds appear to utilize habitats associated with civilian and military airfields and low-altitude military training areas without obvious adverse impacts (Wyle Research, October 1997). Adverse impacts are most likely to occur where "naive" or unacclimated animals are exposed to noise levels of 90 dB or more, and particularly where visual disturbance is associated with noise disturbance. However, since the airfields around NAS Patuxent River and Webster Field have been active since 1942, it is reasonable to assume that the resident wildlife populations in and around the air station are well acclimated to its activities and noise levels.

With respect to threatened and endangered species, while the bald eagle and peregrine falcon have been observed in the vicinity of the air station, they have not been observed to be nesting there. In addition, the northeastern beach tiger beetle probably does not breed at NAS Patuxent River, and even if it did occur there, it would be found in a beach habitat, away from airfield activities. Therefore, continuation of flight and related activities under No Action Alternative conditions would not adversely impact threatened or endangered species at NAS Patuxent River.

BASH and DASH

As described in Subchapter 3.11, NAS Patuxent River and Webster Field are located within the Atlantic flyway, which is used by high concentrations of birds during the migratory season. As a result, arrivals and departures at the airfield and low-level flights, such as those occurring around the target areas, would be at risk for BASH. However, NAS Patuxent River has implemented a number of programs to reduce the potential for BASH, including a BASH Plan and participation in the Partners-in-Flight-Aves de las Americas (PIF) program. Adherence to these programs currently minimizes and would continue to minimize the potential for BASH to occur under the No Action Alternative by:

- Decreasing airfield attractiveness to birds (e.g., routine mowing of airfield, planting of crops that are not attractive to birds);
- Implementing operational changes when BASH risks are considered high (e.g., raising pattern altitude, changing pattern direction to avoid flocks of birds, avoiding takeoffs or landings at dawn or dusk, etc.);
- Issuing advisories when hazardous bird concentrations are known to exist; and
- Initiating procedures to disperse birds when flocking occurs on or near the airfield.

Similarly, the frequency of aircraft arrivals and departures and related ground operations create the potential for DASH. The air station has a DASH Plan that includes measures designed to minimize the potential for deer/aircraft mishaps to occur. This plan would continue to be implemented under No Action Alternative conditions.

Flocking blackbirds (starlings, grackles, and other blackbirds) have been a particular problem at the air station. The NAS Patuxent River natural resources staff monitors the location of blackbird roosts in order to provide advance warning to pilots to avoid areas where roost trees exist.

4.12.2 Operational Workload Alternatives I, II, and III

Implementation of the Operational Workload Alternatives would result in an increase in flight and related operations within the CTR (principally flight operations in support of military training), and an increase in associated ground operations at NAS Patuxent River. These activities, depending on where specifically they occur, would have many of the same potential impacts as described for the No Action Alternative: increased noise disturbance to wildlife; BASH and DASH; direct contacts or strikes on fish and wildlife; and release of chemicals associated with inert stores.

The numbers of stores released under the Operational Workload Alternatives would increase as compared to the No Action Alternative, and involve significant increases in the use of gun ammunition (Tables 4.9-1 and 4.9-2). The quantities of other types of stores released would be the same as described for the No Action Alternative.

4.12.2.1 Chesapeake Test Range and Localized Target Areas

Noise Disturbance to Wildlife

Within the CTR, aircraft noise levels under the Operational Workload Alternatives would be low, with an average L_{dnmr} of 45 dB throughout most of the Bay and an L_{dnmr} of about 50 dB near Hooper target and along the path of VR 1711/1712 (the MTRs that would be an entryway into the CTR for military training operations). Thus, there would be no significant increase in noise in the CTR under these alternatives, as compared with the No Action Alternative, that would potentially impact wildlife. In addition, Navy aircraft will continue to maintain a minimum altitude of at least 1,067 m (3,500 ft) over Blackwater NWR and Martin NWR, which would be protective of the two NWRs and other state WMAs within the footprint of R-4006. In summary, aircraft-related noise impacts to wildlife with implementation of any of the Operational Workload Alternatives would not be significant.

Direct Contacts or Strikes on Fish and Wildlife

Despite the fact that implementing any of the Operational Workload Alternatives would result in an increase in the release of practice bombs at the target areas, and thereby increase the potential for direct contact or strikes on fish and wildlife near the target areas, the probability of direct contacts or strikes of stores on fish and wildlife would still be extremely low given the likely speed of store settlement. This low probability of contact or strike would also be applicable to marine mammals, turtles, and the Atlantic or shortnosed sturgeon.

Also, the practice bombs may increase the displacement of infaunal invertebrates. However, this displacement would still consist of small, isolated areas concentrated around the targets, that, to some extent, would have a positive impact by providing substrate for other species.

Chemical Impacts from Release of Inert Stores

In general, the potential for chemical impacts from stores release under the Operational Workload Alternatives would be similar to that described for the No Action Alternative for most stores, including chaff and flares. However, it is common practice that activities undertaken in support of military training involve the use of signal cartridges (also known as spotting charges) on practice bombs. This practice allows the pilot to score himself for accuracy of ordnance delivery. For the purposes of conservatism, it was assumed that all of the practice bombs projected for use during military training exercises in the CTR (up to 450 under Operational Workload Alternative III) would involve the deployment of signal cartridges. This would result in the maximum future release of about nine signal cartridges per month into the Bay on an annual basis.

The compounds used in the signal cartridges are red phosphorus or titanium tetrachloride. These substances would not adversely impact the aquatic resources of the Chesapeake Bay since:

- Red phosphorus is largely converted to phosphorus oxides when the signal cartridge discharges; these oxides have a low toxicity to aquatic organisms (Yon et al., 1983, in: Atlantic Division Naval Facilities Engineering Command, September 1997). There is also no evidence that unreacted red phosphorus is toxic to aquatic organisms (Uhrmacher, et al., 1985, in: NAVFACENGCOM, March 1998). Further, although the production of red phosphorus may include limited amounts of white phosphorus as an impurity (a substance that may be toxic to aquatic biota, particularly fish), the release would occur in very minute amounts over open waters of the Bay, and would thus be rapidly diluted in the oxygenated surface waters.

- Titanium tetrachloride, based on limited data, can be acutely toxic to some species of algae and zooplankton at concentrations between two and 4.6 mg/l (Uhrmacher, et al., 1985, in: NAVFACENGCOM, March 1998). Although it may be possible that the concentration of titanium tetrachloride in surface water in the immediate area of

> a signal cartridge discharge could reach these levels, titanium tetrachloride reacts rapidly when exposed to air or moisture. Thus, it is expected that the small quantities released (regardless of the concentration of the titanium tetrachloride) would quickly dissapate or be diluted in the Bay's waters with or without wave action and would not accumulate.

Thus, it is unlikely that the use of signal cartridges would adversely affect fish or wildlife.

The increase in use of small ammunition would not adversely affect fish or wildlife, including threatened or endangered species and marine mammals. The bullets are generally too large for most fish and birds to ingest. The species of marine mammals that have been recorded in this part of the Bay, and the sea turtles, are open-water, not bottom, feeders. Therefore, for an individual to ingest a bullet, they would have to encounter the bullet at the precise moment in time it sank through the water column at the depth where the animal was swimming. This combination of events would have a low probability of occurrence.

The potential chemical impacts of releasing chaff and flares would be the same as described for the No Action Alternative.

4.12.2.2 NAS Patuxent River and Webster Field

Noise Disturbance to Wildlife

Potential noise impacts to wildlife at NAS Patuxent River and Webster Field would be the same as described for the No Action Alternative and would not be significant.

BASH and DASH

Adherence to existing BASH and DASH programs would continue to minimize the potential for BASH to occur under the Operational Workload Alternatives. Similarly, the implementation of any of the Operational Workload Alternatives would not adversely impact threatened and endangered species.

4.13 Water and Sediment Quality

4.13.1 No Action Alternative

4.13.1.1 Chesapeake Test Range and Localized Target Areas

Surface Waters and Sediments

Most RDT&E activities, and activities conducted in support of military training, would involve overflights of the CTR and the targets, which include waters of the middle portion of the Chesapeake Bay and its tributaries. There would be no disturbances to surface water resources as a result of these overflights. However, should an aircraft mishap occur, fuel or hydraulic fluids could be released. The magnitude and duration of the spill would be controlled through rescue and spill response procedures, as outlined in the air station's EPA-approved Emergency Spill Control and Countermeasures Plan. The primary response to any mishap would be from NAS Patuxent River personnel and equipment. The second-tier response would be provided by a private local oil spill removal organization capable of responding within one hour. The third-tier response would be the Supervisor of Salvage at Cheatham Annex near Williamsburg, Virginia. This planned response would allow quick containment of any spill and minimize any potential water quality impacts to the Bay.

However, some RDT&E and military training activities would involve the release of inert (nonexplosive) stores into the Bay on or near the targets. With the exception of certain small arms ammunition, these stores are composed of iron/steel casings filled with sand, concrete, or vermiculite. These materials would not adversely affect water quality in the Bay. Policies exist at NAS Patuxent River that govern which stores would, in fact, be recovered: generally some missile shapes, practice bombs, mines, and fuel tanks, launchers, and racks. Other stores would remain in Bay sediments.

When stores that have been dropped or jettisoned from aircraft need to be recovered, NAWCAD uses an in-shore sandbar in the vicinity of Hooper target. Historically, recovery has been nearly 100 percent (ICF Kaiser International, Inc., January 1997). Missiles may be dropped with a parachute, the use of which allows the jettisoned/dropped missiles to slow down as they enter the water and reduces the potential for breakup of the missile and/or the attached telemetry unit. As shown in Table 4.9-1, about five missiles would be released in the CTR under the No Action Alternative. Most of these missiles would be shapes without warheads and solid fuel rock motors. These missiles would be jettisoned from an aircraft rather than fired and would have the same impacts as other inert ordnance on the Bay. The propellants from the few missiles that may be fired in the CTR would typically be consumed within ten seconds of release from the aircraft and any residue remaining within the missile shell upon impact to the Bay would be minimal and not have a significant impact on water quality.

As previously mentioned in Subchapter 4.12, some ammunition rounds from small arms have lead core projectiles (5.56 and 7.62 mm), while the other rounds are mostly steel with small amounts of aluminum and copper. Steel practice bullets may release small amounts of iron, aluminum, and copper into the sediments and the overlying water column as bullets corrode. All three elements are widespread in the natural environment, although elevated levels can cause toxic reactions in exposed plants and animals. Any elevation of metals in sediments would be restricted to a small zone around the bullet. Any release to the overlying water column would be very quickly diluted. Thus, continued use of steel bullets would not adversely affect water quality in the Bay or its tributaries. Additionally, while shell cases often contain brass and steel, they are generally retained with the aircraft after firing and would be returned to the air station and disposed of in an appropriate manner or recycled.

The single largest component of the 5.56 and 7.62 mm projectiles is lead, with small amounts of copper. Lead has been identified as a toxic contaminant under Section 307 of the Clean Water Act. The total estimated amount of lead from these projectiles is 147 kg (327 lbs), which corresponds to a volume of approximately one-hundredth of a cubic m (one-half cubic ft).

Lead tends to be very insoluble in water, particularly at the near-neutral pHs that characterize the mid-Bay waters. At a Stratford, Connecticut, civilian gun range where bullets had been deposited in an estuarine environment over a period of many years, the most rapid dissolution rate for lead occurred where lead occupied the biologically-active upper 2.5 cm (one in) in sand, or 5.1 cm (two in) in silty clay, of the sediment column. The dissolution rate in these sediments was two percent over 50 years. The greater-than-normal rate for solubility was most likely caused by the high-energy, near-shore environment, driving sediments against bullet fragments and causing abrasion. The munitions lodged in the anaerobic sediments below the active zone showed no discernible dissolution rate, and were essentially immobile (ERCO/A, 1986).

Sediments around the targets are generally sandy and would be abrasive. However, the targets are in deeper water, and within a lower-energy environment than at the range in Stratford, Connecticut. Thus, the release of lead into the overlying water column would occur in very small concentrations that are diluted rapidly. The Agency for Toxic Substances and Disease Registry (US Department of Health and Human Services, April 1993) has also indicated that lead is immobile in sediments and degrades very slowly. It does not move from soil to underground water or drinking water unless the water is acidic (US Department of Health and Human Services, April 1993), which is not the case in the Chesapeake Bay.

The results of water quality sampling by the Navy at several ranges and targets in North Carolina support the fact that continued use of the targets under the No Action Alternative would not adversely affect water or sediment quality in the Bay. In 1990, the Navy collected and analyzed water and sediment samples at four target ranges in North Carolina. The water samples were analyzed for pH, conductivity, turbidity, temperature, dissolved oxygen, nine metals (copper, zinc, iron, aluminum, chromium, magnesium, nickel, lead, and silver), sulfate, sulfide, ammonia, 31 volatile organics, and 57 semi-volatile organics. The sediment samples were analyzed for the metals, sulfate, and sulfide. Overall, the study did not identify any water quality impacts at the target ranges that could be attributed to their use for military training (Sirrine Environmental Consultants, February 1991).

Some stores (missiles and general purpose bombs) may have attached telemetry units, which in the past had a battery-powered electrical system using Ni-Cd batteries. However, weapons/stores separation testing being performed in conjunction with the F/A-18E/F program has proved successful in using lithium iron disulfide batteries in the telemetry units as a substitute for the Ni-Cd battery. This type of battery is considered environmentally friendly. Consequently, the future use of Ni-Cd batteries would be greatly reduced and their use would be permitted only if other environmentally-friendly batteries were not available or would not meet technical requirements.

The use of flares in the CTR would also be unlikely to adversely affect water or sediment quality. Properly functioning flares will burn for only a short time (less than ten seconds), with only incidental debris from the packaging remaining. Impacts associated with successful deployment of flares would, therefore, be limited to a small volume of scattered debris. Further, most flares are generally composed of powdered magnesium, a binder, and a trace of other compounds for ignition and control of burning (NAWCAD, September 1995). Magnesium is a naturally-occurring, widespread element in surface waters, soils and sediments. The occasional addition of small amounts is unlikely to cause an adverse impact.

The USEPA EMAP sediment data for metals provide an indication of the extent to which continued release of ordnance would affect water and sediment quality. None of the reported metals concentrations for EMAP samples collected at fourteen selected stations within and outside the CTR area exceeded their respective Effects Range-Median (ER-M) threshold concentrations. For those sediment samples collected near the three targets, concentrations of certain metals generally showed no significant difference when compared to metal concentrations at other stations within and outside of the CTR.

Only one station, which was the closest sampling point to any of the targets (VA91-303 -- approximately 1.6 km [1 mi] from the centerpoint of the Hooper Target or prohibited area), showed sediment concentrations of antimony, arsenic, cadmium, copper, lead, nickel, and zinc at slightly greater than or near the high end of the range of concentrations reported at other stations. However, these metals were less than the ER-M thresholds generally used to indicate a potential problem. Since only inert ordnance is used at the three target areas in the Chesapeake Bay, potential chemical impacts to sediments would be limited to Ni-Cd batteries and signal cartridges as discussed above. As inert ordnance does not contain antimony, arsenic, copper, or zinc as identified in the EMAP data for Station VA91-303, the presence of these metals is not related to Navy use of the target areas.

Groundwater

The No Action Alternative would not further affect groundwater resources underlying the CTR or localized target areas. There would be no increase in groundwater withdrawals, nor release of materials in a way that would contaminate groundwater.

Small arms ammunition, which would be released near the targets, contains lead. As addressed above, lead is insoluble in water at the near-neutral pHs characterizing waters of the mid-Bay. Also, groundwater movement at these locations is generally upward through the sediments and into the overlying surface waters, rather than percolating downward.

4.13.1.2 NAS Patuxent River and Webster Field

Surface Water

Under the No Action Alternative, there would be no planned military construction or other disturbances to the ground surface at either NAS Patuxent River or Webster Field. Hence, there would be no changes to stormwater flow or collection systems or to any 100-year floodplain. Use of Best Management Practices (BMPs) for reduction of suspended particulates and nutrients in stormwater would continue to minimize the impacts of stormwater on the Patuxent River and other surface water bodies within the air station and at Webster Field, as well as the adjacent waters of the Bay.

The air station currently has in effect an Oil and Hazardous Substance Spill Contingency Plan for the air station that provides a plan of action for site specific spill response. Continued adherence to this plan would minimize the impacts of a spill of oil and hazardous substances at the air station, Webster Field, and in the CTR.

Groundwater

There would be no additional employees, either permanent or transient, associated with the No Action Alternative. Therefore, current use of groundwater resources at both NAS Patuxent River and Webster Field would remain the same as under existing (1996) conditions. The air station is planning for future water conservation efforts for both the air station and Webster Field in its *Water Conservation Plan*. The focus of this plan is the potable water system and the installation of water conserving fixtures. In 1995, the air station prepared an *Emergency Drinking Water Plan* that provides for the needs of the Navy in case of a catastrophic event that would impair or damage the Patuxent River Complex potable water system. A draft version of the updated plan was sent to the Maryland Department of the Environment (MDE) for comments in January 1998. The air station expects to finalize the updated plan in May 1998 (Johnson, January 29, 1998).

Strict adherence to the Spill Prevention, Control and Countermeasures Plan, Oil and Hazardous Substance Spill Contingency Plan, and Integrated Pest Management Plan would continue to protect groundwater resources under the No Action Alternative.

4.13.2 Operational Workload Alternatives I, II, and III

4.13.2.1 Chesapeake Test Range and Localized Target Areas

Surface Water

The surface water impacts of the three Operational Workload Alternatives would be similar to those described for the No Action Alternative, with the exception of impacts associated with the volume of lead from expended projectiles that would be deposited in the Bay, and the use and discharge of signal cartridges in the Bay. The total estimated amount of lead from these projectiles would be up to 360 kg (800 lbs), which corresponds to a volume of approximately three hundredth cubic m (or a little more than one cubic ft). As described in Subchapter 4.12, to assist in visual observation in weapon-target impact, a practice bomb signal cartridge (i.e., spotting charge) can be used that emits smoke or flames for impact marking. Spotting charges are not typically used in support of RDT&E activities in the CTR, but they are commonly used in military training activities. It is projected that about 450 signal cartridges would be used on an annual basis during military training activities in the Patuxent River Complex. This would be the equivalent of less than two per day.

The signal cartridges used with practice bombs can contain red phosphorus or titanium tetrachloride. For example, the MK-4 cartridge contains 65 grams of red phosphorus, while the CXU-3 and CXU-4 contain about one fluid ounce and two fluid ounces, respectively, of titanium tetrachloride. The water quality impacts of each of these compounds would be as follows:

- Elevated phosphorus levels can cause algal blooms and increased eutrophication in aquatic systems where phosphorus limits primary production (Wetzel, 1983, in NAVFACENGCOM, March 1998). Where the molar ratio of nitrogen-to-phosphorus (NP ratio) are greater than seven (Wetzel, 1983 in NAVFACENGCOM, March 1998), phosphorus in the water body is in short supply and limits primary production. Values of the NP ratio less than seven indicate that the system is enriched with phosphorus and is nitrogen-limited. The molar ratio in the Chesapeake Bay near the targets is 40:1 (Chesapeake Bay Program Internet Website, accessed February 24, 1998), suggesting that primary production in the Chesapeake Bay is phosphorus-limited. Inputs of phosphorus oxides from signal cartridges (or other sources) could stimulate primary production. However, the release of 65 to 130 grams per day would not cause more than small, localized increases in phytoplankton production.

- In surface water, titanium tetrachloride undergoes rapid hydrolysis to form the chloride ion (Cl^-), the hydrogen ion (H^+), and $Ti(OH)_4$, a titanium hydroxide complex (Uhrmacher, et al., 1985, in NAVFACENGCOM, March 1998). The chloride contribution from signal cartridges to surface water resources would be minor since the chloride ion is naturally abundant in marine and estuarine waters. Also, because marine and estuarine waters act as buffers (i.e., they may be characterized by high alkalinity), hydrogen ion inputs from signal cartridges would not affect surface water pH in the target areas. There may be temporary increases in the titanium concentration of the water in the immediate vicinity of a signal cartridge discharge. This would be in contrast to the naturally low concentrations of titanium in seawater (0.001 ppm as described by Horn, 1978 in NAVFACENGCOM, March 1998). The limited information available on the aquatic toxicology of titanium indicates that this element can be acutely toxic to some species of algae and zooplankton at concentrations between two and 4.6 mg/l (Uhrmacher, et al., 1985, in NAVFACENGCOM, March 1998). Although it may be possible that the concentration of titanium tetrachloride in surface water in the immediate area of a signal cartridge discharge could reach these levels, titanium tetrachloride reacts rapidly when exposed to air or moisture. Thus, it is expected that the small quantities released (regardless of the concentration of the titanium tetrachloride) would quickly be diluted in the Bay's waters with or without wave action and would not accumulate and consequently not have a significant impact on surface water quality.

Groundwater

In the CTR or localized target areas, groundwater impacts resulting from any of the three Operational Workload Alternatives would essentially be the same as for the No Action Alternative. There would be minimal increases in groundwater withdrawals within permitted levels; release of metals associated with gun ammunition would be minimal; and groundwater movement is generally upward through the sediments at these locations.

4.13.2.2 NAS Patuxent River and Webster Field

Surface Water

As there would be no planned military construction or renovations associated with implementation of any of the Operational Workload Alternatives, there would be no new impermeable areas added to NAS Patuxent River or Webster Field and no new increase or changes in flow of stormwater runoff. Therefore, there would be no impacts to surface waters, stormwater collection systems, or 100-year floodplains.

Groundwater

Groundwater impacts at NAS Patuxent River and at Webster Field would be essentially the same for the three Operational Workload Alternatives as for the No Action Alternative. There would be no additional employees, and current use of groundwater resources at both NAS Patuxent River and Webster Field would be within permitted limits. The air station is planning for future water conservation efforts for both the air station and Webster Field in its *Water Conservation Plan.* The focus of this plan is the potable water system and the installation of water-conserving fixtures. In 1995, the air station prepared an *Emergency Drinking Water Plan* that provides for the needs of the Navy in case of a catastrophic event that would impair or damage the Patuxent River Complex potable water system. A draft version of the updated plan was sent to MDE for comments in January 1998. The air station expects to finalize the updated plan in May 1998 (Johnson, January 29, 1998).

Once again, strict adherence to the Spill Prevention, Control and Countermeasures Plan, Oil and Hazardous Substance Spill Contingency Plan, and Integrated Pest Management Plan would continue to protect groundwater resources under the No Action Alternative.

4.14 Aircraft Operations and Safety

4.14.1 No Action Alternative

4.14.1.1 Chesapeake Test Range and Localized Target Areas

Under the No Action Alternative, aircraft operations and flight safety in the CTR and at the target areas would continue to be accomplished through rigorous test planning, test article preparation, use of CTR Instrumentation and Air Traffic Control, and safety precautions for weapons/stores separation tests, all of which are described in Subchapter 3.14. In addition, adherence to the air station's BASH and DASH plans would ensure that impact hazards were avoided to the maximum extent possible.

Target areas would continue to be cleared approximately one hour before scheduled for use. Specific procedures used to clear the target areas may vary depending on the type of testing and the season of the year, but would generally include visual sweeps of the area using one or more surface craft and chase aircraft and/or radar sweeps. Recreational boaters, fishermen, or watermen would be requested to exit the restricted areas via radio transmission, written signs, hand signals, or other appropriate methods. If appropriate, helicopters equipped with loudspeakers would be used. Should an individual refuse to leave the area, tickets would be issued by the Range Safety Officer, or the US Coast Guard would be called in to escort the individual out of the area. As an additional safety measure, prior to release, the pilot would be required to fly over a target to perform a visual check to make sure the targets were clear. Also, all involved parties (range clearance boats, CTR flight controllers, the Range Computation and Control System engineers, Air Operations control tower staff, and other range safety personnel) would continue to be linked together by a voice radio system to ensure coordinated and controlled testing.

No night operations involving weapons/stores separation testing or releases of weapons would be anticipated under the No Action Alternative, because the RDT&E test activities proposed require sufficient light to videotape and/or make other visual observations of the test for evaluation at a later date.

Should an aircraft mishap occur, fuel or hydraulic fluids could be released. The magnitude and duration of the spill would be controlled through rescue and spill response procedures. The primary response to any mishap would be from NAS Patuxent River personnel and equipment. The second-tier response would be provided by a local oil spill removal organization capable of responding within one hour. The third-tier response would be the Supervisor of Salvage at Cheatham Annex near Williamsburg, Virginia. This planned response would allow quick containment of any spill and minimize any potential water quality impacts to the Bay.

4.14.1.2 NAS Patuxent River and Webster Field

Based on continued adherence to in-effect safety procedures and programs as described in Subchapter 3.14, no impacts to flight operations and safety would be anticipated under the No Action Alternative. In addition, with respect to Navy occupational safety and health issues, the safety and health of all Navy personnel are ensured through a series of programs and standards, including routine inspections and surveillance programs. Medical and industrial hygiene disciplines are integrated into other functional activities through a team approach. The workload due to flight activity levels proposed under the No Action Alternative would not affect personnel safety and health programs; therefore, no impacts are anticipated under this alternative.

4.14.2 Operational Workload Alternatives I, II, and III

4.14.2.1 Chesapeake Test Range and Localized Target Areas

Aircraft operations and flight safety in the CTR and at the target areas under the three Operational Workload Alternatives would be similar to that described for the No Action Alternative. However, increased flight and related operations could also lead to an increased potential for mishaps in the airspace of the CTR. Mishaps in the air could also lead to an increase in fuel dumping due to emergency situations and the jettisoning of stores in areas outside the vicinity of the targets. Contributing factors to the potential for mishaps would include increased maintenance requirements and stress on personnel accomplishing an additional workload in the same allotted time. Continued adherence and emphasis on airfield safety policies and procedures and range-related safety and clearance practices would minimize the potential for mishaps due to the proposed increased level of flight and related operations under the three Operational Workload Alternatives. Air Traffic Control at NAS Patuxent River would continue to enforce its "ten aircraft rule" for safety in the CTR (as described in Subchapter 4.13).

In addition, NAS Patuxent River supports an active Disaster Preparedness/Emergency Management Program to deal with aircraft mishaps, as well as other natural or manmade disasters or emergencies, including hurricanes, tornadoes, winter storms, fires, and gas line breaks. The air station's Disaster Preparedness Office maintains, and annually updates, Emergency Response Information on the 33 counties that fall within a 96-km (60-mi) "fly zone" around NAS Patuxent River. These counties are within the states of Delaware, Maryland, and Virginia. The Emergency Response Information includes the identity, telephone numbers, and emergency recall numbers for each County Emergency Manager (fire, police, hospital facilities, radio transmission frequencies, and other pertinent data).

In the case of an aircraft mishap, NAS Patuxent River's Department of Public Safety would dispatch an on-scene military representative immediately to coordinate with local officials. The air station's response team with the department's Communications Command and Control Van would then be dispatched. This van contains a state-of-the-art response system, including:

- A telephone system with hard lines, cellular phones, and a digital cellular satellite system;
- Radios capable of communicating with most emergency response units, most military and civilian aircraft, US Coast Guard and Natural Resources Police;
- Computers, copier, printers, and facsimile machine;
- Public address system; and
- Video/photographic digital camera equipment.

To assist the 33 "fly zone" counties, the Public Safety Department has, and would continue, to update its Emergency Response Information on an annual basis. This would include providing each county with emergency recall information for NAS Patuxent River. The Public Safety Department would also continue to update on an annual basis, and as conditions warranted, the appropriate state firefighting institutes in Delaware, Maryland, and Virginia on the types of emergencies that their members could encounter during an aircraft mishap. The state firefighting institutes are required to train their personnel concerning the emergencies their members could encounter during any aircraft mishap.

The same range clearance procedures as described in Subchapter 4.14.1.1 for the No Action Alternative would be implemented under all three Operational Workload Alternatives. However, activities in support of military training could involve nighttime weapons releases. Should that occur, the Range Safety Officer at NAS Patuxent River would clear the range by making radar sweeps and dispatching a range clearance boat to the target to verify clearance. As a further safety measure, aircraft using the targets at night would likely be equipped with night vision equipment that could be used to determine that the target was clear prior to releasing a weapon.

4.14.2.2 NAS Patuxent River and Webster Field

As with the No Action Alternative, continued adherence to in-effect safety procedures and programs (as described in Subchapter 3.14), including Navy occupational safety and health programs, would minimize the potential for mishaps due to the proposed increased level of flight and related operations under the three Operational Workload Alternatives. However, as mentioned above, increased flight and related operations could increase the potential for mishaps on the ground (e.g., fuel spills, BASH/DASH) as well as in the air around the airfield. Contributing factors to the potential for mishaps would include increased maintenance requirements and stress on personnel accomplishing an additional workload in the same allotted time. Continued adherence and emphasis on airfield safety policies and procedures and range-related safety and clearance practices would minimize the potential for mishaps due to the proposed increased level of flight and related operations under the three Operational Workload Alternatives.

4.15 Cumulative Impacts

Cumulative effects have been defined by the Council on Environmental Quality (CEQ) in 40 CFR 1508.7 as:

> impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions.

The CEQ regulations also state that the cumulative impacts addressed should not be limited to those from actual proposals, but must include impacts from other actions being contemplated or those that are reasonably foreseeable. Pursuant to these regulations, therefore, the analyses in this EIS considered other Navy actions in the Chesapeake Bay at the Naval Research Laboratory (NRL) at Chesapeake Beach, Maryland, and proposed training exercises at the Bloodsworth Island Shore Bombardment and Bombing Range.

The CEQ regulations further require that NEPA environmental analyses address connected, cumulative, and similar actions in the same document (40 CFR 1508.25). This requirement prohibits segmentation of a project into smaller components to avoid the required environmental analysis. Specifically, the result of a cumulative impact analysis should help refine the analysis of alternatives, aid in the design of appropriate mitigation, and ultimately result in a better decision. The analyses contained in this EIS address the impacts of increased flight and related operations in the Patuxent River Complex, as well as connected, cumulative, and similar existing and potential actions in the vicinity of the complex, where applicable. This document is not dependent upon other actions, nor does it foreclose other options or irretrievably commit resources to future projects not considered herein.

With respect to cumulative effects on resources in general, it is important to evaluate whether the proposed action will exceed the capacity of that resource to sustain itself and/or remain productive. Cumulative impact issues for this EIS have been taken into consideration throughout the proposed action's concept development and into and through the formal scoping process, including meetings and consultations with interested parties during the scoping and development phases. The intent of this process was to focus the document's discussion and analysis of the affected environment and environmental consequences on areas of specific public concern, principally the:

- Ecology of the Chesapeake Bay; and
- Human community.

Consequently, as appropriate, when cumulative impacts are discussed in this EIS, it is within the context of the threshold of environmental change involving the Chesapeake Bay ecosystem and/or the human community.

In analyzing cumulative impacts on both the Chesapeake Bay ecosystem and the human community, it is important to determine what additional stresses the proposed changes could have on those resources. The ultimate goal is to evaluate the maximum level of the cumulative effect that can be withstood before desired levels of ecological functioning and human quality of life deteriorate.

With respect to the ecology of the Chesapeake Bay, the cumulative impacts to the ecosystem of the Bay from implementation of the proposed action would be minor, and principally associated with the release of stores into the Bay. Previously shown Tables 4.9-1 and 4.9-2 provide stores release data for the last ten years by type of store. The stores are principally comprised of steel and iron, would corrode over time, and their contents (sand/vermiculite) would blend with existing Bay sediments. Although elevated iron concentrations may occur in the sediments surrounding the corroding store, affected sediments would be restricted to the immediate vicinity of the store itself and it would be unlikely that benthic organisms would be affected by the iron-enriched area. A positive cumulative impact over time is that released stores would provide hard substrate for benthic organisms to attach to and cluster around, thereby increasing the diversity of habitats for the underwater organisms in the vicinity of the released stores.

At present, there is no single source of information or point of contact at NAWCAD or NAS Patuxent River that tracks the quantity and type of stores released, recovered, and determined to be unrecoverable from the Chesapeake Bay during weapons/stores separation tests (and weapons release training exercises). Separate databases on stores releases are currently maintained by several activities within NAS Patuxent River, including the Weapons Division, Range Operations, Range Safety, and the tenants performing such activities. These separate databases are used for varied purposes, and record collected information electronically as well as in telephonic and handwritten records.

Because the Navy recognizes the importance of the historical context of a resource in analyzing and monitoring cumulative impacts, NAWCAD has begun a management initiative to develop a comprehensive and uniform electronic database linking the air station’s separate databases. Administration of the combined database would be the responsibility of the NAS Patuxent River OEP Office, which would provide for efficient tracking of the types and quantities of stores released into the Bay by activities at NAS Patuxent River and Webster Field.

Another water quality-related management initiative being undertaken by NAWCAD relates to the type of batteries powering the telemetry unit electrical systems that are attached to certain missile shapes and general purpose bombs released in the CTR. In the past, nickel-cadmium (Ni-Cd) batteries were used in telemetry units. Recent tests performed in conjunction with the F/A-18 E/F program have proven successful in using the environmentally-friendly lithium iron disulfide batteries in the telemetry units as a substitute for the Ni-Cd battery. Consequently, NAWCAD has instituted a management initiative to reduce and ultimately elminiate future use of Ni-Cd batteries through the required environmental reviews conducted by the ERB and OEP for each test or other activity proposed for the CTR. The use of Ni-Cd batteries in the Patuxent River Complex would only be permitted if lithium iron disulfide or other environmentally-friendly batteries were not available or would not meet technical requirements.

As discussed in Subchapter 4.9, the implementation of the proposed action would involve the annual release of up to 147 kg (327 lbs) of lead in the areas of the targets in the form of some small arms rounds. This corresponds to a volume of approximately one-hundredth of a cu m (one-half cu ft). However, as analyzed in Subchapter 4.13, due to the pH of the Bay this lead would be very insoluble and what small concentrations that are released into the overlying water column would be diluted rapidly. From the standpoint of cumulative impact analysis, this lead would be in addition to the lead released annually to the Bay by recreational fishermen in the form of lost sinkers. An informal survey of a single sporting goods store in the vicinity of the Bay yielded the information that about 1,350 kg (3,000 lbs) of lead sinkers were sold in 1997 alone, presumably replacing sinkers lost in the Bay (Bock, 1998). Consequently, the amount of lead associated with the firing of lead projectiles in the area of the targets under the proposed action would have an insignificant cumulative water quality impact on the Bay.

Within the context of the human community considered in this EIS, two areas of potential cumulative impacts have been identified and evaluated:

- The frequency in which the surface areas in the middle portion of the Bay -- the area within the aerial and surface firing range -- would be closed to accommodate military activities; and

- Aircraft noise from jets, helicopters, and UAVs.

Under the Operational Workload Alternatives proposed for the Patuxent River Complex, the surface areas to be closed would remain the same as under existing (1996) conditions; however, the frequency of closure would increase, with limited portions of the Bay closed to commercial fishing and recreational boating and fishing between 36 and 70 hours per month. Other Navy activities (as proposed for Bloodsworth Island Shore Bombardment and Bombing Range, for example) could close other limited portions of the Bay for an additional 24 hours per month. The total potential for closure of limited portions of the Bay to accommodate Navy activities would, therefore, be projected at between 60 and 94 hours per month, or an average frequency of 15 to 24 hours per week. These operations would occur during day and nighttime hours. During June through September, when commercial fishing is most productive, portions of the Bay would be closed about 21 to 33 percent of weekly daylight hours. For recreational fishermen and boaters, the level of closure would be less (15 to 24 percent of weekly daylight hours). This level of closure, while of greater duration than occurs presently, would not appear to pose a significant limitation for commercial fishing activities given that:

- Most Navy activities would be short (an average duration of two to three hours);

- Tests/exercises would occur at irregular intervals during the month and include evening and nighttime hours when use of the Bay for fishing and boating (commercial fishing activities, in particular) would be less likely to occur;

- The areas to be cleared are relatively small when compared to the surface area of the Chesapeake Bay and are within designated surface restricted areas as codified in 33 CFR 334; and

- Watermen and recreational boaters and fishermen could use other areas of the Bay during Navy operations and return to the restricted areas after operations were completed.

In the area of aircraft noise, there would be a cumulative increase in the use of the MTRs in the vicinity of the CTR. The increase attributable to Navy use has been accounted for in the noise analysis contained in Subchapter 4.6. Other users of the MTRs would be other military services, including the US Air Force and the Air National Guard, the latter of which schedules the use of VR 1711, 1712, and 1713. Another contributing noise source in the Chesapeake Bay area would continue to be the firing of guns at the Naval Surface Warfare Center Dahlgren, Virginia.

With respect to UAV operations, the scope of the proposed action includes the level of operations associated with existing programs. As new UAV programs are considered, they will be evaluated by the Patuxent River Complex ERB to determine if they meet the operational type and tempo forecast, and are within the envelope of environmental impacts as analyzed in this EIS. Should such new programs exceed the scope of this EIS, as determined by the ERB, separate NEPA documentation would be required.

Cumulative impacts in the areas of land use; community facilities and services; transportation; air quality; noise; infrastructure; cultural resources; topography, geology, and vegetation; wildlife and fisheries; water quality; ordnance stores, hazardous materials, and radio frequency sources; and aircraft safety were determined to be nonexistent or minor, and not significant.

Chapters 5-9

- Mitigation Measures
- Relationship of the Proposed Action to Plans, Policies, and Controls
- Unavoidable Adverse Effects
- Relationship Between Local Short-term Uses/Long-term Productivity
- Irreversible and Irretrievable Commitments of Resources

5 MITIGATION MEASURES

The mitigation measures that would minimize potential environmental impacts as identified in this EIS are discussed in this chapter. These proposed mitigation measures were developed in response to comments received during the public review period for the DEIS and focus on mitigating public "annoyance factors" associated with certain Navy flight and related operations, specifically aircraft noise and sonic booms in the CTR, UAV overflights, and the operation of the open-air test cell at NAS Patuxent River. Compliance with these mitigation measures will be tracked as identified in the EIS implementation plan as described in Chapter 2 of this EIS.

5.1 Aircraft Noise and Sonic Booms

The results of the noise impact analysis for CTR flight operations (as documented in Subchapter 4.6 of this EIS) did not initially indicate a need for developing and applying mitigation measures to reduce aircraft noise, including sonic booms. However, the nature and level of public comment received during the DEIS public review period resulted in the Navy's reviewing the issues and proposing the following mitigation measures:

- **Noise Disturbance Reporting System** - Establishment of formalized procedures to ensure proper handling of and response to noise or aircraft disturbance reports. These procedures will involve a centralized process for receiving and responding to noise disturbance reports. Noise disturbance reports will be acknowledged by letter, or if requested, a return call will be made to the individual.

  An electronic database of noise disturbance reports will be maintained. The AICUZ Officer will review the database and new reports on a monthly basis. This review will focus on the nature of the reports and an analysis of these data to determine if any trends exist that may justify corrective action, as appropriate. For example, if the AICUZ Officer's monthly review identified a procedural or operational change that would minimize noise disturbances in the future and could be accomplished without jeopardizing mission requirements, that operational change would be implemented.

- **Briefs on Air Operations Procedures** - Expansion of the existing briefings on aircraft operations procedures that are conducted with all users of the CTR, and others, as appropriate, to ensure an understanding of proper procedures and EIS mitigation measures. This brief will include review of OPNAVINST 3710.7R, which identifies disciplinary actions that could be taken for violation of flight restrictions.

- **Sonic Booms** - The results of the noise analysis show an L_{Cdn} of 40 dB over the water in the CTR near Smith Island. This L_{Cdn} contour delineates where impacts at ground level would be negligible. However, a number of complaints concerning sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Operations conducted by NAWCAD in the Patuxent River Complex may not be the only source of loud noises, including sonic booms. Other sources could include military jet aircraft traversing MTRs that cross Maryland's Eastern Shore and Virginia's Northern Neck or the firing of large guns at the Naval Surface Warfare Center Dahlgren, Virginia, which is situated on the Potomac River. However, to mitigate for sonic booms that are potentially caused by Patuxent River Complex operations in the CTR, the Navy has proposed the following:
  - Restricting supersonic flights below 9,000 m (30,000 ft) to supersonic test flights for weapons separation. Above 9,000 m (30,000 ft), supersonic flights are restricted to mission-critical flights only.
  - Implementing a sonic boom monitoring system in the CTR. The information developed from this system and the noise/aircraft disturbance reports will be used to enable corrective action to be taken, or to alter operations or procedures to minimize sonic boom impacts, as appropriate.

With respect to aircraft noise in the vicinity of the NAS Patuxent River and Webster Field airfields, the 75+ dB DNL and the 70+ dB DNL contours would not extend beyond the property boundaries of each installation, respectively. Therefore, no aircraft noise-related mitigation measures are proposed for operations at these locations, although the Navy would continue its current practices of routing aircraft over water rather than populated areas, weather or other conditions permitting.

5.2 Overflights by UAVs

Although noise impacts of UAV overflights were evaluated in the noise analysis documented in Subchapter 4.6, the results of this analysis did not indicate that UAV overflights were the source of significant noise impact. However, the nature and level of public comment on UAV-related noise received during the DEIS public review period resulted in the Navy's reassessing this issue.

It was found that UAVs presently operate in a constricted area of the CTR over the Northern Neck of Virginia. This area was originally established to easily segregate unmanned from manned flight operations. However, the constraints imposed by operating in this small area have resulted in multiple UAV overflights of the same locales numerous times per mission. As a result, residents of the Northern Neck have been subjected each day to the low level noise and almost continuous presence of the UAVs, both of which are considered to be highly annoying.

To mitigate this annoyance factor, the Navy will increase the area within the CTR available to UAVs for routine training purposes. This action will greatly reduce UAV exposure time over any one location and thus eliminate the almost continuous presence of UAVs which annoyed many citizens. These additional UAV operating areas are being identified by the Navy using detailed demographic and land use data to avoid overflights of densely populated areas.

This mitigation plan, estimated to be fully implemented during the period between February 1999 to August 1999, would cause no additional environmental impacts beyond those previously discussed for existing flight operations in this EIS. The Public Affairs Office will notify potentially affected residents of plan implementation through mailings and press releases.

5.3 Operations at the Open-Air Test Cell

During the first and second quarters of 1998, an anomalous situation occurred that caused the tempo and type of operations at the open-air engine test facility (located near Patuxent River shoreline) to temporarily differ from those predicted in the EIS. During this period, the open-air facility was used to complete critical engine tests for the ongoing F/A-18E/F aircraft test program resulting in increased noise levels in the Solomons, Maryland area. The open-air facility was used because the air station’s new enclosed primary engine test cell (the enclosed T-10) was unavailable due to facility start-up problems. When the T-10 test cell became available to support the F/A-18E/F program, the short-term testing effort at the open-air facility ended.

However, there is a continuing need to conduct critical engine tests at the open-air facility. In order to continue testing at this location and at the same time minimize impacts to the environment, a noise mitigation plan has been developed and the Navy has committed to eliminating the use of the open-air engine test facility for aircraft jet (turbofan and turbojet) engine maintenance runs. The only exception would be for mission-critical situations where the primary engine maintenance test cell, the T-10, is unavailable for an extended period of time. Use of the open-air engine test facility in these situations would require the approval of the Commanding Officer of NAS Patuxent River.

In addition to the above-identified mitigation measure, the Navy will investigate feasible technical solutions to reduce the noise associated with operations at the open-air engine test facility. The Navy will also evaluate the technical feasibility of developing an alternative back-up site for the T-10, such as the hush house, to further reduce the likelihood that the open-air engine test facility will be required for aircraft jet engine maintenance runs.

6 RELATIONSHIP OF THE PROPOSED ACTION TO FEDERAL, STATE, AND LOCAL PLANS, POLICIES, AND CONTROLS

The proposed action would comply with existing federal regulations and with state, regional, and local policies and programs. The federal acts, executive orders, and policies with which the proposed action must demonstrate compliance include:

- National Environmental Policy Act;
- RCRA, CERCLA, and SARA;
- Executive Order 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements;
- Chesapeake Bay Agreement;
- Clean Water Act;
- Clean Air Act;
- Endangered Species Act;
- Marine Mammal Protection Act;
- National Historic Preservation Act;
- Coastal Zone Management Act;
- Occupational Safety and Health Act and Navy Occupational and Safety and Health Program;
- Executive Order 11990, Protection of Wetlands;
- Executive Order 11988, Floodplain Management; and
- Executive Orders 12898 and 13045, Environmental Justice.

For the preparation of this EIS, contacts were made with relevant state, regional, and local authorities to determine which existing policies and programs apply to the proposed action.

6.1 National Environmental Policy Act (NEPA)

This Environmental Impact Statement has been prepared in accordance with the Council on Environmental Quality regulations implementing NEPA (40 CFR Part 1500-1508) and Navy NEPA procedures (OPNAVINST 5090.1B). Executive Order 11991 of May 24, 1977 directed the Council on Environmental Quality to issue regulations for procedural provisions of NEPA; these are binding for all federal agencies. The preparation of this EIS and the provision for its public review are being conducted in compliance with NEPA.

6.2 RCRA, CERCLA, and SARA

The Resource Conservation and Recovery Act (RCRA) was passed in 1976 and continued earlier provisions relating to solid waste and resource recovery, including hazardous waste. It sets standards for hazardous waste treatment, storage, and disposal facilities. The management of hazardous waste in the Patuxent River Complex at NAS Patuxent River and Webster Field is conducted in conformance with the Subtitle C regulations and the proposed action would not impact programs in effect in the Patuxent River Complex.

In 1980, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) was passed in order to provide a superfund for cleanup of sites with uncontrolled releases of hazardous substances. This program was continued in the Superfund Amendments and Reauthorization Act (SARA) of 1986. Section 211 of SARA provides continued authorization for the DoD Environmental Restoration Program and the Defense Environmental Restoration Account. Major responsibilities for monitoring compliance with these acts rest with the USEPA.

The Navy recognizes its responsibilities for control and management of hazardous substances and wastes in compliance with federal, state, and local requirements. These responsibilities are defined in the Navy's Environmental and Natural Resources Program Manual (US Department of the Navy, November 1994) and activities in the Patuxent River Complex conform with these responsibilities. All hazardous materials procured in the complex are comprehensively managed by the HMC&M Office in a state-of-the-art hazardous material warehouse and storage facility (HAZMART). The process followed involves the centralized distribution of hazardous materials through HAZMART and the proper disposal of hazardous waste. Hazardous materials generated as a result of the proposed action would be managed through HAZMART.

6.3 Executive Order 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements

This Executive Order mandates that federal agencies place high priority on obtaining funding and for developing innovative pollution prevention programs for installations. A Pollution Prevention (P2) Plan for NAS Patuxent River has been implemented and source reduction, through chemical substitution or elimination, is its primary emphasis. This effort has already reduced the magnitude of different National Stock Number products in use in the Patuxent River Complex and has identified specific chemicals for reduction or elimination. The proposed action would comply with the mandates of this Executive Order.

6.4 Chesapeake Bay Agreement

The Chesapeake Bay Program was established in 1983 with the signing of the Chesapeake Bay Agreement. This agreement is a unique voluntary partnership between Pennsylvania, Maryland, Virginia, the District of Columbia, the tri-state legislative Chesapeake Bay Commission, and the USEPA. Federal agencies play a major role as partners in the Bay program. In 1994, 30 federal officials representing 24 agencies signed the *Agreement of Federal Agencies on Ecosystem Management in the Chesapeake Bay* committing to 20 specific commitments that further protection and restoration of the Bay's ecosystem. The proposed action would be conducted in compliance with these commitments while meeting the requirements of the Navy's mission in the Patuxent River Complex. This EIS assesses the impacts of the proposed action on the environment and Chesapeake Bay and describes on-going management initiatives that would lead to the development of a released stores database and the elimination of releases of Ni-Cd batteries in the Bay.

6.5 Clean Water Act

The Clean Water Act of 1977, which amends the Federal Water Pollution Act of 1972, and subsequent amendments, were designed to assist in restoring and maintaining the chemical, physical, and biological integrity of the nation's waters. This covers the discharge of pollutants into navigable waters, wastewater treatment management, and protection of relevant fish, shellfish, and wildlife. Section 402 of this act requires a National Pollutant Discharge Elimination System (NPDES) permit for discharges into navigable waters. Congress also passed the Water Quality Act of 1987 to address the excessive levels of toxic pollutants still found in some waters.

A Section 404 permit is not required because implementation of the proposed action would have no impacts to wetlands and would not involve a discharge of dredged or fill material. Regulatory authorities, in general, have not required Section 402 (NPDES) permits for the release of ordnance from Navy ranges to surface water.

6.6 Clean Air Act

The Federal Air Pollution Control Act of 1955, the succeeding Clean Air Act of 1970, and subsequent amendments specify regulations for control of the nation's air quality. Federal and state ambient air standards have been established for each criteria pollutant. The 1990 amendments to the Act require federal facility compliance with all applicable substantive and administrative requirements for air pollution control. Key programs are Nonattainment New Source Review, Prevention of Significant Deterioration, Title V Permitting, and General Conformity (note that the states of Delaware, Maryland, and Virginia have adopted a comparable set of conformity regulations). The proposed action would be in compliance with all applicable Clean Air Act regulatory programs.

Total net changes in NO_x and VOC emissions attributable to implementation of the proposed action were compared to nonattainment area emission target levels in order to evaluate regional significance. A figure of ten percent of the SIP emission target level was used as the measure of significance, based on the criteria in the general conformity rule. For all Operational Workload Alternatives, net changes in emissions would be less than ten percent of the designated target levels. Further, emission rates would be less than the applicability rates of 45 metric tons (50 tons) per year of NO_x or VOC, a formal Conformity Analysis is not required. A Record of Non-Applicability is included in Appendix F. In summary, while the proposed action would result in a slight addition in air emission in the complex, there would be no significant environmental impact.

6.7 Endangered Species Act

The Endangered Species Act of 1973 and subsequent amendments provide for the conservation of threatened and endangered species of animals and plants, and the habitats in which they are found. The proposed action would have no impacts on threatened and endangered species.

6.8 Marine Mammal Protection Act

The Marine Mammal Protection Act of 1972 (MMPA) was most recently reauthorized in 1994. The Act recognizes that marine mammals are resources of great international significance, and have aesthetic, recreational, and economic value. The act protects marine mammals since certain species and population stocks of marine mammals are, or may be, in danger of extinction or depletion as a result of man's activities and provides that measures be taken to replenish any species or population stock that has diminished below its optimal sustainable level. The MMPA established a moratorium, with certain exceptions, on the taking of marine mammals in US waters by US citizens on the high seas, and on importing marine mammals and marine mammal products into the US. The proposed action would have no impacts on marine mammals.

6.9 National Historic Preservation Act

This National Historic Preservation Act (NHPA) was passed in 1966 to provide for the protection, enhancement, and preservation of any property that possesses significant architectural, archaeological, historical, or cultural characteristics. Executive Order 11593 of 1974 further defined the obligations of federal agencies concerning this act. Section 106 of NHPA requires the head of any federal agency having direct or indirect jurisdiction over a proposed federal or federally financed undertaking to, prior to the expenditure of any federal funds on the undertaking, take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places.

Implementation of any of the three operational workload alternatives would maintain existing uses of the historic structures at NAS Patuxent River and Webster Field. No new construction, alteration, or renovation would be undertaken. Further, the Navy will undertake Section 106 consultations should implementation of the proposed action lead to any unscheduled new construction, alteration, or renovation at either NAS Patuxent River or Webster Field. Therefore, the Navy has determined that implementation of the proposed action (increased flight and related ground operations in the Patuxent River Complex) would be an undertaking as defined in 36 CFR 800.2(o) of the Advisory Council for Historic Preservation's regulations, *Protection of Historic Property*. Further, the Navy has evaluated the area of potential effect of the proposed undertaking (NAS Patuxent River, Webster Field, and the CTR), assessed the effect (36 CFR 800.5[a]), applied the Criteria of Effect (36 CFR 800.9[a]) to the affected resources, and determined that there would be "No Adverse Effect" on historic properties. In a letter dated February 10, 1998, the Navy requested concurrence with this determination from the Maryland Historical Trust (see Appendix B). On April 3, 1998, the Maryland Historical Trust provided a concurrence that the proposed action would have "No Effect" on historic properties in Maryland. On August 13, 1998, the Virginia Department of Historic Resources provided a concurrence that the proposed action would have "No Adverse Effect" on historic resources in Virginia that are listed in or eligible for listing in the National Register of Historic Places.

6.10 Coastal Zone Management Act

The Coastal Zone Management Act of 1972 provides assistance to states, in cooperation with federal and local agencies, for developing land and water use programs for coastal zones. This includes the protection of natural resources and management of coastal development. Policy is implemented by the respective state's coastal zone management program. With respect to CZM consistency for projects on federal lands, the Navy has determined that implementation of the proposed action would comply with and be carried out in a manner consistent to the maximum extent practicable, with the coastal zone management programs of Delaware, Maryland, and Virginia. Concurrence of the Navy's determination has been received from Delaware, Maryland, and Virginia.

6.11 Occupational Safety and Health Act and Navy Occupational Safety and Health Program

The Occupational Safety and Health Act (OSHA) of 1970, last amended on November 5, 1990, guarantees the quality of the working environment for all employees. In accordance with OSHA, the Navy has developed a proactive Navy Occupational Safety and Health (NAVOSH) Program and prepared OPNAVINST 5100.23C Navy Occupational Health and Safety, an instruction manual providing guidance for a healthy and safe work environment. Tailored to the Navy's unique environment and its hazards, NAVOSH and the instruction establish, among other things, OSHA training and inspections, occupational medical investigations, and industrial hygiene regulations.

While increased flight and related operations could be expected to increase the potential for mishaps, activities conducted by the Navy under the proposed action at the Patuxent River Complex would continue to comply with these regulations. As a result, potential mishaps could be avoided or minimized.

6.12 Executive Order 11990, Protection of Wetlands

This order of May 24, 1977 directs federal agencies to take action to protect wetlands on their property and mandates review of proposed actions on wetlands through procedures established by the NEPA. Implementation of the proposed action would result in no impacts to wetlands.

6.13 Executive Order 11988, Floodplain Management

This order sets forth the responsibilities of federal agencies in reducing the risk of flood loss or damage to personal property, minimizing the impact of flood loss, and restoring the natural and beneficial functions of floodplains. This order was issued in furtherance of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. The proposed action would have no impact on floodplains.

6.14 Executive Orders 12898 and 13045, Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was signed on February 11, 1994. It directs all federal departments and agencies to incorporate environmental justice in achieving their mission. Each federal department and agency is to accomplish this by conducting programs, policies, and activities that substantially affect human health or the environment in a manner that does not exclude communities from participation in, deny communities the benefits of, nor subject communities to discrimination under such actions because of their race, color, or national origin.

The study area population ethnic makeup and income factors are described in Subchapter 3.2. About 26 percent of the population residing in the land area underlying the CTR belong to minority groups. About nine percent of families and 12 percent of persons residing within the footprint of the CTR were considered to have incomes below the poverty level in 1989. These statistics are comparable to state-level data for Delaware, Maryland, and Virginia. There are no discernable concentrations of minority or low income individuals within the footprint of the CTR that would be adversely affected by noise from aircraft overflights. Therefore, as evaluated in accordance with Executive Order 12898, Environmental Justice, overflights of the land and water areas underlying the CTR under the proposed action would not cause any disproportionately high and adverse environmental or health impacts specific to any groups or individuals residing within Southern Maryland, Eastern Shore, or Northern Neck communities, including those from minority or low-income populations. Furthermore, no persons would be displaced.

Finally, the public participation mandated under the National Environmental Policy Act process (notifications and public advertisements of the scoping meeting and public hearing) will allow the general public (including minority and low-income individuals and populations) the opportunity to comment on the proposed action.

Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, was signed on April 21, 1997. Due to recognition by the scientific community that children may suffer disproportionately from environmental health and safety risks, each federal agency is directed to identify and assess such risks and consequently ensure that its policies, programs, activities, and standards address effects on children. "Environmental health and safety risks" are defined as "risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest." Covered regulatory actions that are affected by this EO are those substantive actions in a rulemaking and concern an environmental health risk or safety risk that an agency has reason to believe may disproportionately affect children. This proposed action would not disproportionately affect children.

6.15 State and Local Plans and Policies

The Navy pursues close and harmonious planning relations with local and regional agencies and planning commissions of adjacent cities, counties, and states for cooperation and resolution of mutual land use and environmentally-related problems. In addition, coordination was made with state and regional planning clearinghouses as established pursuant to Executive Order 12372 of 1982. In preparing this EIS, information from relevant state, regional, and local agencies was reviewed for data on potential impacts of the proposed action. Opportunities to provide input occurred during the Scoping period from April 1 through June 1, 1997, including the Scoping Meetings held in May 1997, as well as during the DEIS public review period between May and July 1998. Comments from state, regional, and local agencies were received via the MDE Clearinghouse Coordinator, the Virginia Department of Environmental Quality Coordinator, and the Delaware Coastal Management Program. Based on comments received, the proposed action is considered to be consistent with state, local, and regional plans and policies.

7 UNAVOIDABLE ADVERSE EFFECTS

Unavoidable adverse effects resulting from the proposed action would be related to aircraft noise as described in Subchapter 4.6.

8 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Short-term uses of the environment are considered those that occur over a period of less than the life of the proposed action. Conversely, long-term uses of the environment include those impacts that would persist for a period of five years or the life of the proposed action.

None of the activities addressed in this EIS for increased flight and related operations in the Patuxent River Complex could be categorized as short-term. For example, although the use of the target areas may be of short duration, the target areas would receive increased and repeated use. The same is true of the use of the airspace of the CTR and the proposed extended use of the laboratories and other facilities at NAS Patuxent River and Webster Field.

From the long-term perspective, the increased use of the targets, airspace, and facilities would increase the productivity of the Patuxent River Complex. This would achieve the purpose of the proposed action, which is to enhance the use of taxpayer-funded facilities. The proposed action would also meet the long-term goal of allowing the Navy to successfully meet current and future national and global defense challenges posed by a post-Cold War environment. The negative impacts of achieving these goals would include closure of small portions of the Bay, air emissions, increased exposure to aircraft noise, increased expenditure of stores, and increased infrastructure use. Implementation of the proposed project would positively affect long-term productivity in the region surrounding the middle portion of the Chesapeake Bay.

9 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that use of these resources may have on future generations. The use or destruction of specific resources (e.g., energy and minerals) that cannot be replaced within a reasonable time frame are termed an irreversible resource commitment of that resource.

Commitments of resources associated with the proposed action would include the aviation fuel that would be consumed by the aircraft flying the sorties to accomplish the projected RDT&E and military training missions and the fuel used by range safety boats to clear the areas around the targets. Also irreversibly and irretrievably committed to the proposed action would be the energy (electrical power, heating oil, and natural gas) used in operating facilities in the Patuxent River Complex for extended hours of operation, supplies of water, and sewage treatment capacity at both METCOM's Pine Hill Run Sewage Treatment Facility and the NOTW at Webster Field. Also committed would be the quantities of stores to be released into and not recovered from the Chesapeake Bay. In addition, the use of the land area comprising NAS Patuxent River, Webster Field, and the targets would be irreversibly and irretrievably committed to the proposed action for its life.

Chapter 10

Public Review Process and Response to Comment

10 PUBLIC REVIEW PROCESS AND RESPONSE TO COMMENT

Public involvement in the review of EISs is stipulated by 40 CFR Part 1503 of the Council on Environmental Quality's regulations implementing the NEPA and in OPNAVINST 5090.1B. These regulations and guidance provide for active solicitation of public comment via scoping meetings, public comment periods, and public hearings. This chapter has been prepared to respond to the specific questions and comments raised by individual commentors during the public comment period on the *Draft Environmental Impact Statement for Increased Flight and Related Operations in the Patuxent River Complex, Patuxent River, Maryland.*

10.1 Public Review Process

10.1.1 Overview of Public Participation Program

EISs are issue-oriented, and input from the public -- including citizens, elected officials, special interest groups, and local, state, and federal agencies -- is very important. Public involvement should:

- Promote understanding on the part of the public about the way environmental problems are studied and solved;
- Keep the public informed about the project and the EIS; and
- Actively seek opinions and perceptions from all concerned citizens.

The public participation program designed for the *EIS for Increased Flight and Related Operations in the Patuxent River Complex, Patuxent River, Maryland*, was intended to provide as much opportunity as possible for members of the public to learn about the proposed project. Emphasis was placed on the Integrated Management Plan (IMP) (which describes future Patuxent River Complex operations in the CTR), the CTR, and the EIS, and to comment on them. Communications tools to be used in scoping, including a video, were reviewed for clarity of content by a Public Involvement Working Group. This group's membership represented a cross-section of the community at large, including persons in business, agriculture, academia, government agencies (USEPA and state natural resources), as well as watermen, citizens, elected officials, recreational boaters, environmentalists, and representatives of the Navy League, Navy active enlisted, and Navy active officers.

10.1.2 Notice of Intent

The NOI for this project was published in the *Federal Register* on April 1, 1997. It broadly described the proposed action, the alternatives to be considered, and the analyses to be conducted for this EIS. The NOI also announced that five public scoping meetings would be held during the first two weeks of May 1997.

10.1.3 Public Scoping Meetings

Public scoping meetings were held between May 6 and May 15, 1997 in five Maryland and Virginia communities underlying or adjacent to the footprint of the CTR: Prince Frederick, Leonardtown, Westover, and Cambridge in Maryland, and Burgess in Virginia. The meetings were designed to be people-friendly, open house-type meetings. The first stop for an attendee was a 15-minute video that provided an introduction to the Patuxent River Complex, explained the purpose of the IMP, and described the NEPA process. Next, attendees visited a series of five poster stations, manned by knowledgeable personnel. Through text and graphic presentations, the poster stations provided an explanation of the IMP, the CTR, and the EIS. Attendees had the opportunity to ask questions, receive answers, and make comments. At sign-in, all attendees were given a packet of information as take-home supplements to the poster station displays that included copies of the NOI, fact sheets about the proposed project, a brochure, and other related materials.

The public scoping meetings were attended by 120 persons, and 109 comments were offered. An additional 25 comments were received via a toll-free telephone number, an Internet website, fax, and other means. General areas of concern expressed by commentors included (but not listed in order of importance):

- Air emissions from aircraft;
- Aircraft noise (especially impacts of sonic booms on humans, wildlife, and domestic animals);
- Electromagnetic pulse (EMP) impacts;
- Environmental stewardship;
- Frequency of use of the restricted areas and possible closure of portions of the Chesapeake Bay and its resources to the watermen and recreational boaters;
- Future availability of restricted airspace by private pilots and local airports;

- Range operations-related interference with TV reception or other electronic equipment;
- Issues related to BRAC;
- Low-flying aircraft;
- Presence of large aircraft overhead apparently using the NAS Patuxent River airfield and airspace;
- Potential for increased ordnance stores release as a result of IMP implementation;
- Potential restrictions on use of the Chesapeake Bay (individual events and cumulatively from all Navy operations);
- Safety;
- Use of UAVs; and
- Water pollution (e.g., frequency and impacts of fuel dumping).

A complete report of comments received has been published separately in *Report on Public Scoping: Draft Environmental Impact Statement for Increased Flight and Related Operations in the Patuxent River Complex, Patuxent River, Maryland* (NAWCAD, September 1997).

10.1.4 Information Repositories

Documents produced for the Patuxent River Complex IMP and EIS have been made available for review at public libraries and schools throughout the Chesapeake Bay area and at the Law Library at NAS Patuxent River. A complete list of repositories, addresses, and hours of operation is available at the EIS Internet website at: *http://tamsconsultants.com/paxriver/*. The Internet website will be available for information purposes until 60 days after publication of the ROD in the *Federal Register*.

10.2 Public Hearings and Comment Opportunities for the DEIS

10.2.1 Filing and Distribution of the Draft Environmental Impact Statement

On May 15, 1998, copies of the DEIS and/or its Executive Summary, along with a copy of the public hearing notices, were distributed to agencies and officials of federal, state, and local governments, citizen groups and associations, and other interested parties.

10.2.2 Public Review Period and Public Hearings

Public review and comment on the DEIS occurred through July 29, 1998. This comment period originally was scheduled to close on June 29, 1998 and was first extended to July 6, 1998, and then to July 29, 1998. During this period, public hearings were held as follows:

- June 10, 1998 - Lusby, Maryland;
- June 15, 1998 - Cambridge, Maryland;
- June 17, 1998 - Heathsville, Virginia; and
- June 22, 1998 - Great Mills, Maryland.

An open house, featuring information stations and videos on the DEIS and its findings, was available for public review before, during, and after the formal public hearing where comments were taken by a stenographer. The hearings were conducted in accordance with NEPA requirements. Complete transcripts of the hearings are available for the cost of reproduction from:

Ms. Kelly Burdick
c/o Office of Legal Counsel
47031 Liljencrantz Road
Bldg 435, MS 39
Patuxent River, MD 20670

10.3 Receipt of Comments

Comments on the DEIS were received in the following forms: letters, written statements delivered at the public hearings, oral statements made at the public hearings, written statements received via facsimile and e-mail correspondence, and oral statements received via toll-free telephone voice mail. In some cases, oral statements were summaries or verbatim readings of written statements submitted at the public hearings or of letters that were sent to the Navy. Written and oral comments were received from a total of 137 commentors, including federal, state, regional, and local agencies, groups and associations, and private individuals. Comments postmarked by July 29, 1998 or received via facsimile, voice mail, or e-mail by 5:00 pm on July 29, 1998 were reviewed and are considered in this chapter.

10.3.1 Identification of Comments

Each submission received, whether written, contained in the transcripts of the public hearings, or transcribed from voice mail, were assigned one of the following letter codes:

F - Federal agencies and officials;
S - State agencies and officials;
R - Regional agencies and officials;
L - Local agencies and officials;
G - Groups and associations; and
P - Public (Individuals).

These labels were assigned for the convenience of readers and to assist the organization of this document; priority or special treatment was neither intended nor given in the responses to comments. Within each of the categories, each submission was then assigned a number, in the order it was received and processed, such as F-1, S-1, and so on. In addition, each separate comment was assigned a separate sub-number. Thus, if an agency or citizen made three different comments, they are designated as F-1.1, F-1.2, F-1.3 or as P-1.1, P-1.2, P-1.3, etc.

Due to the lengthiness of the written hearing transcripts, they are not reprinted in this document, but have been made available as noted in Subchapter 10.1.2. However, all oral comments were coded and treated in the same manner as written comments.

All written submissions have been included in Appendix J to this EIS. The alphanumeric code associated with each written submission is marked at the top of the first page of each letter; the subnumbers of the individual comments are marked in the outer margin. Comment letters or statements are reprinted in numerical order. If a number code appears to be missing in the written comments, it may have been assigned to an oral comment.

10.3.2 Locating Responses to Comments

10.3.2.1 Comment Index

The Comment Index (Table 10-1), following this text, contains a complete listing of all commentors and responses to comments. The listing allows readers to find answers to specific questions they have raised. In this format, the index is organized generally in order of date of receipt of correspondence (letters, facsimiles, or e-mail) and voice mail messages from commentors. The index provides the following information:

- The first column lists the names of all commentors alphabetically, according to type (federal, state, regional, local, group, or private citizen);
- The second column identifies the alphanumeric file code assigned to each comment and indicates whether comments were written or oral;
- The third column provides a summary of the comment; and
- The fourth column indicates the response to the comment.

In a few instances, a commentor may appear in the Comment Index more than once, because he/she sent different letters, sent letters different from oral statements, or made different oral statements. If an individual spoke for a group and then wrote a letter in his/her name (or vice-versa), the submissions were coded separately and each appears in the Comment Index.

It was not always clear if a commentor intended to represent an organization/group or simply himself/herself. The reader is advised to examine both the G (Group) listing for the name of the group, firm, or association used on the letterhead of a written submission and the P (Public) list for his/her own name.

10.3.2.2 Kinds of Responses

Responses to comments include the types described below:

- **Specific Response to Comment** - The comment is answered in the index.
- **Reference to Final EIS** - Modifications have been made to specific sections of the Final EIS (FEIS). The chapter headings and section numbers are the same as or similar to those in the DEIS. This type of reference typically states: Refer to FEIS Subchapter 2.7, or other appropriate section number.

Table 10-1
Comment Response Index

Name/Agency	Comment Code	Comment	Response
Federal Government Comments			
Bohanan, John (on behalf of Rep. Steny H. Hoyer)	F-1.1 Written/ Oral	Statements supporting proposed action and a pledge to continue to work with any individual and/or the Navy to resolve any specific issues or problems.	Thank you for your comments; they will be taken into consideration by the decision maker.
Department of the Interior, Office of Environmental Policy and Compliance	F-2.1 Written	Acknowledgment of receipt and review of DEIS.	The Department of the Interior indicated it has no comments to offer on the DEIS.
US Coast Guard	F-3.1 Written (e-mail)	Acknowledgment of receipt and review of DEIS.	The Coast Guard indicated it has no comments to offer on the DEIS.
Hooker, Ann/Albee, William W. Federal Aviation Administration, Office of Environment and Energy	F-4.1 Oral (voice mail)	How will the Navy avoid violations of the Clean Water Act for jet fuel dumping over the Chesapeake Bay and associated lands?	As discussed in FEIS Subchapter 4.10, Navy policy and concern for the environment, make fuel dumping a rare occurrence in the CTR. Navy pilots are prohibited from dumping fuel below 6,000 ft, except in an emergency situation. Above 6,000 ft, the fuel would have enough time to completely vaporize and dissipate and would therefore have a negligible effect on the ground below. In an emergency, a fuel release may be performed to save the pilot and/or the aircraft. How-ever, should an aircraft mishap occur, fuel or hydraulic fluids could be released. The magnitude and duration of the spill would be controlled through US Coast Guard approved rescue and spill response procedures and would provide quick containment of any spill and minimize any potential water quality impacts to the Bay.
	F-4.2 Oral (voice mail)	How is the Navy responding to concerns of low-flying aircraft over 4-F properties within the affected environment?	The military is not required to comply with Section 4(f), (see 10 USC 1079); however no significant impacts were identified as a result of aircraft overflights of 4(f) properties, including publicly-owned park land, recreation areas, or wildlife and waterfowl refuges, or historic sites (see FEIS Subchapters 4.3 and 4.8).
	F-4.3 Oral (voice mail)	Is the Navy preparing an Environ-mental Justice analysis and if so, what does it reveal and what are the significant disproportionate im-pacts and mitigation measures?	As discussed in FEIS Subchapter 4.2, direct and indirect effects of the proposed action (under any of the alternatives) would not result in disproportionately high or adverse environmental or health impacts specific to any groups or individuals residing in the land area underlying the CTR, including those from minority or low-income populations. Furthermore, no persons would be displaced.

Name/Agency	Comment Code	Comment	Response
Hooker, Ann/Albee, William W. Federal Aviation Administration, Office of Environment and Energy (Continued)	F-4.4 Written	We suggest that the Navy disclose whether and how it will mitigate the significant noise impact above 65 DNL on the more than 150 addi-tional households that will be af-fected eventually by the proposed action. That is, will the Navy sound-proof the homes, relocate affected populations, acquire development rights, or any one of several other possible measures?	While the FAA has legal authority and receives funding to provide sound attenuation measures, the Navy lacks any such special legislative or funding authority to condemn property, provide sound attenuation, or otherwise compensate property owners. The Navy does not intend to seek this authorization for the purpose of supporting the proposed project.
	F-4.5 Written	We also suggest that the Navy, in consultation with the Coast Guard and possibly also Maritime Admini-stration, consider potential impacts, including safety risks and dis-ruption, to commercial shipping in the Chesapeake Bay.	Refer to FEIS Subchapter 4.4 for a discussion of potential impacts to commercial shipping in the Chesapeake Bay. Note that the DEIS was provided to the US Coast Guard for comment and the Coast Guard indicated it had no comments to offer on the DEIS.
	F-4.6 Written	We also suggest that more information be provided about the nature of the disruption to rec-reational boating and other forms of recreation (e.g., how many hours a day, how many days a week each month the indicated areas would be closed, and how the clear zones relate to the shipping channel).	Potential impacts to recreational boating are discussed in FEIS Subchapter 4.3. Depending on the alternative selected, localized target areas would be cleared to allow Navy tests/exercises for an average of 58 to 70 hours per month. This would not have a significant impact on boaters because: • The cleared area would only be in the immediate vicinity of or around the targets, averaging about 3 sq mi or about 0.3 percent of the surface water area under the CTR (including the prohibited areas surrounding the targets that are not available for navigation or fishing at any time). • Areas to be cleared would **exclude** the relatively shallower portions of the Bay, including Tangier Sound, Pocomoke Sound, or Hooper, Holland or Kedges straits. Furthermore, tests/exercises would last an average of about 1-3 hours and after completion boaters would be allowed access to the previously cleared portions of the Bay outside the prohibited areas. With respect to commercial shipping, the distance of the shipping lanes from the targets, in combination with the shallow surrounding water, would limit the potential for impacts to commercial shipping under any of the three alternatives. Furthermore, regulations published at 33 CFR 334.210(6) provide for minimizing or eliminating disruption to commercial shipping by allowing commercial vessels traversing the aerial and surface firing range, when in “established steamer lanes,” to “proceed on their normal course through the area with all practicable speed” if the Navy will be, or soon will be, initiating an exercise.

Name/Agency	Comment Code	Comment	Response
Hooker, Ann/Albee, William W. Federal Aviation Administration, Office of Environment and Energy (Continued)	F-4.7 Written	How will the activities be scheduled to avoid impacts on migratory bird and marine mammal seasonal activities and risk of wildlife to aircraft and persons and property on the ground (or in the Bay)? Will a wildlife hazard mitigation program be developed?	FEIS Subchapter 4.12 describes the potential impacts that would occur to wildlife and fish as a result of implementing the proposed action, and particularly focuses on the on-going BASH and DASH programs in effect in the Patuxent River Complex.
	F-4.8 Written	What are the emergency response resources in the area?	The capabilities and resources available to the Office of Public Safety at NAS Patuxent River are discussed in FEIS Subchapter 4.14, in addition to this office's coordination with local emergency response/disaster preparedness agencies.
	F-4.9 Written	We also suggest that once the Navy has begun consultation with USFWS and NMFS, it disclose in greater detail, possibly as an appendix, the cumulative effects of the remnant ordnance, fuel dumping, and other activities on marine flora and fauna, especially crabs and other animals in the upper levels of the food chain.	In September 1997, the Navy initiated coordination with USFWS and NMFS as required by the Endangered Species Act of 1973 and the Marine Mammal Protection Act of 1972. The USFWS responded with a letter dated October 16, 1997 (see Appendix C). NMFS responded via telephone on September 11, 1998. With respect to comments on the DEIS, the USFWS has not specifically submitted comments on the DEIS, although the Department of Interior has indicated that it has no comments to offer on the DEIS (see Comment F-2.1, above). On September 23, 1998, NMFS provided written response on the DEIS (see Comment F-7.1, below).
Congressman Bateman, Herbert H.	F-5.1 Written	I am writing to urge that action be taken to minimize to the slightest degree possible the sonic booms that sometimes cause property damage and certainly cause alarm.	During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5.

Name/Agency	Comment Code	Comment	Response
Denmark, Roy E. Deputy Director, Office of Environmental Programs, USEPA, Region III	F-6.1 Written	It would be helpful to add background information concerning other Naval facilities that could absorb additional flight operations and why they were not studied in greater detail.	The mission of the Patuxent River Complex is to be the Navy's principal RDT&E, engineering, and fleet sup-port activity for naval aircraft, engines, avionics, and aircraft support systems (see FEIS Chapters 1 and 2). The complex contains a number of laboratories and flight test support facilities unique to the Navy and DoD that are operated by skilled personnel (instrumented CTR with its restricted airspace, aerial and surface firing range, and three targets; 70 dedicated land-based test facilities; and the airfields at NAS Patuxent River and Webster Field). The purpose of the pro-posed action is to enhance the use of these unique taxpayer-funded facilities and skilled workforce by increasing efficiencies and lowering costs to users. This action is needed in order for the Navy to success-fully meet current and future national and global de-fense challenges posed by a post-Cold War environ-ment. There is no other existing Navy or DoD facility that can fully meet the purpose and need delineated in the EIS without extensive construction and personnel relocation. Therefore, alternate Navy facilities were not considered in this EIS.
	F-6.2 Written	The Onset-Rate Adjusted Day-Night Average Sound Level de-scription in Table 3.6-2 of the noise metric indicates that the difference between this metric and DNL is how the average daily operations are obtained. Are there other differences, since the name implies that the metric is "onset-rate adjusted"?	Individual military overflight events differ from typical community noise events. Overflights can be highly sporadic and may be conducted at low-altitude and/or high speeds. These characteristics result in aircraft that exhibit a rate of increase in sound level (onset rate) of up to 30 dB per second. In noise modeling, the DNL metric is adjusted to account for the "surprise" effect of the onset rate of aircraft noise on humans with an adjustment ranging up to 5 dB added to the normal SEL. Onset rates between 15 and 150 dB per second require an adjustment of 0 to 11 dB, while onset rates below 15 dB per second require no adjustment.
	F-6.3 Written	Figure 2-4 indicates that the total flight hours for 1996 were 20,600 but the "no action" in Table 2-8 indicates only 18,200. There is a difference in the RDT&E hours.	As stated in the FEIS (Pg. 2-11), of the 20,600 flight hours recorded for 1996, about 80 percent (18,400 flight hours) were conducted exclusively within the CTR. Since that time, the number of flight hours recorded in the CTR (as reflected In the No Action Alternative) have decreased slightly to 18,200.
	F-6.4 Written	Table 3.6-5 shows a DNL of 57 dB for Lexington Park Elementary School (Receptor 21) and DNL 66 dB for Carver Elementary School (Receptor 22). Figure 3.6-8 shows Receptor 21 closer to the NAS Patuxent River than Receptor 22, yet the DNL levels are higher at Receptor 22.	The differences in DNL for the two schools reflect the approach/departure tracks for the NAS Patuxent River airfield. Carver Elementary School lies closer to these tracks than Lexington Park Elementary.

Name/Agency	Comment Code	Comment	Response
Denmark, Roy E. Deputy Director, Office of Environmental Programs, USEPA, Region III (Continued)	F-6.5 Written	Figure 3.6-3 shows the noise contours for existing flight oper-ations within the CTR. Since it is clear that the noise contour near Princess Anne extends outside the CTR, it would be useful to acknow-ledge this fact and include the extended contours.	The noise contour near Princess Anne is associated with VR 1711 and VR 1712, two MTRs that enter the CTR. These MTRs are scheduled and controlled by the 113th Fighter Wing at Andrews Air Force Base, not the Patuxent River Complex. The routes of these MTRs near the Chesapeake Bay are depicted in FEIS Figure 3.14-2. The noise contours outside the CTR would follow the routes depicted on Figure 3.14-2.
	F-6.6 Written	Because of the different restricted airspaces involved, it would be useful if the tables that have sensitive receptor data include the minimum altitudes at those sites.	The minimum altitudes associated with the restricted airspaces are shown in FEIS Table 2-1. The Navy believes that including this information in the sensitive receptor tables would be confusing to a reader.
	F-6.7 Written	It may also be helpful to provide the top SEL number in addition to the average SEL in the sensitive receptor tables.	The sensitive receptor tables in FEIS Subchapters 3.6 and 4.6 show the outdoor maximum A-weighted sound levels (Lmax) and their associated speech interference and sleep disturbance values, all of which are based on weighted-average Sound Exposure Levels (SELs). The weighted-average accounts for lesser sound levels occurring more frequently (in nighttime periods, especially) than considering the highest level and its occurrence alone. To add the maximum SELs or highest Lmax to the referenced tables could cause the reader to mistake these worst cast situations as being typical or common.
	F-6.8 Written	EPA believes that it would be useful to include some additional flight track information, such as arrival tracks for NAS Patuxent River, both departure and arrival tracks for OLF Webster Field, and other high use areas such as near Princess Anne.	Detail on departure and arrival tracks by aircraft type was incorporated into the noise modeling that was conducted for this EIS and an example of VFR departures are shown in FEIS Subchapter 3.6. The Navy believes that given the number of aircraft types, providing additional flight track information in the EIS, including maps, would be cumbersome and confusing to the reader. Complete flight tracks may be found in the supporting noise analysis prepared by Wyle Research (January 1998).
	F-6.9 Written	EPA noticed that on the sensitive receptor tables that official nursery schools and day care centers were not listed as sensitive receptors. Is this because these receptors did not fall within the sensitive noise area or because they were not considered?	The selected sensitive receptors were considered representative of the different populations that exist within the boundaries of the CTR. These sensitive receptors include several schools where large numbers of children of varying ages could reasonably be expected to be exposed to aircraft noise.

Name/Agency	Comment Code	Comment	Response
Denmark, Roy E. Deputy Director, Office of Environmental Programs, USEPA, Region III (Continued)	F-6.10 Written	The emissions impacts from the use of chaff and flares have not been discussed. The largest amount of these units used per operation should be identified as well as stating whether they will create hot spots of pollution in either residential areas or in wildlife areas.	As shown in Table 4.9-1, a maximum of about 835 canisters of chaff and 840 flares would be annually deployed under the most intensive alternative (Operational Workload Alternative III). This would result in an average deployment of about 70 chaff canisters and flares per month. Based on study prepared by the US Air Force (August 1997), which involved an extensive literature review, combined with controlled experiments, the deployment of chaff and flares at these levels would have a negligible impact on air quality in the CTR. In addition, these small deploy-ment levels would not create hot spots of pollution in the CTR, and furthermore, the Navy is keeping apprised of research in the use of biodegradable chaff for future use (see FEIS Subchapter 4.12).
	F-6.11 Written	Additional takeoffs and landings should be accounted for in the determination of compliance to the requirements of General Con-formity. A table similar to Table 3.5-2 should accompany this discussion.	Additional takeoffs and landings associated with the proposed action are accounted for in the determina-tion of compliance with the requirements of General Conformity. Tables similar to Table 3.5-2 are already been included in FEIS Subchapter 4.5. A detailed description and backup data on the air quality analysis are included in Appendix E.
	F-6.12 Written	The use of EMAP data to charac-terize the benthos in the specific geographic area is not appropriate. Direct statistically designed com-parison measurements should be made in, and adjacent to, target sites if you intend to draw conclu-sions about impacts from operations.	The text on Pg. 3.12-13 has been clarified to address the fact that the EMAP data were used to characterize benthic conditions in the middle portion of the Chesapeake Bay and not specific conditions in the vicinity of the targets.
	F-6.13 Written	Page 4.13-3 states that sediment sampling was conducted near the target areas within the CTR. The closest sampling point to any of the targets was approximately one mile from the centerpoint of Hooper target. This sampling showed sed-iment sampling concentrations of antimony, arsenic, cadmium, cop-per, lead, nickel, and zinc at slightly greater than or near the high end of the range of concentrations reported at other stations. Although concentrations were less than the ER-M thresholds, it would seem more accurate and prudent to test the sediments closer to the target.	The sediment sampling referred to on FEIS Pg. 4.13-3 was conducted under USEPA's EMAP program. Be-cause inert ordnance is used at the three target areas in the Bay, potential chemical impacts to sediments would be limited to Ni-Cd batteries and signal car-tridges. These items do not contain the metals (anti-mony, arsenic, copper, or zinc) identified at EMAP Station VA91-303. Consequently, sampling sediments in the target areas for metals unrelated to Patuxent River Complex operations is considered unnecessary. The Navy has instituted a management initiative to greatly reduce the future use of Ni-Cd batteries in the Patuxent River Complex (see FEIS Subchapter 4.13). Their use would be permitted only if lithium iron disul-fide or other environmentally-friendly batteries were not available or would not meet technical requirements. The use of signal cartridges during military training activities and their impact on water and sediment quality is discussed in FEIS Subchapter 4.13.

Name/Agency	Comment Code	Comment	Response
Denmark, Roy E. Deputy Director, Office of Environmental Programs, USEPA, Region III (Continued)	F-6.14 Written	Overall, with much less sensitive areas than the Chesapeake Bay available for exercises which re-quire deploying stores, is there a plan to phase out all releases of these materials in the Bay?	The Navy has no plans to phase out all releases of stores to the Bay, since stores are iron/steel forms filled with sand, concrete, or vermiculite (materials common in the environment), their release does not adversely affect water quality in the Bay.
	F-6.15 Written	What is the level of concentration of titanium tetrachloride within the stores? We know that the CXU-3 and CXU-4 contain about 1-2 fluid oz of titanium tetrachloride. The EIS states that the rapid dilution of titanium tetrachloride would occur as a result of wave action. How-ever, is there enough wave action occurring at the target sites to allow for rapid dilution? With the proposed increased activity, what is the cumulative impact?	As noted in Appendix I, RDT&E activities in the CTR do not involve the use of signal cartridges. However, the potential exists that signal cartridges containing either red phosphorus of titanium tetrachloride may be deployed with practice bombs during activities sup-porting military training. Consequently, the analysis contained in the FEIS assumes that all of the practice bombs projected for future use during military training exercises in the CTR (450) would involve the deployment of signal cartridges. This would result in the future release of less than two signal cartridges per day into the Bay. The small quantities of titanium tetra-chloride that would be released (regardless of its con-centration) would quickly dissipate or be diluted in the Bay's waters (with or without wave action) and would not accumulate. The text in FEIS Subchapter 4.12 has been revised to reflect this information.
	F-6.16 Written	It has recently become evident that Navy aircraft had been conducting personnel deployment and recov-ery exercises on one of the small Bay islands. MDNR and USFWS data document many sensitive rookeries on these islands, making intrusions on them inappropriate. While it is indicated that the specific practice has been halted, the likelihood of similar "inadvertent" impacts will increase as the number and nature of flights, as the kind of exercises increases in the future. What are the Navy's plans in this regard?	The Navy does not anticipate future inadvertent impacts to wildlife resources in the CTR. This would be avoided by the proposed mitigation to expand existing briefings on aircraft operations procedures that are conducted with all existing and prospective users of the CTR, and others, as appropriate, to ensure an understanding of proper procedures (see FEIS Chapter 5).
	F-6.17 Written	There is no historical data on air-craft accidents and losses for oper-ations in the study area. Thus, it is not possible to judge risk levels. The APZs over water were not pre-sented even though the potential for small commercial and recrea-tional aircraft being in these areas during operations is significant.	FEIS Subchapters 3.14 and 4.14 discuss aircraft safety issues in detail and Subchapter 3.14 provides in-formation on the safety record at NAS Patuxent River. The impact analysis acknowledges that increased flight and related operations could also lead to an increased potential for mishaps in the airspace of the CTR. The FEIS also stresses that continued adherence and emphasis on airfield safety policies and procedures and range-related safety and clearance practices (including the ten aircraft rule) would minimize the potential for mishaps with implementation of the proposed action.

Name/Agency	Comment Code	Comment	Response
Denmark, Roy E. Deputy Director, Office of Environmental Programs, USEPA, Region III (Continued)	F-6.18 Written	The DEIS ordnance data is insuffi-cient to allow evaluation of environ-mental impact. Stores expended during exercises do not disappear from the Bay, but despite some corrosion, accumulate indefinitely. Estimates should be provided regarding the overall quantities of Naval stores currently in the target areas. While current quantities are reported in the DEIS, the project quantities should be provided for future levels of operations.	FEIS Tables 3.9-1 and 3.9-2 provide data on quantities of stores releases (by type of store) in the Chesapeake Bay since 1988. FEIS Tables 4.9-1 and 4.9-2 provide annual estimates of the quantities of stores projected for future release in the Bay for each of the alternatives under consideration.
	F-6.19 Written	What are past and current quant-ities of mercury and/or Ni-Cd bat-teries dropped during operations, and the projections for increased amounts (until they are completely phased out)?	The Navy does not use, nor does it intend to use, batteries containing mercury. The phase out of Ni-Cd batteries is already underway at the complex, with the F/A-18E/F program currently using telemetry units containing lithium iron disulfide batteries. Regardless of the type of batteries used, the Navy makes every effort to recover released telemetry units and has ex-perienced intact recovery rates of 90 to 95 percent (see FEIS Subchapter 3.9.1). Based on this recovery rate and the stores release data contained in Table 4.9-1, it is estimated that about 1-2 telemetry units might remain unrecovered each year if Operational Workload Alternative III (the most intensive alternative under consideration) were implemented. Conserva-tively, even if continued and exclusive use of Ni-Cd bat-teries was assumed for the entire phase out period (estimated at five years), a total of about 2.5 pounds of cadmium and 2.0 pounds of nickel might potentially remain unrecovered in the Bay.
	F-6.20 Written	What is the fate and effect of pro-pellants from air to sea missiles?	As shown in FEIS Table 4.9-1, it is projected that only about seven missiles would be released in the CTR under the Navy's most intensive alternative (Opera-tional Workload Alternative III), two missiles more than were projected for release under No Action conditions. All of these missiles would contain inert warheads. Also, most missiles would be jettisoned from an aircraft rather than fired and generally would be recovered. Thus, the release of missiles would have the same impacts as other inert ordnance on the Bay. The propellants from the few missiles that may be fired in the CTR would typically be consumed within ten seconds of release from the aircraft and any residue remaining within the missile shell upon impact on the Bay would be minimal and not have a significant impact on water quality.

Name/Agency	Comment Code	Comment	Response
Denmark, Roy E. Deputy Director, Office of Environmental Programs, USEPA, Region III (Continued)	F-6.21 Written	The DEIS does not discuss sew-age capacity in the Patuxent River Complex. Section 4.7 states that increased demand for sewer would occur at NAS Patuxent River. Pre-sently the complex is treated by the Piney Hill Run Municipal WWTP. This WWTP is a 3 mgd plant cur-rently discharging about 200,000 lbs/yr of Tn directly into the Ches-apeake Bay (the plant is scheduled to have BNR by the year 2000). From 1996 to 1998, an additional 4,000 service personnel are pro-jected, which could mean some 20,000 additional people in the area. (Maryland does not account for this expansion in their tributary strategy load which goes down to 75,000 lbs/yr due to BNR addition.) Thus, the added Tn discharged as a result of the expansion should be addressed in the FEIS (EPA sug-gests that the Patuxent River Com-plex obtain a BNR system that would go to 4 mg/l instead of the planned 8 mg/l).	FEIS Subchapter 4.7 accounts for increased sewage demand associated with increased hours of nonflight and laboratory test operations (i.e., overtime), as well as the increased utility requirements associated with joint task force exercises or US Army Airborne training exercises under the proposed action. With Operational Workload III (the most intense alternative), the in-creased sewage demand would be about 30,000 gallons per day more than identified for no action conditions and would not significantly impact the WWTP. Furthermore, the proposed action does not involve an increase in employment in the Patuxent River Complex. Any new facilities constructed in the complex are associated with BRAC realignment, the impacts of which were assessed in two EISs (finalized in 1993 and 1994). Should any new facilities be proposed for the complex in the future, separate environmental documentation would be required.
	F-6.22 Written	The area of fisheries closure is not accurately presented. The bulk of the area under the operations area perimeter is normally fished intensely. The most active areas include: a) portions where up-welling from deep to shoal water occurs and these are popular with recreational fishers; b) relatively shallow areas where crab-potting occurs; and c) the extensive Bay grass beds where “scrapping” crabs with dredges occurs. The comparison should be made on this basis, so that watermen can make a proper decision. Over the last five years, a serious and unexplained decline has occurred in the extraordinarily important grass beds surrounding Tangier, Smith, South Marsh, and Bloods-worth islands, making these areas especially vulnerable to insult.	Although the number of events requiring clearance of portions of the Bay would increase, this would not have a significant impact on fishermen because: • The cleared area would only be in the immediate vicinity of or around the targets, averaging about 3 sq mi or about 0.3 percent of the surface water area under the CTR (including the prohibited areas surrounding the targets that are not available for navigation or fishing at any time). • Areas to be cleared would **exclude** the relatively shallower portions of the Bay, including Tangier Sound, Pocomoke Sound, or Hooper, Holland or Kedges straits. Further, tests/exercises would last an average of about 1-3 hours and after completion, fishermen and boaters would be allowed access to the previously cleared portions of the Bay outside the prohibited areas. In addition, as discussed in FEIS Subchapter 4.11, the nearest SAV bed to any of the targets is approximately four nm to the southeast of the Tangier Island target. As a result, the release of stores would not impact SAV beds in the Chesapeake Bay.

Name/Agency	Comment Code	Comment	Response
Denmark, Roy E. Deputy Director, Office of Environmental Programs, USEPA, Region III (Continued)	F-6.23 Written	The discussion of potential actual impact strikes on marine life is not accurately presented. While there may average 3 fish/sq m in summer and 5 fish/sq m in autumn, the probability of impact is increased because of the attraction of fish to the structures in the target areas and the natural dense schooling of many species in the Bay.	Although comparing strike areas to fish densities could provide a worst case estimate of the number of fish killed, the overall impact on fishery resources would not be reflected using this method since it would not account for reproduction, recruitment, or other factors affecting a population's sustainability. The exception would, of course, be where a species is considered threatened or endangered, and mortality of a single individual could be a significant impact. A better measure would be to evaluate whether the strike area contains important habitat such as nursery areas, oys-ter bars, or SAV beds. Impacts to habitat serving specific life needs are more likely to reflect impacts on sustainability by reducing carrying capacity. NMFS has indicated that if stores were to be dropped in areas of SAV, particularly in very shallow water, or in known spawning or nursery areas, they would recommend changing the area of the drop. They would also be concerned if the stores were to be dropped in areas frequently use by commercial bottom trawlers or other fishermen with gear that might snag on any stores left behind (Nichols, September 11, 1998). The target areas are not in SAV beds, nursery or spawning habi-tats, or oyster beds and the shallowest waters occur near Tangier target (12 ft). Furthermore, the prohibi-ted areas surrounding the targets are closed to commercial fishing and other civilian activities. There-fore, it has been concluded that the release of stores as proposed would not cause a significant impact on fish populations or fishing activities in the Bay. In addition, even though stores have been released in the target areas during the past 50 years, these areas continue to be identified in Bay charts as popular recreational fishing spots (see FEIS Subchapter 3.12).
	F-6.24 Written	The DEIS states that the Atlantic Sturgeon is being considered for listing as a threatened and endan-gered species and that it is the largest fish to be found in the Chesapeake Bay. The smaller shortnose sturgeon which is federally-listed as endangered is capable of sustaining populations in the Patuxent River and Bay. The DEIS states that "the likelihood of a store striking an Atlantic or shortnose sturgeon would be very unlikely," since they are present in very small numbers. However, the probability still exists and the impacts are great.	The Navy coordinated with the NMFS during the development of the DEIS. In a letter dated September 21, 1998, NMFS has indicated that it agrees with the conclusion reached in FEIS Subchapter 4.12 by concluding that while there is a chance for any activity on the Bay to impact on threatened or endangered species, the probability of stores releases impacting the shortnose sturgeon, Atlantic sturgeon, or other listed species present in the Bay is so low that it would be unlikely to have an adverse affect (see Comment F-7.1 below).

Name/Agency	Comment Code	Comment	Response
Denmark, Roy E. Deputy Director, Office of Environmental Programs, USEPA, Region III(Continued)	F-6.25 Written	The DEIS states that "About 26 percent of the population residing in the land area underlying the CTR belongs to minority groups. About nine percent of the families and 12 percent of persons residing within the footprint of the CTR had incomes below the poverty level in 1989." Nine years later it is quite conceivable that this number can be larger. Also, a map depicting where these designated popula-tions exist would be helpful in determining their proximity to NAS Patuxent River	US Census 1990 data were used to characterize the existing population residing within the boundaries of the Patuxent River Complex. These 1990 Census data provide population statistics on a census tract basis, a level of information that will not otherwise be available for the complex until the publication of 2000 Census results. Furthermore, the noise analysis relies on the use of 1990 Census data for consistency in comparing the existing noise environment with that under the proposed alternatives. A further examination of the 1990 Census data shows that any minority group concentrations are found in census tracts that exist mainly around the borders of the CTR on the Eastern Shore of Maryland.
	F-6.26 Written	The DEIS states that the level of operations proposed by the three Operational Workload Alternatives would be less intensive than the historic high point of Patuxent River operations in the 1970s. The text also states that "As recently as the 1970s, operations levels at NAS Patuxent River were about 28,000 to 30,000 flight hours per year, which is greater than the operational levels that would occur under any of the alternatives." Al-though this may be true, the sur-rounding areas may have been altered such that there may now be more people residing in the project area, there may be a larger number of minorities living within the im-pacted areas, and there may be a greater quantity and a more di-verse habitat within the Chesa-peake Bay. Thus, this may not be a relative point as the impacts today may be far greater than in 1970.	This statement concerning flight operations in the Patuxent River Complex in the 1970s was only included to provide a comparison with the levels of operations proposed by the alternatives evaluated in the FEIS, which have been analyzed for impacts. By today's standards, the impacts of implementing these alternatives are not significant.

Name/Agency	Comment Code	Comment	Response
Rittgers, Jon C. Acting Regional Administrator, National Marine Fisheries Service	F-7.1 Written	Of the proposed RDT&E activities, only the release of nonexplosive practice bombs into waters of the test range could potentially affect sea turtles and shortnose stur-geon. However, a practice bomb is highly unlikely to result in death or injury to a turtle or sturgeon, and therefore we conclude the pro-posed activities are not likely to adversely affect sea turtles or the shortnose sturgeon in the test range area. Therefore, no addition-al consultation will be required with NMFS at this time.	Thank you for your comments; they will be taken into consideration by the decision maker.
State Government Comments			
Maryland Dept of Natural Resources, Critical Area Commission	S-1.1 Written (facsimile)	Acknowledgment of receipt and review of DEIS.	The Maryland Department of Natural Resources, Critical Area Commission indicated it has no comments to offer on the DEIS.
Maryland Office of Planning	S-2.1 Written	Acknowledgment of receipt of DEIS.	The Office of Planning provided a notification that it had initiated state review of DEIS.
Virginia Dept of Conservation and Recreation	S-3.1 Written	Provided a list of natural heritage resources (plants and animals) documented in the project area.	The existence of these species is addressed in FEIS Subchapter 3.12.
Schmidt, Bill Maryland Dept of Environment, Waste Management Administration	S-4.1 Oral	Concerned with release of fuel from aircraft--specifically what that is doing to the Bay.	As discussed in FEIS Subchapter 4.10, Navy policy and concern for the environment, make fuel dumping a rare occurrence in the CTR. Navy pilots are prohib-ited from dumping fuel below 6,000 ft, except in an emergency situation. Above 6,000 ft, the fuel would have enough time to completely vaporize and dissipate and would therefore have a negligible effect on the ground below. In an emergency, a fuel release may be performed to save the pilot and/or the aircraft. Should an aircraft mishap occur, fuel or hydraulic fluids could be released. The magnitude and duration of the spill would be controlled through US Coast Guard approved rescue and spill response procedures and would provide quick containment of any spill and minimize any potential water quality impacts.

Name/Agency	Comment Code	Comment	Response
Schmidt, Bill Maryland Dept of Environment, Waste Management Administration	S-4.2 Oral	Also concerned with lead bullets. Why not use something less harmful than lead (why not steel)? Even though it's just a little (the amount of lead added), it's still something.	Only ammunition rounds from small arms have lead core projectiles (5.56 and 7.62 mm); larger caliber ammunition is mostly steel with small amounts of aluminum and copper. Implementation of the pro-posed action would result in about 1.0 cu ft of lead being added to the Bay. This amount is insignificant when compared with the amount of lead released annually to the Bay by recreational fishermen in the form of lost sinkers.
	S-4.3 Oral	Concerned with the impact of air-craft noise on the poultry industry.	The issue of aircraft noise impacts on the poultry industry underlying the CTR is discussed in FEIS Subchapter 4.2. Because aircraft activities over areas with concentrations of poultry farms would be too brief and intermittent to allow poultry to become acclimated, NAWCAD has implemented a management initiative to address this issue (see FEIS Subchapter 4.2). In addition, the Navy has proposed mitigation for sonic booms in the CTR as discussed in FEIS Chapter 5.
Bieber, Steven Maryland Dept of the Environment, Clearinghouse Coordinator	S-5.1 Written	The proposed action has been determined to be consistent with MDE's plans, programs, and objectives.	Thank you for your review; they will be taken into consideration by the decision maker.
Murphy, Michael Director, Division of Environmental Enhancement, Virginia Dept of Environmental Quality	S-6.1 Written	The Commonwealth of Virginia has no objections to the proposed pro-ject provided it is carried out in strict accordance with all applicable federal, state, and local regulations. The Commonwealth concurs with the Navy's "finding of no significant impact on the environment."	Thank you for your review; they will be taken into consideration by the decision maker.
	S-6.2 Written	Although the impacts on water quality from the release of stores, munitions, and flares are expected to be localized, potential adverse impacts must be minimized. Therefore, we discourage the (1) use of Ni-Cd batteries in store telemetry units; (2) use of large quantities of small arms rounds in the Chesapeake Bay target areas to prevent bioaccumulation effects of lead in aquatic organisms; and (3) release of aircraft fuel, espec-ially in recreational and environ-mentally sensitive areas located in the CTR.	(1) FEIS Subchapters 4.9 and 4.13 describe the Navy's management initiative to greatly reduce future use of Ni-Cd batteries in the Patuxent River Complex by substituting use of lithium iron disulfide or other environmentally-friendly batteries. (2) Only ammunition rounds from small arms have lead core projectiles (5.56 and 7.62 mm); larger caliber ammunition is mostly steel with small amounts of aluminum and copper. Implementation of the pro-posed action would result in about 1.0 cu ft of lead being added to the Bay. This amount is insignificant when compared with the amount of lead released annually to the Bay by recreational fishermen in the form of lost sinkers. (3) FEIS Subchapter 4.10 discusses Navy policy and concern for the environment that makes fuel dumping a rare occurrence in the CTR.

Name/Agency	Comment Code	Comment	Response
Murphy, Michael Director, Division of Environmental Enhancement, Virginia Dept of Environmental Quality (Continued)	S-6.3 Written	If the flights and testing are extended outside the CTR to include Northern Virginia or the Tidewater area, air quality issues discussed in the DEIS should be reevaluated and air conformity determination provided.	The proposed action would involve flight operations and testing within the CTR only.
	S-6.4 Written	According to information in the files of the Dept of Conservation and Recreation's Division of Natural Heritage (DNH), there are several natural heritage resources within the project area. The DNH recom-mends coordination with the USFWS and the Dept of Game and Inland Fisheries to ensure compliance with protected species legislation.	The existence of natural heritage resources is addressed in FEIS Subchapter 3.12 and coordination was undertaken with the USFWS and the Dept of Game and Inland Fisheries.
	S-6.5 Written	All solid or hazardous waste gen-erated at the site during con-struction should be reduced at the source, reused, or recycled. All solid waste, hazardous waste, and hazardous material must be managed in accordance with all applicable federal, state, and local environmental regulations.	The issue of solid and hazardous waste generation is discussed in FEIS Subchapter 4.9. All solid waste, hazardous waste, and hazardous material must are in accordance with all applicable federal, state, and local environmental regulations.
	S-6.6 Written	The Dept of Conservation and Recreation has indicated that this project will not affect any streams on the National Park Service Nationwide Inventory, Final List of Rivers, or existing or potential State Scenic Rivers. Nor will the project affect existing or potential State Scenic Byways.	Thank you for your review; they will be taken into consideration by the decision maker.
	S-6.7 Written	The use of herbicides or pesticides for landscape maintenance should be in accordance with the principles of integrated pest management.	As described in FEIS Subchapter 3.9.3.2, use of herbicides and pesticides in the Patuxent River Com-plex is conducted in accordance with an *Integrated Pest Management Plan* adopted in 1994. The em-phasis of the plan is on a comprehensive approach to pest management or prevention that considers various chemical, physical, and biological suppression tech-niques, the habits of the pest, and the environment. The program stresses preventive control measures in lieu of corrective measures wherever cost effective.

Name/Agency	Comment Code	Comment	Response
Murphy, Michael Director, Division of Environmental Enhancement, Virginia Dept of Environmental Quality (Continued)	S-6.8 Written	Pursuant to the Coastal Zone Man-agement Act of 1972, as amended, the proposed action must be consistent, to the maxi-mum extent practicable, with the Virginia Coastal Resources Man-agement Program (VCRMP). Based on the information provided in the DEIS, we concur with the Navy's determination that this prop-osal is consistent with the VCRMP. The Navy must ensure that all the applicable permits and approvals listed under the Enforceable Pro-grams of the VCRMP have been addressed prior to commencing this project.	Thank you for your comment concerning the proposed action's consistency with the VCRMP; this comment will be taken into consideration by the decision maker.
Barnard, Thomas A. Marine Scientist, Virginia Institute of Marine Science	S-7.1 Written	We have reviewed the subject doc-ument from a marine environment perspective and have no significant comments to make at the present time.	Thank you for your comment; it will be taken into consideration by the decision maker.
Badger, George Environmental Engineer, Virginia Marine Resources Commission	S-8.1 Written	Provided the proposed project does not extend channelward of mean low water mark, no author-ization is required from the Marine Resources Commission.	As discussed in FEIS Chapter 2, any new facilities constructed in the complex are associated with BRAC realignment, the impacts of which were assessed in two EISs (finalized in 1993 and 1994). Should any new facilities be proposed for the complex in the future, separate environmental documentation would be required.
Virginia Division of Soil and Water Conservation	S-9.1 Written	The Division of Soil and Water Conservation has no comment on this project.	Thank you for your comment; it will be taken into consideration by the decision maker.
Katten, Sheri Tidewater Regional Office, Virginia Dept of Environmental Quality	S-10.1 Written	The use of Ni-Cd batteries in store telemetry units is discouraged due to potential adverse effects to water quality and the abundant fishery and wildlife resources in and adjacent to the waters of the Bay.	FEIS Subchapters 4.9 and 4.13 describe the Navy's management initiative to greatly reduce future use of Ni-Cd batteries in the Patuxent River Complex and substitute lithium iron disulfide or other environ-mentally-friendly batteries.
	S-10.2 Written	The use of large quantities of small arms rounds in the Chesapeake Bay target areas is discouraged due to the lead content of the ammunition and the potential adverse bioaccumulation effects in aquatic organisms.	Only ammunition rounds from small arms have lead core projectiles (5.56 and 7.62 mm); larger caliber ammunition is mostly steel with small amounts of aluminum and copper. Implementation of the pro-posed action would result in about 1.0 cu ft of lead being added to the Bay. This amount is insignificant when compared with the amount of lead released annually to the Bay by recreational fishermen in the form of lost sinkers.

Name/Agency	Comment Code	Comment	Response
Katten, Sheri Tidewater Regional Office, Virginia Dept of Environmental Quality (Continued)	S-10.3 Written	While not mentioned in the DEIS, the release of aircraft fuel is not recommended, especially over the several special, recreational, and environmentally sensitive areas located in the CTR.	As discussed in FEIS Subchapter 4.10, Navy policy and concern for the environment, make fuel dumping a rare occurrence in the CTR. Navy pilots are prohibited from dumping fuel below 6,000 ft, except in an emergency situation. Above 6,000 ft, the fuel would have enough time to completely vaporize and dissipate and would therefore have a negligible effect on the ground below. In an emergency, a fuel release may be performed to save the pilot and/or the aircraft. How-ever, should an aircraft mishap occur, fuel or hydraulic fluids could be released. The magnitude and duration of the spill would be controlled through US Coast Guard approved rescue and spill response procedures and would provide quick containment of any spill and minimize any potential water quality impacts to the Bay.
	S-10.4 Written	Inclusion of a monitoring schedule in the NPDES Permit No. MD002050 for anti-icing/deicing parameters is recommended.	Deicing at the Patuxent River Complex does not occur very often as the vast majority of test aircraft do not fly in wintry weather. When deicing must occur, most air-craft are deiced on washracks that lead to the sanitary sewer and the local sewage treatment plant. However, one squadron is allowed to deice at the taxiway and deicing Best Management Practices (BMPs) are cur-rently under development (as required by the NPDES permit) that will be used this winter. It is because of infrequent deicing and use of the washracks that MDE chose to regulate deicing discharges using BMPs.
	S-10.5 Written	No comments were solicited from our Ground Water Program as im-pacts to ground water are not anticipated.	Thank you for your comment; it will be taken into consideration by the decision maker.
	S-10.6 Written	No comments were solicited from our Underground Storage Tank Program as impacts are not anticipated.	Thank you for your comment; it will be taken into consideration by the decision maker.
	S-10.7 Written	There are no comments con-cerning waste issues in relation to this project.	Thank you for your comment; it will be taken into consideration by the decision maker.
	S-10.8 Written	There are no comments con-cerning air quality impacts in relation to this project.	Thank you for your comment; it will be taken into consideration by the decision maker.

Name/Agency	Comment Code	Comment	Response
Linderman, Curtis Planning Mgr Piedmont Regional Office, Virginia Dept of Environmental Quality	S-11.1 Written	No significant areawide impacts are anticipated to occur in Virginia from Alternatives I, II, or III during normal operational conditions.	Thank you for your comment; it will be taken into consideration by the decision maker.
	S-11.2 Written	Water quality impacts from the release of stores, munitions, and flares are expected to be localized and minor due to the diluting effects of the Chesapeake Bay.	Thank you for your review; they will be taken into consideration by the decision maker.
	S-11.3 Written	An Oil and Hazardous Substance Spill Contingency Plan will be fol-lowed to minimize impacts resulting from the emergency release of fuels.	Thank you for your comment; it will be taken into consideration by the decision maker.
	S-11.4 Written	The DEIS references projected air emissions; however, the report would be enhanced with additional analyses to address air quality impacts these emissions may have within the Virginia portion of the test range.	Air emissions in the Virginia portion of the CTR would be below de minimus levels and are therefore not discussed in the FEIS (refer to Appendix E).
Hassell, Joseph Environmental Program Mgr Office of Water Protection, Virginia Dept of Environmental Quality	S-12.1 Written	No comments. Action has no effect on Water Programs.	Thank you for your comment; it will be taken into consideration by the decision maker.
Cooksey, Sarah Administrator Delaware Coastal Management Program	S-13.1 Written	Based upon our review of the DEIS and pursuant to NOAA regulations (15 CFR 930), the Del-aware Coastal Management Pro-gram concurs that the proposed action in the Patuxent River Com-plex will be consistent with its policies. Our concurrence is based upon the restrictions and/or cond-itions placed on any and all permits issued to you for this project.	Thank you for your comment concerning the proposed action's consistency with the Delaware Coastal Management Program; this comment will be taken into consideration by the decision maker.
Barry, Warren State Senator Virginia 37th Senatorial District	S-14.1 Written	In response to the proposed ex-panded military exercises over the Northern Neck of Virginia, I would like to express my objection to continued or expanded drones and the maddening drone they create. Expanded jet or helicopter exercises are tolerable.	Through the NEPA process, the Navy has become aware of the annoyance factor associated with UAV operations over the Northern Neck of Virginia. The Navy's plan to mitigate this annoyance factor is described in FEIS Chapter 5. In essence, the plan would involve increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.

Name/Agency	Comment Code	Comment	Response
Janey, Linda C. Manager, Clearinghouse and Plan Review Unit, Maryland Office of Planning	S-15.1 Written	The Maryland Depts of Agriculture, Environment, Housing and Com-munity Development, Budget and Management, Natural Resources, Transportation, Public Safety and Correctional Services, and Busi-ness and Economic Development; the Maryland Military Department; the counties of Dorchester, St. Mary's, Somerset, Talbot, Wicom-ico, and Worcester; the towns of La Plata, Easton, and Leonard-town; the cities of Cambridge, Cris-field, and Salisbury; and the Mary-land Office of Planning found this project to be consistent with their plans, programs, and objectives. The Maryland Dept of Health and Hygiene and the University of Maryland system had no comments.	Thank you for your review; they will be taken into consideration by the decision maker.
	S-15.2 Written	The Maryland Historical Trust has determined that the project will have "no effect" on historic prop-erties and that the federal and/or state historic preservation require-ments have been met.	Thank you for your comment that the proposed action would have "no effect" on historic properties and that federal and/or state historic preservation requirements have been met; it will be taken into consideration by the decision maker.
	S-15.3 Written	The town of La Plata expressed support for the regional economic development connected with the Navy's planned expansion at the Patuxent River Naval Air Station.	Thank you for your comment; it will be taken into consideration by the decision maker.
Murphy, W. Tayloe Virginia House of Delegates	S-16.1 Written	Requested consideration of an enclosed letter from one of his constituents (Winnifred Carrigan) concerning UAV impacts.	Ms. Carrigan's comments are addressed in this chapter (see Comment P-23).
Dutton, David H. Director, Division of Project Review, Virginia Dept of Historic Resources	S-17.1 Written	The Virginia Dept of Historic Resources concurs with the Navy's recommendation that the under-taking will have no adverse effect on historic resources listed in or eligible for listing in the National Register of Historic Places.	Thank you for your comment that the undertaking will have no adverse effect on historic resources listed in or eligible for listing in the National Register of Historic Places; it will be taken into consideration by the decision maker.

Name/Agency	Comment Code	Comment	Response
Regional Agency Comments			
Collins, Arthur L. Exec Director, Hampton Roads Planning District Commission	R-1.1 Written	Based on a review of the DEIS, it appears that the project is consis-tent with local and regional plans. We have no significant comments concerning the project.	Thank you for your review; they will be taken into consideration by the decision maker.
McKenzie, Stuart Environmental Planner, Northern Neck Planning District Commission	R-2.1 Written	The EIS discusses noise in great detail, however, the emphasis is placed on the higher noise level areas associated with takeoffs and landings in and around the airstrips of Maryland. In the Northern Neck (mainly Northumberland County), the noise from circling UAVs is bothersome to many residents, especially during the warmer months of the year, when more time is spent outside the home.	Through the NEPA process, the Navy has become aware of the annoyance factor associated with UAV operations over the Northern Neck of Virginia. The Navy's plan to mitigate this annoyance factor is described in FEIS Chapter 5. In essence, the plan would involve increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.
	R-2.2 Written	Another type of noise event, the sonic boom, affects many persons on the east coast of Northumber-land County, particularly Reedville. The effects of sporadic sonic booms are magnified by their unexpected nature and are very troubling to some residents.	During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5.
	R-2.3 Written	Another concern is the increased closure and clearing of the target areas. It is not necessarily the in-creased amount of time the areas are closed, but the timing of these closures that could affect Northern Neck watermen and charter boat activity. Most watermen work from sunup to about 10:00 am; salt-water sport fishing charter boats usually depart early in the mornings also. Closures in the target areas could cause interruption of the watermen's work schedule, and diversion of charter boats to less productive fishing areas. Some discussion on the scheduling of the closures needs to be included in the EIS. It would be preferable to schedule these events, when pos-sible, around midday during the week.	Although the number of events requiring clearance of portions of the Bay would increase, this would not have a significant impact on fishermen because: • The cleared area would only be in the immediate vicinity of or around the targets, averaging about 3 sq mi or about 0.3 percent of the surface water area under the CTR (including the prohibited areas surrounding the targets that are not available for navigation or fishing at any time). • Areas to be cleared would **exclude** Tangier Sound, Pocomoke Sound or Hooper, Holland or Kedges straits. Further, tests/exercises would last an average of about 1-3 hours and after completion, fishermen and boaters would be allowed access to the previously cleared portions of the Bay outside the prohibited areas. Scheduling of tests/exercises is dependent on the Navy's mission needs and requirements.

Name/Agency	Comment Code	Comment	Response
Local Government Comments			
Haley, James P. Manager, St. Mary's County Central Services	L-1.1 Written	Recommends that the EIS address the Navy's awareness of the extent of existing and planning flight operations at the St. Mary's County Airport.	As is discussed in FEIS Subchapter 4.3, when the special use airspace comprising the CTR is under Navy control, NAS Patuxent River Air Operations Division provides radar air traffic control services and approach control services to commercial and general aviation flights using the 29 airports located within the range, including St. Mary's County Airport. Under any of the alternatives, this service to commercial and general aviation traffic within the CTR would be main-tained, even with a scheduled increase in commercial flights from St. Mary's County Airport. Therefore, no impacts are anticipated.
Long, James Northumberland County Board of Supervisors	L-2.1 Oral	What effect will the additional flight hours have on the fishing industry and other water-related jobs?	Although the number of events requiring clearance of portions of the Bay would increase, this would not have a significant impact on commercial or recreational fishermen or other water-related jobs because: • The cleared area would only be in the immediate vicinity of or around the targets, averaging about 3 sq mi or about 0.3 percent of the surface water area under the CTR (including the prohibited areas surrounding the targets that are not available for navigation or fishing at any time). • Areas to be cleared would **exclude** Tangier Sound, Pocomoke Sound or Hooper, Holland or Kedges straits. Further, tests/exercises would last an average of about 1-3 hours and after completion, fishermen and boaters would be allowed access to the previously cleared portions of the Bay outside the prohibited areas.
	L-2.2 Oral	Additional information is needed on future flight activities--time of the day, time of the activity, and how many activities in one day.	As indicated in FEIS Chapter 2, proposed future operating hours in the Patuxent River Complex would be essentially the same as current operating hours. About 97 percent of existing flight operations are flown between 7:00 am and 10:00 pm.

Name/Agency	Comment Code	Comment	Response
Long, James Northumberland County Board of Supervisors (Continued)	L-2.3 Oral	What effect will additional flight hours and aircraft noise have on the citizens of Northumberland County, particularly with its abundance of older citizens?	FEIS Subchapter 4.6 presents a comprehensive dis-cussion of the potential for noise impacts from a physi-ological and behavioral perspectives, including annoy-ance, speech interference, and sleep disturbance. Standard computer noise models (accepted by the USEPA and many other federal agencies) were used to simulate the noise levels that would be produced in the Patuxent River Complex for the alternatives. The modeling results showed no significant noise impacts among the three alternatives for subsonic and supersonic aircraft operations in the CTR. Single-event noise impacts also were evaluated at more than 20 specific locations, including residences, schools, and hospitals. The results of the analysis found little difference among the alternatives with respect to overall noise levels or the potential for speech interference or sleep disturbance at all of the sensitive receptor locations.
	L-2.4 Oral	And what about the effects of aircraft noise on wildlife and on the Bay? Has that been addressed?	As is summarized in FEIS Subchapter 4.12, there would be no significant increase in aircraft noise impacts that could adversely impact wildlife. Of the threatened and endangered species that may occur in the area, the northeastern beach tiger beetle is not likely to breed at NAS Patuxent River, and although the bald eagle and peregrine falcon have been sighted in the area, nesting has not been observed. Water quality issues examined in FEIS Subchapter 4.13 include spill prevention and control, stores releases, releases of Ni-Cd batteries, and groundwater withdrawals. No significant impacts were identified.
	L-2.5 Oral	What about the materials released from the planes and their effects on the environment?	Implementation of any of the proposed alternatives would involve the continued release of nonexplosive or dummy ordnance, or stores, to the Bay at the target areas. These articles contain materials that are common to the environment (iron, steel, concrete, sand), so the objects themselves would have minimal water quality impact. The Navy is greatly reducing the use of Ni-Cd batteries that are currently released with certain stores. This would benefit the water quality of the Chesapeake Bay and be in effect for any of the alternatives selected.
Thompson, Barbara Commissioner, St. Mary's County	L-3.1 Oral	Requests a clarification on how noise can increase if the size of the airspace being used remains the same even if the number of flights increase?	The commentor is referred to topic of "decibel addition." Because of the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. Some simple rules of thumb that are useful in dealing with the addition of sound levels are shown in FEIS Subchapter 3.6.

Name/Agency	Comment Code	Comment	Response
Clements, J. Bradley St. Mary's County Public Schools	L-4.1 Written	At the present time, St. Mary's County Public Schools has planned to renovate, expand, and modernize Lexington Park Elemen-tary School. We have concerns over the AICUZ Zone's potential encroachment on the Lexington Park Elementary School site. We do not want to invest in this school and then have the Navy request that we relocate the school. If at all possible, I would appreciate a de-tailed map showing Lexington Park Elementary School and any poten-tial encroachment. If there is any encroachment on the Lexington Park Elementary School site, the school system would have to consider opposing the increased flight and related operations alternates to the Patuxent River Complex.	The Navy has reviewed the projected flight profiles and associated noise contours near Lexington Park Elementary School and found that no changes to the current Accident Potential Zones (AICUZ Zone II) are anticipated. Additionally, the increased noise footprint of 65 dB DNL does not impact the school property, although the boundary does occur just south of it. A map detailing the AICUZ Zone II, and the projected noise contours associated with increased flight operations in the vicinity of Lexington Park Elementary School, was forwarded to St. Mary's County Public Schools on September 8, 1998. Receipt of this information has been acknowledged in a letter dated September 16, 1998.
Burton, John E. Administrator, Northumberland County, Virginia	L-5.1 Written	Most complaints from county residents are about the noise from UAVs which residents say disturbs them because of the constant droning sound, which is annoying. It seems that the UAVs are over certain areas on a somewhat regular basis at different times.	Through the NEPA process, the Navy has become aware of the annoyance factor associated with UAV operations over the Northern Neck of Virginia. The Navy's plan to mitigate this annoyance factor is described in FEIS Chapter 5. In essence, the plan would involve increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.
	L-5.2 Written	The other complaint is in regard to sonic boom which comes from residents that are mostly located on the Potomac River and Chesa-peake Bay. Some of these have reported cracked or broken windows.	During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5.
	L-5.3 Written	The Board of Supervisors of North-umberland County, being aware of aircraft noise complaints, is very much concerned about what can be expected when the activity is to be increased as proposed.	Although increased flight operations are proposed for the CTR, the Navy has proposed several mitigation measures in the FEIS which should reduce the impact of aircraft noise over Northumberland County (see FEIS Chapter 5).

Name/Agency	Comment Code	Comment	Response
Burton, John E. Administrator, Northumberland County, Virginia (Continued)	L-5.4 Written	The Board of Supervisors of North-umberland County is also con-cerned about any effects that the increase in one of the target areas in the CTR may have on fishing, which is a critical industry to Northumberland County.	Although the number of events requiring clearance of portions of the Bay would increase, this would not have a significant impact on fishermen because: • The cleared area would only be in the immediate vicinity of or around the targets, averaging about 3 sq mi or about 0.3 percent of the surface water area under the CTR (including the prohibited areas surrounding the targets that are not available for navigation or fishing at any time). • Areas to be cleared would **exclude** Tangier Sound, Pocomoke Sound, or Hooper, Holland or Kedges straits. Tests or exercises would last an average of about 1-3 hours and after completion, fishermen and boaters would be allowed access to the previously cleared portions of the Bay outside the prohibited areas.
Massey, Charles Administrator Somerset County, Maryland	L-6.1 Written	Many of our citizens living in close proximity to our shoreline are concerned about noises and sonic booms that may be frequent from the proposed action.	During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5.
	L-6.2 Written	The CTR is also heavily populated with poultry houses producing thousands of birds every eight weeks. Excessive noise and shad-ows could be damaging to flock production and could cause heavy losses of birds due to smothering. If this occurred, damage claims against the government could be staggering.	Because aircraft activities over areas with concen-trations of poultry farms would be too brief and intermittent to allow poultry to become acclimated, NAWCAD has implemented a management initiative to address this issue (see FEIS Subchapter 4.2). In addition, the Navy has proposed mitigation for sonic booms in the CTR as discussed in FEIS Chapter 5.
Group and Association Comments			
Loeffler, Donald Chesapeake Biological Laboratory, University of Maryland	G.1-1 Oral	A discussion of noise and vibration associated with an engine test facility facing Solomons Island was omitted from the DEIS.	During the first and second quarters of 1998, the tempo and type of operations at the open-air engine test facility at NAS Patuxent River (near the Patuxent River shoreline) temporarily differed from those presented in the FEIS. This resulted in increased noise levels in the Solomons, Maryland area. Although these changes were temporary, the Navy anticipates a continuing need to perform critical engine tests using this open-air testing facility and has proposed the mitigation measures described in Chapter 5.

Name/Agency	Comment Code	Comment	Response
Waters, Clint Maryland Saltwater Sportmens' Association of Dorchester County, Maryland	G-2.1 Written	Interested in any information on the Navy's Empress I and II Programs.	Both these programs no longer exist and the equipment has been disposed of.
	G-2.2 Written	Requests that the Navy provide advance announcement of its tests and exercises on the Weather Channels in order for recreational fishermen and boaters to plan their activities.	Thank you for your review; they will be taken into consideration by the decision maker.
Maffuid, Jesse Dorchester Fishing Club	G-3.1 Written	Concerned that 50 percent increase in target area use would dramatically increase the probability that a fisherman would be impacted.	Although the number of events requiring clearance of portions of the Bay would increase, this would not have a significant impact on fishermen because: • The cleared area would only be in the immediate vicinity of or around the targets, averaging about 3 sq mi or about 0.3 percent of the surface water area under the CTR (including the prohibited areas surrounding the targets that are not available for navigation or fishing at any time). • Areas to be cleared would **exclude** Tangier Sound, Pocomoke Sound, or Hooper, Holland or Kedges straits. Further, tests/exercises would last an average of about 1-3 hours and after completion, fishermen and boaters would be allowed access to the previously cleared portions of the Bay outside the prohibited areas.
	G-3.2 Written	Requests that the Navy provide advance announcement of its tests/exercises on Marine Radio Service Weather Stations 2,3,4 in order for recreational fishermen and boaters to plan their activities.	Thank you for your review; they will be taken into consideration by the decision maker.
Randall, Don Federation of Southern Calvert Communities	G-4.1 Written	Essential US Census data used throughout the EIS is obsolete and inadequate for use in developing the Navy's Operations Plans, particularly as it relates to the Drum Point peninsula.	The Navy recognizes the potential for increased im-pacts with increased population. The reasons for use of the 1990 US Census data for characterizing the existing population of the Patuxent River Complex is that these 1990 Census data provide population statis-tics on a census tract basis. This level of information will not otherwise be available for the complex until the publication of 2000 Census results. Furthermore, the noise analysis relies on the use of 1990 Census data for consistency in comparing the existing noise environment with that under the proposed alternatives. For context, an analysis of future population changes is contained in FEIS Subchapter 4.1 using future population projections from the Maryland Office of Planning and county planning departments.

Name/Agency	Comment Code	Comment	Response
Randall, Don Federation of Southern Calvert Communities (Continued)	G-4.2 Written	The EIS does not comment on the large number of visitors to the Solomons area.	FEIS Subchapter 3.2 has been modified to note the importance of tourism to the Solomons area.
	G-4.3 Written	The EIS needs to consider impacts on recreational boaters who enjoy the use of facilities in Solomons and elsewhere in the southern part of Calvert County.	A discussion of the economic importance of sport fishing, boating, and sailing in the Patuxent River Complex is contained in FEIS Subchapter 3.2 (p. 3.2-4 and 5). This text summarizes the results of study undertaken in 1997 by the Maryland Sea Grant Exten-sion Program. Further, the impact of the proposed action on recreational boating and fishing is considered in FEIS Subchapter 4.3. The analysis concludes that the level of restriction proposed "...would not have significant impacts on either recreational boaters or fishermen given the duration of the exercises and the limited portion of the Bay that would be closed. In fact, the Navy has, in the past, accommodated large scale regattas and/or boat races."
	G-4.4 Written	The EIS relies upon 1990 US Census data that does not reflect the inordinate population expan-sion that has occurred in Southern Maryland from 1990 to date...the Federation estimates that there are 16,500 residents of the Drum Point peninsula plus a seasonal visitor population of more than 7,500.	As stated above in the response to Comment G-4.1, the Navy recognizes the potential for increased impacts with increased population. US Census 1990 data were used to characterize the existing population residing within the boundaries of the Patuxent River Complex. These 1990 Census data provide population statistics on a census tract basis, a level of information that will not otherwise be available for the complex until the publication of 2000 Census results. Furthermore, the noise analysis relies on the use of 1990 Census data for consistency in comparing the existing noise environment with that under the proposed alternatives. For context, an analysis of future population changes is contained in FEIS Subchapter 4.1 using future population projections from the Maryland Office of Planning and county planning departments.
	G-4.5 Written	Figure 3.1-2 of the EIS erroneously shows Southern Calvert County as rural residential. In fact, this area is one of the seven largest population centers in the state of Mary-land...and has one of the highest growth rates in Maryland in recent years.	FEIS Figure 3.1-2 has been modified to reflect the Growth/Protection Areas map delineated in the *Calvert County Comprehensive Plan* (1997). As a result, Solomons and its immediate vicinity is shown as a Town Center. The remainder of Drum Point is shown as a Rural Community.
	G-4.6 Written	Because of the population growth and the EIS's reliance on 1990 population data, most of the assumptions, tables, and conclu-sions in Chapters 3, 4, and 5, par-ticularly as they relate to noise, are seriously flawed.	As stated above in the response to Comment G-4.1, the Navy recognizes the potential for increased impacts with increased population. However, the noise analysis relies on the use of 1990 Census data for consistency in comparing the existing noise environment with that under the proposed alternatives.

Name/Agency	Comment Code	Comment	Response
Randall, Don Federation of Southern Calvert Communities (Continued)	G-4.7 Written	Please note that EIS Table 3.6-3 and Figures 3.6-4 and 5 incorrectly show the areas that are impacted by noise levels in excess of 65 dB. This table and figure estimate of 3,138 off-base population affected within the 60 dB contours is erroneous.	As discussed in FEIS Subchapter 3.6.1, standard computer noise models (accepted by the USEPA and many other federal agencies) were used to simulate the noise levels that would be produced in the Patuxent River Complex for the alternatives. The contours in the figures delineate airfield impacts based on the 24-hour day-night average sound level (Ldn), which has been determined to be a reliable measure of community sensitivity to aircraft noise and is the standard noise metric used in the US to measure the effects of aircraft noise. Ldn takes into account both the noise levels of all individual events that occur during a 24-hour period and the number of times those events occur. This metric is not a measure of individual, or single, noise events to which the commentor may be referring.
	G-4.8 Written	Although EIS Figure 3.6-5 shows VFR Departure Flight Tracks over the Patuxent River, actual arrival and departures to runways 14-32 and 08 frequently overfly the Drum Point peninsula rather than remaining over water.	Flight tracks represent the approximate centerline of flight patterns and corridors and are used for noise modeling purposes. Actual routes widths may vary up to one mile due to type of operation, type of aircraft, aircraft weight, aircrew technique, number of aircraft in the pattern, wind, etc.
	G-4.9 Written	We respectfully urge that flight operations be kept over open waters to the extent safety and mission requirements permit.	It is the practice of NAS Patuxent River Air Operations to route aircraft flights over water, weather conditions and mission-related requirements permitting. How-ever, as mentioned above in the response to Com-ment G-4.8, actual routes may vary due to type of operation, type of aircraft, aircraft weight, aircrew technique, number of aircraft in the pattern, wind, etc.
	G-4.10 Written	We recommend that engine testing at the end of runway 14 incorp-orate a muffler device which we believe will minimize the sleep interruption noise of nighttime tests.	During the first and second quarters of 1998, the tempo and type of operations at the open-air engine test facility at NAS Patuxent River (near the Patuxent River shoreline) temporarily differed from those that were presented in the FEIS. This resulted in increased noise levels in the Solomons, Maryland area. Although these changes were temporary, the Navy anticipates a continuing need to perform critical engine tests using this open-air testing facility and has proposed the mitigation measures described in FEIS Chapter 5.

Name/Agency	Comment Code	Comment	Response
Jansson, Erik President Potomac River Association	G-5.1 Written	We have received reports from residents in Lexington Park and elsewhere about having fuel dumped upon them by landing air-craft. This is a proven health prob-lem at commercial airports and there are some epidemiology studies of this problem. Yet the DEIS does not mention the prob-lem nor propose ways to solve or minimize it.	As discussed in FEIS Subchapter 4.10, Navy policy and concern for the environment, make fuel dumping a rare occurrence in the CTR. Navy pilots are prohibited from dumping fuel below 6,000 ft, except in an emergency situation. Above 6,000 ft, the fuel would have enough time to completely vaporize and dissipate and would therefore have a negligible effect on the ground below. In an emergency, a fuel release may be performed to save the pilot and/or the aircraft. How-ever, should an aircraft mishap occur, fuel or hydraulic fluids could be released. The magnitude and duration of the spill would be controlled through US Coast Guard approved rescue and spill response procedures and would provide quick containment of any spill and minimize any potential water quality impacts to the Bay.
	G-5.2 Written	The DEIS should address the problem of increased greenhouse gas emissions (carbon dioxide) by increased flights.	Aircraft emissions are considered in the air quality analysis prepared for this EIS (see FEIS Subchapters 3.5 and 4.5). In summary, the air quality analysis per-formed for the FEIS found that air emissions increases related to flight operations in nearly all of the CTR would be well within the budgeted limits of Delaware, Maryland, and Virginia. For that portion of the range over Calvert County, a Clean Air Act nonattainment area for ozone, air emissions from air operations would be well below established threshold limits and a formal Air Conformity Analysis would not be required.
	G-5.3 Written	There is inadequate disclosure of the effects of aircraft noise on children...The DEIS does not adequately disclose the adverse effects of noise or offer alternatives as is required by law. We think that you need to do more.	The noise analysis contained in the FEIS considered noise impacts from aircraft flight operations from both human physiological and behavioral perspectives. The effects of aircraft noise on children are discussed in Subchapter 3.6.4.3. Of the 20 sensitive receptors evaluated for potential impacts to speech intelligibility and sleep interference, seven were schools, locations where children were likely to be found.
Cofer, Elinor Vice President, Friends of the Chesapeake	G-6.1 Oral	The DEIS says there will be an in-crease in the noise level but no mitigation is needed and as some-one who frequently has drone planes over her house, it does need some type of mitigation efforts.	FEIS Chapter 5 discusses the Navy's proposed measures to mitigate noise from UAV overflights. In essence, the plan would involve increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.
	G-6.2 Oral	The DEIS makes a reference to the fact that there is no bald eagle nest. Now I live here in the southern part of the county and see a bald eagle go over our property about a twice a week.	As discussed in FEIS Subchapter 3.12 (pg. 3.12-6), three bald eagle nests occur within two miles of NAS Patuxent River. Bald eagles forage approximately 2-3 miles from their nest and could, therefore, potentially occur within the CTR. Nine bald eagle nests have been found in St. Mary's County between the Patuxent and Potomac rivers. There is also a vacant nest on the northern tip of Holland Island, at which the last observed activity occurred in 1994.

Name/Agency	Comment Code	Comment	Response
Cofer, Elinor	G-6.3 Oral	I personally observed a sonic boom over our property while looking out the picture window and observed the collapse of a great blue heron.	As discussed in FEIS Subchapter 4.12, the impact of aircraft noise on herons and other colonial waterbirds would not be significant. This analysis cites several noise impact studies conducted with wading birds, all of which have indicated that many wading birds can utilize habitats associated with civilian and military airfields and low-altitude military training areas, and do so without obvious deleterious impacts to their population dynamics.
Marks, Christiane Board Member, Friends of the Chesapeake	G-7.1 Written	I hope that Pax River will minimize the additional air traffic it needs to take on and still stay afloat and that every effort will be made to move additional operations to less heavily-settled areas, where noise will affect fewer people and where air and water quality and wildlife, etc. are not already under strain.	The mission of the Patuxent River Complex is to be the Navy's principal RDT&E, engineering, and fleet sup-port activity for naval aircraft, engines, avionics, and aircraft support systems (see FEIS Chapters 1 and 2). The complex contains a number of laboratories and flight test support facilities unique to the Navy and DoD that are operated by skilled personnel (instrumented CTR with its restricted airspace, aerial and surface firing range, and three targets; 70 dedicated land-based test facilities; and the airfields at NAS Patuxent River and Webster Field). The purpose of the pro-posed action is to enhance the use of these unique taxpayer-funded facilities and skilled workforce by increasing efficiencies and lowering costs to users. There is no other existing Navy or DoD facility that can fully meet the purpose and need delineated in the EIS without extensive construction and personnel relocation. Therefore, alternate Navy facilities were not considered in this EIS.

Name/Agency	Comment Code	Comment	Response
Penley, A.J. President East Fairway Drive Residents Association, Inc.	G-8.1 Written	Expresses concerns regarding pro-posed increased flights over North-umberland County and the impact on noise pollution, community, safety, and fish and wildlife as well as sonic booms.	FEIS Subchapter 4.6 presents a comprehensive dis-cussion of the potential for noise impacts from a physiological and behavioral perspectives, including annoyance, speech interference, and sleep distur-bance. Standard computer noise models (accepted by the USEPA and many other federal agencies) were used to simulate the noise levels that would be pro-duced in the Patuxent River Complex for the alter-natives. The modeling results showed no significant noise impacts among the three alternatives for both subsonic and supersonic aircraft operations in the CTR. Single-event noise impacts also were evaluated at more than 20 specific locations, including resi-dences, schools, and hospitals. The results of the analysis found little difference among the alternatives with respect to overall noise levels or the potential for speech interference or sleep disturbance at all of the sensitive receptor locations. Community impacts of implementing any of the three alternatives are discussed in FEIS Subchapter 4.2. The proposed action would involve no on-ground disturbances or planned military construction projects, and there would be no changes in projected employ-ment. Hence, there would be no demographic or employment impacts on persons residing within the footprint of the CTR. With respect to safety issues, continued adherence and emphasis on airfield safety policies and proc-edures and range-related safety and clearance prac-tices would minimize the potential for mishaps due to the proposed increased level of flight and related oper-ations under any of the alternatives. Air Traffic Control at NAS Patuxent River would continue to enforce its "ten aircraft rule" for safety in the CTR. Also, as summarized in FEIS Subchapter 4.12, there would be no significant increase in aircraft noise impacts that could adversely impact wildlife. Of the threatened and endangered species that may occur in the area, the northeastern beach tiger beetle is not likely to breed at NAS Patuxent River, and although the bald eagle and peregrine falcon have been sighted in the area, nesting has not been observed.
Stansbury, Robert President Sampsons Wharf Property Owners Association	G-9.1 Written (e-mail)	Officially protests the proposed changes in the "fly over" program due to sonic booms and excessive noise created by low flying "jets."	Thank you for your comments; they will be taken into consideration by the decision maker. Though it may appear that your locality experiences a significant number of the flight operations that are conducted in CTR, flight operations are actually distributed through-out the CTR. However, as discussed in FEIS Chapter 5, the Navy is proposing several measures to mitigate the annoyance factor associated with sonic booms that affect the Northern Neck of Virginia.

Name/Agency	Comment Code	Comment	Response
Schipp, Dorothy Secretary Sampsons Wharf Property Owners Association	G-10.1 Written	Strongly protests the Navy's plan to increase flight operations at the Patuxent River Complex that will certainly impact all of Northumberland County...It is the Association's understanding that Northumberland County is already the recipient of over 18,000 hours of these flights, creating a significant amount of noise. Furthermore, this increase will not provide jobs or any other benefit to our County. We believe that the most prudent measure would be to remove our County from the plan of the CTR.	See response to Comment G-9.1 above.
Dougherty, Barb President Art Calendar Magazine	G-11.1 Written (facsimile)	Just a few seconds by jet is the entirety of the Atlantic Ocean, whose residents, if they are disturbed by the endless sonic booms from aircraft, have the advantage of being able to dive to the bottom of the ocean to escape it. Here in quiet Fairmount, we enjoy no such escape, and virtually jump out of our chairs time after time, as these aircraft race about...if the air tests are to be expanded, they should be expanded somewhere way out over the deep blue sea.	During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5.
Private Individual Comments			
Smith, Dr. Nancy P.	P-1.1 Written (facsimile)	Consider scheduling a public hearing in St. Mary's County.	As a result of public interest, the Navy scheduled a fourth public hearing for June 22, 1998 in Great Mills, Maryland in St. Mary's County. This hearing was announced in the Federal Register on June 4, 1998 and advertised in local newspapers.
Smith, Dr. Nancy P. (Continued)	P-1.2 Written (facsimile)	Explicitly address the issue of the use of the increased flight hours to accommodate the testing of nonmilitary aircraft (private corporations' planes).	As discussed in FEIS Chapter 2, the Patuxent River Complex has, and is currently, accommodating non-military customers. This nonmilitary testing may involve commercial or nonmilitary government agencies. Further, these tests may involve flight operations or may occur in the complex's unique ground test facilities. In any event, the types of tests performed for nonmilitary customers would be similar to RDT&E tests that are presently conducted for military customers and associated environmental impacts would be similar. Under the proposed action, nonmilitary customers would continue to be accommodated in the Patuxent River Complex. Nonmilitary customers would be charged for the use of the complex's facilities in accordance with DoD's commercial pricing policy.

Name/Agency	Comment Code	Comment	Response
	P-1.3 Written (facsimile)	Explicitly address the issue of increased air pollution and identify if considered point source or nonpoint source for regulatory purposes.	The air quality impacts of each of the alternatives considered in the FEIS is included in FEIS Subchapter 4.5. Aircraft air pollution is considered a mobile source for regulatory purposes.
	P-1.4 Written	The DEIS does not provide a very compelling national security reason for increasing flight hours in the Patuxent River Complex.	The mission of the Patuxent River Complex is to be the Navy's principal RDT&E, engineering, and fleet sup-port activity for naval aircraft, engines, avionics, and aircraft support systems (see FEIS Chapters 1 and 2). The complex contains a number of laboratories and flight test support facilities unique to the Navy and DoD that are operated by skilled personnel (instrumented CTR with its restricted airspace, aerial and surface firing range, and three targets; 70 dedicated land-based test facilities; and the airfields at NAS Patuxent River and Webster Field). The purpose of the pro-posed action evaluated in this EIS is to enhance the use of these unique taxpayer-funded facilities and skilled workforce by increasing efficiencies and lowering costs to users. There is no other existing Navy or DoD facility that can fully meet the purpose and need delineated in the EIS without extensive construction and personnel relocation.
Mahar, Ray	P-2.1 Written	Concerned that noise pollution from increased aircraft flights will negatively affect the community in southern Calvert County.	FEIS Subchapter 4.6 discusses the potential human physiological and behavioral impacts from aircraft noise, including: annoyance (measured by consid-eration of the DNL of 65 dB; speech interference; and sleep disturbance.
LeBaron, Richard	P-3.1 Written	The DEIS gives inadequate consideration to the impact of increased flights on the environ-ment of Northumberland County given that many of the current 18,200 flight hours involve overflights of the county already.	Thank you for your comments; they will be taken into consideration by the decision maker. Though it may appear that your locality experiences a significant num-ber of the flight operations that are conducted, flight operations are actually distributed throughout the CTR. Furthermore, as discussed in FEIS Chapter 5, the Navy is proposing measures to mitigate annoyance from sonic booms and UAV overflights in the CTR.
	P-3.2 Written	The method used to report noise impacts is flawed. Specifically the 65 decibel DNL is not an appro-priate measure of disturbance for semi-rural Northumberland County.	As discussed in FEIS Subchapter 3.6.1, there are many ways to express the loudness of sound pro-duced by aircraft. Among these are maximum or average maximum levels, as well as the Day-Night Average Sound Level (Ldn) used in the FEIS. The 24-hour Ldn has been determined to be a reliable mea-sure of community sensitivity to aircraft noise and is the standard noise metric used in the US to measure the effects of aircraft noise. Ldn takes into account both the noise levels of all individual events that occur during a 24-hour period and the number of time those events occur. Furthermore, based on community noise studies undertaken by the federal government, the 65 dB DNL has been determined to be the noise level above which noise is considered to be annoying.

Name/Agency	Comment Code	Comment	Response
	P-3.3 Written	The DEIS only considers the impact of aircraft noise that literally cuts off conversation inside a house. This unacceptable standard was meant to apply to populations living directly adjacent to airports, as the DEIS notes. It does not even attempt to measure noise impacts on the communities over-flown by aircraft. Using such an obviously biased measurement led the analysis to identify a very small number of households that would be impacted by increased noise.	The FEIS examines noise impacts from aircraft operating at the airfield(s) and in the affected airspaces, near to and far from communities overflown by aircraft. The FEIS presents the impacts using the latest and most widely-accepted noise methodologies. For com-munities near the airfields, the noise exposure was presented in contours of DNL, within which the areas and populations were estimated. For communities overflown by aircraft operating in the airspaces, the noise exposure was discussed in terms of L_{dnmr} (and L_{Cdn} for supersonic flight). The potential for speech interference and sleep disturbance was analyzed at 20 locations representative of communities near both concentrated and infrequent flight activity to supplement the noise impact presentation. Your community is most affected by (subsonic) flight operations in Restricted Areas R-4006 and R-4008. As mentioned in the DEIS, there were no significant impacts between the alternatives examined.
LeBaron, Richard (Continued)	P-3.4 Written	The DEIS makes no effort to analyze the impact of the noise from UAVs, even though it records the fact that disturbance reports related to UAVs have come largely from Northumberland County and one other location. Given the persistent and irritating high-pitched noise from UAVs, their impact merits separate and thorough study.	Through the NEPA process, the Navy has become aware of the annoyance factor associated with UAV operations over the Northern Neck of Virginia. The Navy's plan to mitigate this annoyance factor is described in FEIS Chapter 5. In essence, the plan would involve increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.
	P-3.5 Written	I would suggest a different line of analysis that accounts for the fact that Northumberland County is a semi-rural environment...The DEIS makes it clear that population cen-ters in this county are already some of the most impacted by flight oper-ations. Even low levels of noise from aircraft create annoyance in such an environment, where the ambient noise is much lower than in heavily populated areas.	Please see response to P-3.4 above.

Name/Agency	Comment Code	Comment	Response
	P-3.6 Written	The DEIS must consider mitigating measures to reduce aircraft noise impacts in Northumberland County. Because mitigating measures such as directing flights over water are inadequate for county residents (given that most of the population lives on the banks of or very near rivers and the Bay), the county should be removed from the CTR and the range moved to another area.	The boundaries of the CTR were established more than 50 years ago during World War II and testing of Naval aircraft has been an on-going activity in the Patuxent River Complex since that time. As a result, the complex contains a number of unique laboratories and flight test support facilities and a skilled workforce. The purpose of the proposed action is to enhance the continued use of the facilities in the complex, including the CTR in order to increase efficiencies and lower costs to users as well as the taxpayer. The socioeco-nomic environment of the Northern Neck of Virginia was not a factor in the development of the proposed action. Though it may appear that your locality experiences a significant number of the flight opera-tions that are conducted, existing flight operations are actually distributed throughout the CTR. However, as discussed in FEIS Chapter 5, the Navy is proposing several measures to mitigate the annoyance factor associated with UAV overflights and sonic booms that affect the Northern Neck of Virginia.
Kampf, Alex	P-4.1 Written	Identify the real (specific) proposed flight hour increase in drone flying at Webster Field under the proposed action per day, night, and week.	It is anticipated that UAV operations may increase up to 20 percent (about 200 flight hours per year) if Operational Workload Alternative III were imple-mented. However, the actual flight hours associated for UAVs will depend on RDT&E and training requirements.
Kampf, Alex (Continued)	P-4.2 Written	Identify the real (specific) flight hour increase in helicopter hover over Webster Field under the proposed action.	It is anticipated that helicopter operations, including hover over Webster Field, may increase up to 20 percent if Operational Workload Alternative III were implemented. However, the exact increase cannot be quantified at this time since the alternatives represent operational estimates based on foreseeable mission requirements and the complex's unique airfield, facility, and range capabilities. Whether operations increase or remain the same in the future, implementation of the proposed action would provide the complex with the flexibility to accept new workloads, if required.
	P-4.3 Written	Why is the Navy flying the noisiest tow planes for glider flying instead of using environmentally friendly mechanical or truck tows for launching of gliders? Or why not use self-launching (small contained engines) on motor gliders which are quiet and more efficient?	The Navy uses tow planes for gliders that both meet the needs of the mission and are economical to oper-ate. Self-launching gliders are not used as the Test Pilot School syllabus includes flying unpowered vehi-cles. In any event, the glider flying is a short-term event for each class.

Name/Agency	Comment Code	Comment	Response
	P-4.4 Written	Very concerned about single event decibel levels of drones, heli-copters, and glider tows outside of Webster Field property line. Flights continually transgress southeast side of Molls Cove and overfly properties along Creek and Grayson roads.	NAS Patuxent River takes all noise complaints seriously. In fact, as part of its mitigation plan for the proposed action (see FEIS Chapter 5), the Navy will be establishing formalized procedures to ensure proper handling of and response to noise or aircraft distur-bance reports. These procedures will involve a central-ized process for receiving and addressing noise distur-bance reports. An electronic database of those reports would be maintained and used by the Navy to enable corrective action to be taken, as appropriate.
	P-4.5 Written	Why are flight patterns con-centrated to the northeast of Webster Field and not over St. Inigoes Creek and St. Mary's River or even over the base buildings?	Standard flight patterns have been established at Web-ster Field to allow for safe and efficient flight operations and according to the Air Operations Manual for the Complex are over the base buildings. The actual routes on any single day may vary due to type of oper-ation, type of aircraft, aircraft weight, aircrew technique, number of aircraft in the pattern, wind, etc.
	P-4.6 Written	Why early morning or late night evening runups on drones and concentrated helicopter activity after 2100 hours?	Occasional missions require flight or related operations in the evening hours. However, these missions ac-count for a small percentage of overall operations.
	P-4.7 Written	Why are transient fliers not briefed on noise sensitive areas when visiting Webster Field or NAS Patuxent River?	Transient fliers are briefed on noise sensitive areas when visiting the Patuxent River Complex. In the fu-ture, the Navy proposes to expand existing briefings on aircraft operations procedures that are conducted with all users of the CTR, and others, as appropriate, to ensure an understanding of proper procedures and FEIS mitigation measures.
Kampf, Alex (Continued)	P-4.8 Written	Why are military fliers not held accountable for deliberate trans-gressions and residential over-flights?	Military fliers are held accountable for deliberate violations of aircraft operating procedures as required under in place administrative procedures.
	P-4.9 Written	Are there published ingress and egress routes to Webster Field?	Flight track information for both the airfields at NAS Patuxent River and OLF Webster Field are published in the Air Operations Manual for the Patuxent River Complex.
	P-4.10 Written	How about publishing or making available a daily flight schedule hotline for neighborhood planning purposes?	Thank you for your review; they will be taken into consideration by the decision maker.
Kocen, Joan & Elliot	P-5.1 Written	Current flight levels are sufficient to reduce the "quiet enjoyment" of our homes well below tolerable levels given that flights occur daily be-tween 6 am and 11 pm and pre-flight preparations begin even earlier.	Scheduling of tests/exercises is dependent on the Navy's mission needs and requirements. However, about 97 percent of existing flight operations are flown between 7:00 am and 10:00 pm.

Name/Agency	Comment Code	Comment	Response
	P-5.2 Written	Past experience indicates that allowing other Naval air uses as well as other military services to train in the Patuxent River Complex means that minimum altitudes will be continuously violated. Aircraft unfamiliar with the complex's policies to minimize air traffic annoyance tend to fly too low over populated areas. Adding Army Airborne exercises will just add to our burdens.	Transient fliers are briefed on noise sensitive areas when visiting the Patuxent River Complex. In the future, the Navy proposes to expand existing briefings on aircraft operations procedures that are conducted with all users of the CTR, and others, as appropriate, to ensure an understanding of proper procedures and FEIS mitigation measures.
	P-5.3 Written	Current levels of particulate poilu-tion from unburned fuel is currently at a level sufficient to coat homes and outdoor furniture with a black greasy film. If this is occurring now, consider how the environ-ment will be affected by the proposed increase in flight hours. Consider, also, the effect on the Bay and its wildlife.	There are no jet engine operating conditions under which raw fuel would be emitted through the engine exhaust. The modern military aircraft that fly in the Pat-uxent River Complex are designed to emit negligible amounts of particulate; this engine characteristic minimizes the likelihood of oily particulate settling out of the atmosphere and causing an impact on the ground.
Kocen, Joan & Elliot (Continued)	P-5.4 Written	Increases as called for in the cur-rent proposal would diminish the perception and enjoyment of the Solomons area by those of us currently living here and those that might come in the future.	The boundaries of the CTR were established more than 50 years ago during World War II and testing of Naval aircraft has been an on-going activity in the Patuxent River Complex since that time. As a result, the complex contains a number of unique laboratories and flight test support facilities and a skilled workforce. The purpose of the proposed action is to enhance the continued use of the facilities in the complex, including the CTR in order to increase efficiencies and lower costs to users as well as the taxpayer. Though it may appear that your locality experiences a significant number of the flight operations that are conducted, existing flight operations are actually distributed throughout the CTR.

Name/Agency	Comment Code	Comment	Response
	P-5.5 Written	The proposed action seems driven by an attempt to justify the exis-tence of NAS Patuxent River by wrapping it in the cloak of a nation-al crisis and future assumed chal-lenges. The ultimate result of this proposed expansion will be to decrease enjoyment of the area and reduce the value of its homes, businesses, and tax base. South-ern Calvert County, and particularly the Solomons area, will pay a dis-proportionate price for these unproven national needs.	Property values are determined by a complex combin-ation of neighborhood characteristics (e.g., the quality of schools, local property taxes, access to transpor-tation, and the crime rate) and individual housing characteristics (e.g., age of the house, number of rooms, and amenities such as garages). Conse-quently, there are no definitive federal standards for quantifying the impact of aircraft noise on property val-ues and such an analysis is not addressed in the FEIS. The stated purpose of the proposed action evaluated in this FEIS is to enhance the use of unique taxpayer-funded facilities and the skilled workforce in the Patuxent River Complex by increasing efficiencies and lowering costs to users. There is no other existing Navy or DoD facility that can fully meet the purpose and need delineated in the FEIS without extensive construction and personnel relocation.
	P-5.6 Written	We appreciate the value of the jobs and income resulting from the air station. This is a trade off for the loss of peaceful enjoyment. However, the proposed increases suggested by the additional flight hours and opening the complex to other military services brings no value with it. These uses are transitory, irritating to the local pop-ulation, and serve to further erode the area's benefits.	See response to Comment P-5.5 above.
Kocen, Joan & Elliot (Continued)	P-5.7 Written	Sound averaging is ridiculous and is a classic example of political double-speak.	As discussed in FEIS Subchapter 3.6.1, there are many ways to express the loudness of sound produced by aircraft. Among these are maximum or average maximum levels, as well as the Day-Night Average Sound Level (Ldn) used in the FEIS. The 24-hour Ldn has been determined to be a reliable measure of community sensitivity to aircraft noise and is the standard noise metric used in the US to measure the effects of aircraft noise. Ldn takes into account both the noise levels of all individual events that occur during a 24-hour period and the number of time those events occur. Furthermore, based on community noise studies under-taken by the federal gpvernment, the 65 dB DNL has been determined to be the noise level above which noise is considered to be annoying.

Name/Agency	Comment Code	Comment	Response
	P-5.8 Written	We've done our homework and the Navy has conveniently attempted to give as little information as possible to the community.	The public has been provided many opportunities to learn about the Navy's proposed action: • In May 1997, five advertised scoping meetings were held around the Chesapeake Bay to solicit comment from the interested public; fact sheets discussing the proposed action were available at the scoping meetings and upon request. • An Internet website provided both information and opportunity to submit comments, and a toll-free telephone number allowed the public to submit oral comments or request additional materials. Between May 1997 and the public hearing held in June 1998, the Internet website and the message at the toll-free number were regularly updated to keep the public informed on progress of the EIS. • In May 1998, the DEIS and/or the Executive Summary was distributed to a mailing list of over 400 interested citizens. Four public hearings were held around the Bay. Informational poster sta-tions, videos, and fact sheets explaining the results of the EIS were available for public review.
Bock, Wolf	P-6.1 Written	I object very strongly to the use of the term "BP" (Before Present) for dating pre-history. This is an im-precise term that is meaningless to anyone not in the "Cultural History Elite Academia." The term "BC" is much clearer. "BP" will be inter-preted as a base year of 1998 by the public (at best).	The term "BP" or Before Present is currently the standard reference for archaeological dating.
Bock, Wolf (Continued)	P-6.2 Written	The use of hectares instead of acres throughout the DEIS is confusing. It is a unit that is used nowhere in this country.	Executive Order 12770 (Metric Usage in Federal Government Programs), signed by President Bush in 1991, gives specific direction to the federal government to use the metric system in all of its business-related activities, unless it is not economically feasible or is likely to cause significant inefficiencies or loss of markets to US firms. In the FEIS, the use of hectares, a metric unit, is consistent with this Presidential Executive Order.

Name/Agency	Comment Code	Comment	Response
Frye, Travis	P-7.1 Written	I live approximately 20 miles north of the noise zone shown as 65 decibels. I have aircraft fly directly over my house, rattling things and such. This is much louder than normal speaking to me. This doesn't bother me, as I enjoy watching them. But the noise measures on the map aren't always correct.	As discussed in FEIS Subchapter 3.6.1, there are many ways to express the loudness of sound pro-duced by aircraft. Among these are maximum or aver-age maximum levels, as well as the Day-Night Average Sound Level (Ldn) used in the FEIS. The 24-hour Ldn has been determined to be a reliable measure of community sensitivity to aircraft noise and is the stan-dard noise metric used in the US to measure the effects of aircraft noise. Ldn takes into account both the noise levels of all individual events that occur during a 24-hour period and the number of time those events occur. Furthermore, based on community noise studies undertaken by the federal government, the 65 dB DNL has been determined to be the noise level above which noise is considered to be annoying.
Anonymous	P-8.1 Written	If the Navy isn't contributing significant pollution to the Bay, how would eliminating Ni-Cd batteries benefit the Bay?	The Navy's management initiative to greatly reduce future releases of Ni-Cd batteries would continue the Navy's commitment to the improvement and main-tenance of water quality in the Chesapeake Bay as a signatory to the Chesapeake Bay Program.
Osterman, Doris Steele	P-9.1 Oral	I firmly believe that the range should be moved to a less populated area.	The mission of the Patuxent River Complex is to be the Navy's principal RDT&E, engineering, and fleet sup-port activity for naval aircraft, engines, avionics, and aircraft support systems (see FEIS Chapters 1 and 2). The complex contains a number of laboratories and flight test support facilities unique to the Navy and DoD that are operated by skilled personnel (instrumented CTR with its restricted airspace, aerial and surface firing range, and three targets; 70 dedicated land-based test facilities; and the airfields at NAS Patuxent River and Webster Field). The purpose of the pro-posed action is to enhance the use of these unique taxpayer-funded facilities and skilled workforce by in-creasing efficiencies and lowering costs to users. There is no other existing Navy or DoD facility that can fully meet the purpose and need delineated in the EIS without extensive construction and personnel relo-cation. Therefore, alternate Navy facilities were not considered in this EIS.
Osterman, Doris Steele (Continued)	P-9.2 Oral	Planes and helicopters fly too low and are noisy.	Aircraft are flown by the Navy at altitudes necessary to meet specific mission requirements.

Name/Agency	Comment Code	Comment	Response
	P-9.3 Oral	Sonic booms are shattering and/or cracking old glass that I have in my house.	During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5. Structural damage from existing or proposed aircraft operations is not expected. The Navy could be respon-sible for repair to your home if structural damage was caused by the Navy aircraft overflights. A determin-ation would need to be conducted through the Navy's claims process. Contact the Command Staff Judge Advocate at NAS Patuxent River at 301-342-1045.
	P-9.4 Oral	Increased flights will decrease property values.	Property values are determined by a complex com-bination of neighborhood characteristics (e.g., the quality of schools, local property taxes, access to trans-portation, and the crime rate) and individual housing characteristics (e.g., age of the house, number of rooms, and amenities such as garages). Conse-quently, there are no definitive federal standards for quantifying the impact of aircraft noise on property val-ues and such an analysis is not addressed in the FEIS. The stated purpose of the proposed action evaluated in this EIS is to enhance the use of unique taxpayer-funded facilities and the skilled workforce in the Patuxent River Complex by increasing efficiencies and lowering costs to users. There is no other existing Navy or DoD facility that can fully meet the purpose and need delineated in the EIS without extensive construction and personnel relocation.
	P-9.5 Oral	Aircraft noise has behavioral impacts on both humans and animals.	FEIS Subchapter 4.6 discusses the potential human physiological and behavioral impacts from aircraft noise, including: annoyance (measured by consid-eration of the DNL of 65 dB; speech interference; and sleep disturbance. As discussed in FEIS Subchapter 4.12, there would be no significant increase in aircraft noise impacts that could adversely impact wildlife. Of the threatened and endangered species that may occur in the area, the northeastern beach tiger beetle is not likely to breed at NAS Patuxent River, and although the bald eagle and peregrine falcon have been sighted in the area, nesting has not been observed.

Name/Agency	Comment Code	Comment	Response
Osterman, Doris Steele (Continued)	P-9.6 Oral	Hoopers Island residents are vulnerable to mistakes that could occur during bombing exercises at Bloodsworth Island.	Operations conducted at the US Navy's Bloodsworth Island Shore Bombardment and Bombing Range are scheduled and controlled by Naval Amphibious Base (NAB) Little Creek, Norfolk, Virginia and are outside the scope of this FEIS. Comments or concerns about Bloodsworth Island should be referred to Ms. Barbara Jennings, Public Affairs Office, NAB Little Creek at (757) 464-7923.
Bealefeld, John	P-10.1 Oral	Concerned with noise from sonic booms and low flying aircraft.	During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5.
	P-10.2 Oral	The Navy wants too much airspace and target areas for practice.	The boundaries of the CTR were established more than 50 years ago during World War II and testing of Naval aircraft has been an on-going activity in the Patuxent River Complex since that time. As a result, the complex contains a number of unique laboratories and flight test support facilities and a skilled workforce. The purpose of the proposed action is to enhance the continued use of the facilities in the complex, including the CTR in order to increase efficiencies and lower costs to users as well as the taxpayer. Though it may appear that your locality experiences a significant number of the flight operations that are conducted, existing flight operations are actually distributed throughout the CTR.
	P-10.3 Oral	Dummy bombs can cause an accident by going through somebody's ship or boat in the Bay.	As discussed in both FEIS Subchapters 3.14 and 4.14, in order to protect the public, the Navy clears target areas approximately one hour before they are scheduled for use. Specific procedures depend on the type of testing and the season of the year and may include visual sweeps of the area using one or more surface craft and chase aircraft and/or radar sweeps. Recreational boaters, fishermen, or watermen are re-quested to exit the restricted areas via radio trans-mission, written signs, hand signals, or other appro-priate methods. Helicopters equipped with loud-speakers are sometimes used. Should an individual refuse to leave the area, tickets are issues by the Range Safety Officer, or the US Coast Guard is called in to escort the individual out of the area. As an add-itional safety measure, prior to release, the pilot flies over a target to perform a visual check to make sure the targets are clear.

Name/Agency	Comment Code	Comment	Response
Bealefeld, John (Continued)	P-10.4 Oral	Dummy bombs released into the Bay disturbs the fishing and the crabbing in the Bay.	The probability of direct contacts or strikes of fish and wildlife by released stores from these activities would continue to be very low under any of the alternatives as described in FEIS Subchapter 4.12.
	P-10.5 Oral	Aircraft overflights disturb television reception.	NAS Patuxent River is the home of the Mid-Atlantic Area Frequency Coordination Office. This office ensures effective and compatible authorized use of the radio frequency spectrum by all activities, tenants, and contractors in the Patuxent River Complex. Among the office's responsibilities is the coordination and approval of all Navy electronic warfare frequency usage in the Middle Atlantic area. Radio frequency use in the complex is approved and monitored at all times. As a result, off-base interference with commercial television and radio signals does not occur except for those occasions when required by specific equipment tests. Such tests are rare occurrences, and their off-base impacts are minimized by very early morning scheduling (i.e., 2:00-3:00 am time frame) and operations of the equipment in short bursts of less than a second. Phenomena such as electrical interference from equipment with motors, multipath interference, and ducting, could be responsible for any television and radio interference that may occur in the Patuxent River Complex. The effect of these phenomena are discussed in FEIS Subchapter 4.9.1.
Bealefeld, Joan	P-11.1 Oral	The sound barrier is broken continuously. Also, the aircraft are flying lower to the ground than they need to be. One week ago, a plane did a roll over on top of her house. If this needs to be done (for training), it should be done over the Bay.	Citizens who observe disruptive flight activities by Navy aircraft should file an Aircraft Disturbance Report with NAS Patuxent River. Collect calls to 301-342-3836 are accepted. NAS Patuxent River takes all aircraft disturbance reports seriously. In the future, as part of its mitigation plan for the proposed action (see FEIS Chapter 5), the Navy will be establishing formalized procedures to ensure proper handling of and response to noise or aircraft distur-bance reports. These procedures will involve a central-ized process for receiving and addressing noise disturbance reports. An electronic database of those reports would be maintained and used by the Navy to enable corrective action to be taken, as appropriate.
Lawrence, Patricia	P-12.1 Oral (voice mail)	Aircraft noise around Webster Field is too noisy for the children and adults in her household to sleep at night. The sound is annoying and the Navy is requested not to fly there anymore.	Scheduling of tests/exercises is dependent on the Navy's mission needs and requirements. The normal days and hours of operation for Webster Field are Monday through Friday, excluding holidays, from 8:00 am to 4:00 pm during the winter and 9:00 am to 5:00 pm during the summer months.

Name/Agency	Comment Code	Comment	Response
Woolwine, Richard	P-13.1 Written (e-mail)	The DEIS does not address the noise pollution generated by current flights nor quantify the increase in misery that will accompany increased flights.	EIS Subchapters 3.6 and 4.6 discusses the potential human physiological and behavioral impacts from aircraft noise, including: annoyance (measured by consideration of the DNL of 65 dB; speech interference; and sleep disturbance.
	P-13.2 Written (e-mail)	I believe at least one, possibly more, UAVs have crashed in the local area within the last several years. Given that fact, why do Naval authorities continue to allow these planes to endanger and irri-tate heavily populated land areas when there are miles of open water areas to practice over? If there is a valid mission reason that dictates that these flights must occur over land areas, the Navy should alter-nate flight paths to avoid flying con-sistently over the same areas, and either muffle the engines or restrict the planes to a very high altitude to minimize noise reaching ground level.	Although the UAV program experienced aircraft losses in the past, the reliability of the engine has substantially increased and in the last two years, no incidents have occurred. In any event, the Navy identifies UAV operating routes using detailed demographic data with the specific goal of avoiding overflights of densely populated areas. In addition, as discussed in FEIS Chapter 5, the Navy is proposing measures to mitigate UAV overflights by increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.
	P-13.3 Written (e-mail)	Low flying and hovering heli-copters also add to the drone of UAVs to produce an almost con-stant level of irritating noise throughout the day and into the evening hours. On a half dozen occasions within the last two months, a low flying helicopter has hovered in the same spot close to his home around 7:30 pm for ap-proximately 30 minutes at a time. Helicopter noise is never pleasant and these hovering flights are un-bearable if you are outside or have your windows open.	The Air Operations Manual for the Patuxent River Complex specifies that helicopters are permitted overflights at 500 ft altitude, but may not overfly or hover over residences. Citizens who observe disruptive flight activities by Navy aircraft should file an Aircraft Disturbance Report with NAS Patuxent River. Collect calls to 301-342-3836 are accepted. NAS Patuxent River takes all aircraft disturbance reports seriously.
Jonnson, Jr., Arthur C.	P-14.1 Written	In this quiet, peaceful part of the world, I feel there is already more air traffic and sonic booms than we need. The booms rattle the entire house and its contents.	During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5.

Name/Agency	Comment Code	Comment	Response
Jonnson, Jr., Arthur C. (Continued)	P-14.2 Written	With all the media reporting the underfunding of our military, why this costly increase in flight time? It flies in the face of current information.	The mission of the Patuxent River Complex is to be the Navy's principal RDT&E, engineering, and fleet sup-port activity for naval aircraft, engines, avionics, and aircraft support systems (see FEIS Chapters 1 and 2). The complex contains a number of laboratories and flight test support facilities unique to the Navy and DoD that are operated by skilled personnel (instrumented CTR with its restricted airspace, aerial and surface firing range, and three targets; 70 dedicated land-based test facilities; and the airfields at NAS Patuxent River and Webster Field). The purpose of the pro-posed action is to enhance the use of these unique taxpayer-funded facilities and skilled workforce by increasing efficiencies and lowering costs to users. This action is needed in order for the Navy to success-fully meet current and future national and global de-fense challenges posed by a post-Cold War environ-ment. There is no other existing Navy or DoD facility that can fully meet the purpose and need delineated in the EIS without extensive construction and personnel relocation. Therefore, alternate Navy facilities were not considered in this EIS.
Abell, Mary C.	P-15.1 Written	Strongly opposes any increase in flight hours of aircraft at Pax River due to noise and chemical pollution.	Thank you for your comments; they will be taken into consideration by the decision maker.
Graf, Mary Louise M.	P-16.1 Written	My objection is to what sounds like engine testing which usually goes on for hours at a time with no letup. The noise is persistent and aggra-vating. In addition there is an accompanying vibration which has the potential for knocking a wall hanging loose. It would seem that something could be done to insulate the world from this source of pollution.	During the first and second quarters of 1998, the tempo and type of operations at the open-air engine test facility at NAS Patuxent River (near the shoreline) changed from those which were predicted in the FEIS. This resulted in increased noise levels in the Solomons, Maryland area. Although these changes were temporary, the Navy anticipates a continuing need to perform critical engine tests using this open-air testing facility and has proposed the mitigation measures described in Chapter 5.
Waggoner, Lee R. LCDR (ret) USNR	P-17.1 Written	As a Dorchester County resident, expressed support for the Navy and for whatever level of exercises it deems necessary for maintaining readiness.	Thank you for your comments, they will be considered by the decision maker.
Taylor, Alison Clarke	P-18.1 Oral (voice mail)	Stated that she is against in-creases in flights near her house since flights are already very disturbing and annoying.	Thank you for your comments; they will be taken into consideration by the decision maker.

Name/Agency	Comment Code	Comment	Response
Taylor, Alison Clarke (Continued)	P-18.2 Written	The quality of life in St. Mary's County has been greatly decreased by the sudden increase in population...we are also losing open land, woods and farmland at an alarming rate; due to proposed housing and commercial projects, we stand to lose even more. How do the above changes pertain to the proposed increases in flights over the Pax River area?	With implementation of the proposed action, the permanent employment base at NAS Patuxent River and Webster Field would be expected to remain the same as under the current level of operations (e.g., full post-BRAC employment); the number of transient workers that would be associated with specific test pro-grams would also remain the same as described for current operations levels. In addition, any new fac-ilities constructed in the complex have been associated with BRAC realignment, the impacts of which were assessed in two EISs (finalized in 1993 and 1994). Should any new facilities be proposed for the complex in the future, separate environmental documentation would be required.
	P-18.3 Written	I live on the shores of the Potomac, and we get both helicopters and jets. Sometimes there are hovering maneuvers over the water, which causes noise over a long period of time. Enough is enough...Let's not increase the stress any further.	Citizens who observe disruptive flight activities by Navy aircraft should file an Aircraft Disturbance Report with NAS Patuxent River. Collect calls to 301-342-3836 are accepted. NAS Patuxent River takes all aircraft disturbance reports seriously. In the future, as part of its mitigation plan for the proposed action (see FEIS Chapter 5), the Navy will be establishing formalized procedures to ensure proper handling of and response to noise or aircraft distur-bance reports. These procedures will involve a central-ized process for receiving and addressing noise distur-bance reports. An electronic database of those reports would be maintained and used by the Navy to enable corrective action to be taken, as appropriate.
Aswell, J.R.	P-19.1 Oral (voice mail)	Inquiry as to why no public meetings were held closer to Somerset or Worcester counties, especially since these counties provide emergency assistance when planes crash.	In addition to holding four public hearings around the Chesapeake Bay, the public has been provided many opportunities to provide comment on the DEIS via an Internet website and a toll-free telephone number. The public was also provided the opportunity to submit comments via the US mail or facsimile. All comments received, regardless of the submission method chosen, were made part of the public record and given consideration in the decision making process.
Brown, Barry	P-20.1 Oral (voice mail)	Requests that flights be restricted over Maryland's Eastern Shore chicken farms since thousands of chickens are killed when they pile in the corner out of fear and suffocate.	The issue of aircraft noise impacts on the poultry industry underlying the CTR is discussed in FEIS Subchapter 4.2. Because aircraft activities over areas with concentrations of poultry farms would be too brief and intermittent to allow poultry to become acclimated, NAWCAD has implemented a management initiative to address this issue (see FEIS Subchapter 4.2). In addition, the Navy has proposed mitigation for sonic booms in the CTR as discussed in FEIS Chapter 5.

Name/Agency	Comment Code	Comment	Response
Corkran, Dan	P-21.1 Oral	He lives in north Dorchester County. Periodically, three planes fly directly over his house, breaking the sound barrier--the Navy should not try to break the sound barrier while flying out towards the ocean.	Northern Dorchester County underlies VR 1709, a MTR scheduled and controlled by the Air National Guard at McGuire Air Force Base in New Jersey. This visual flight rule MTR is described in FEIS Subchapter 3.14. Aircraft are allowed to fly between the altitudes of 500 ft to 1,500 ft above ground level.
Noland, Arnold	P-22.1 Oral	Fuel drops are killing off all of the trees around the airports--and we want to find out what the fuel is doing to the Bay.	As discussed in FEIS Subchapter 4.10, Navy policy and concern for the environment, make fuel dumping a rare occurrence in the CTR. Navy pilots are prohibited from dumping fuel below 6,000 ft, except in an emergency situation. Above 6,000 ft, the fuel would have enough time to completely vaporize and dissipate and would therefore have a negligible effect on the ground below. In an emergency, a fuel release may be performed to save the pilot and/or the aircraft. Should an aircraft mishap occur, fuel or hydraulic fluids could be released. The magnitude and duration of the spill would be controlled through US Coast Guard approved rescue and spill response procedures and would provide quick containment of any spill and minimize any potential water quality impacts to the Bay.
Carrigan, Winnie	P-23.1 Oral	The noise associated with drone overflights is irritating and un-nerving. For training purposes a muffler could be used that could be removed in combat circumstances.	Through the NEPA process, the Navy has become aware of the annoyance factor associated with UAV operations over the Northern Neck of Virginia. The Navy's plan to mitigate this annoyance factor is described in FEIS Chapter 5. In essence, the plan would involve increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.
	P-23.2 Written	The safety of people in this area is also a concern. What happens if one of the trainees loses control of the UAV or the vehicle has a de-fect and crashes? We are at risk.	Should a trainee lose a datalink with a UAV, the UAV is programmed to rise in altitude, attempt to reestablish the datalink, and failing that return to a predetermined location over the Potomac River near Webster Field where it will circle until a datalink is reestablished or until it runs out of fuel and glides into the river. With respect to UAV losses in the past, the reliability of the engine has substantially increased in the last two years and no incidents have occurred. Furthermore, the Navy identifies UAV operating routes using detailed demographic data with the specific goal of avoiding overflights of densely populated areas.
	P-23.3 Written	Sonic booms! Our son, who flew (F-14) from the Virginia Beach area, told us they were restricted to that type of flying over the Atlantic Ocean. Why should the planes from the Patuxent command be allowed special exception?	Mission requirements for supersonic store separation tests or other RDT&E mission-critical requirements dictate these types of flights in the CTR.

Name/Agency	Comment Code	Comment	Response
Stevens, Thomas	P-24.1 Oral	Concerned with increasing noise pollution around the Chesapeake Bay if the Navy increases flight operations.	FEIS Subchapter 4.6 presents a comprehensive dis-cussion of the potential for noise impacts from a physi-ological and behavioral perspectives, including annoy-ance, speech interference, and sleep disturbance. Standard computer noise models (accepted by the USEPA and many other federal agencies) were used to simulate the noise levels that would be produced in the Patuxent River Complex for the alternatives. The modeling results showed no significant noise impacts among the three alternatives for both subsonic and supersonic aircraft operations in the CTR. Single-event noise impacts also were evaluated at more than 20 specific locations, including residences, schools, and hospitals. The results of the analysis found little difference among the alternatives with respect to overall noise levels or the potential for speech inter-ference or sleep disturbance at all of the sensitive receptor locations.
Grant, Franklin	P-25.1 Written (e-mail)	Concerned with damage that has occurred to his house as a result of sonic booms.	During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5. Structural damage from existing or proposed aircraft operations is not expected. The Navy could be respon-sible for repair to your home if structural damage was caused by the Navy aircraft overflights. A determination would need to be conducted through the Navy's claims process. Contact the Command Staff Judge Advocate at NAS Patuxent River at 301-342-1045.
	P-25.2 Written (e-mail)	Objects to sonic booms near his Reedville, Virginia home and Bed & Breakfast business.	See response to Comment P-25.1 above.
Fears, Jr., Charles C.	P-26.1 Oral/ Written	Concerned with damage that has occurred to his house as a result of sonic booms.	During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5. Structural damage from existing or proposed aircraft operations is not expected. The Navy could be respon-sible for repair to your home if structural damage was caused by the Navy aircraft overflights. A determination would need to be conducted through the Navy's claims process. Contact the Command Staff Judge Advocate at NAS Patuxent River at 301-342-1045.

Name/Agency	Comment Code	Comment	Response
Fears, Jr., Charles C. (Continued)	P-26.2 Oral/ Written	Concerned with potential aircraft accidents.	Flight safety is a top priority for all types of aircraft operations at the Patuxent River Complex as described in FEIS Subchapters 3.14 and 4.14. Efforts to minimize risk to participants, the public, and property are part of daily operations and test planning and flight operational procedures. A primary indicator of safety practices is the safety record for NAS Patuxent River. In the past ten years, there have only been five Class A mishaps in the complex, one of which occurred on the ground (a Class A mishap is one that incurs a loss of life or causes total damages to aircraft and/or land-based property in excess of $1 million). Continued adherence and emphasis on airfield safety policies and procedures and range-related safety and clearance practices would minimize the potential for future mishaps due to the proposed increased level of flight and related operations under any of the alternatives. In addition, Air Traffic Control at NAS Patuxent River would continue to enforce its "ten aircraft rule" for safety in the CTR (see FEIS Subchapter 3.13).
	P-26.3 Oral/ Written	Why are there so many overflights between Burgess and Reedville, a rapidly developing area, when two or three miles to the east, aircraft would be over the Smith Point lighthouse or the Bay and it wouldn't be as much of a safety hazard and the noise level might not impact residents as much?	Through the NEPA process, the Navy has become aware of the annoyance factor associated with UAV operations over the Northern Neck of Virginia. The Navy's plan to mitigate this annoyance factor is described in FEIS Chapter 5. In essence, the plan would involve increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.
Braxton, Alf	P-27.1 Oral	Concerned about aircraft noise, overflight activity, and damage that has occurred to his house as a result of sonic booms.	During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5. Structural damage from existing or proposed aircraft operations is not expected. The Navy could be respon-sible for repair to your home if structural damage was caused by the Navy aircraft overflights. A determination would need to be conducted through the Navy's claims process. Contact the Command Staff Judge Advocate at NAS Patuxent River at 301-342-1045.
Hill, James	P-28.1 Oral	Concerned with damage that has occurred to his house as a result of sonic booms and the potential for the number of sonic booms to increase.	Please see response to Comment P-27.1 above.

Name/Agency	Comment Code	Comment	Response
Hill, James (Continued)	P-28.2 Oral	Suggests that noise monitors be installed on the Northern Neck.	Please see response to Comment P-27.1 above. Note that sonic boom monitoring is part of the Navy's mitigation proposal described in FEIS Chapter 5.
	P-28.3 Oral	Concerned with noise impacts to wildlife.	Aircraft noise impacts on wildlife are addressed in FEIS Subchapter 4.12. In summary, there would be no significant increase in aircraft noise impacts that could adversely impact wildlife. Of the threatened and endangered species that may occur in the area, the northeastern beach tiger beetle is not likely to breed at NAS Patuxent River, and although the bald eagle and peregrine falcon have been sighted in the area, nesting has not been observed.
	P-28.4 Oral	The Navy and other aircraft dump jet fuel when they have too much.	As discussed in FEIS Subchapter 4.10, Navy policy and concern for the environment, make fuel dumping a rare occurrence in the CTR. Navy pilots are prohibited from dumping fuel below 6,000 ft, except in an emergency situation. Above 6,000 ft, the fuel would have enough time to completely vaporize and dissipate and would therefore have a negligible effect on the ground below. In an emergency, a fuel release may be performed to save the pilot and/or the aircraft. How-ever, should an aircraft mishap occur, fuel or hydraulic fluids could be released. The magnitude and duration of the spill would be controlled through US Coast Guard approved rescue and spill response procedures and would provide quick containment of any spill and minimize any potential water quality impacts to the Bay.
	P-28.5 Oral	We don't know what the effects of bombing are on the fish. I'm a scuba diver so I know that if I'm down under the water, I don't want to be anywhere near a bomb going off underwater because it could kill you going through the ears. And fish are the same way. An underwater bomb can kill fish.	Ordnance stores released in the CTR are nonexplosive, except for signal cartridges that are used to score the accuracy of delivery. On impact, the signal cartridge emits smoke or flames for impact marking can be used. A spotting charge is similar in explosive strength to a firecracker.
Neal, Randolph	P-29.1 Oral	I am president of the Northumber-land Association for Progressive Stewardship and am very con-cerned with sonic booms. We need some insurance against the potential increase in those disturbances.	During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5.
Neal, Randolph (Continued)	P-29.2 Oral	One thing I noticed, there was some slide that we saw that indicated a maximum of 34 hours per month increase in flight activity. By my calculations, the smallest option increase is 192 hours per month.	The commentor has confused increases in flight operations with target area use. The 34 hours per month refers to the increased time that the target areas would be used under Alternative III.

Name/Agency	Comment Code	Comment	Response
	P-29.3 Oral	I suggest that the scheduling people should coordinate their target practice when certain fishing is not in season--for example, there are certain specific seasons for rock-fish. After a certain period of time there are almost no fish in the Bay. You should try to schedule the practices then...it would be good for public relations.	Thank you for your comments; they will be taken into consideration by the decision maker. However, note that while mission requirements are critical factors in scheduling, the Navy has, on occasion, rescheduled its activities to accommodate public events in the Bay.
Bryant, Donald	P-30.1 Oral	What I'm mainly concerned about is that the planes and drones that the Navy plans to use, whether they are armed, unarmed, manned or unmanned, they contain fuel and flammable liquids. I'm a member of the EMS of this county and I'm concerned because the more flying hours, sooner or later these planes or drones are going to come down...and I don't feel that the county or the state of Virginia should have to foot the bill to deal with this...How is the Navy going to address this if one of these manned or unmanned planes go down? Who's going to help train the local people in what to do, because as fast as your fastest helicopter is, you can't be as fast as we are.	Flight safety is a top priority for all aircraft operations at the Patuxent River Complex (see FEIS Subchapters 3.14 and 4.14). Efforts to minimize risk to participants, the public, and property are part of daily operations and test planning and flight operational procedures. A primary indicator of safety practices is NAS Patuxent River's safety record. In the past ten years, there have only been five Class A mishaps in the complex (a Class A mishap is one that incurs a loss of life or causes total damages to aircraft and/or land-based property in excess of $1 million). Continued adherence and emphasis on airfield safety policies and procedures and range-related safety and clearance practices would minimize the potential for future mishaps due to the proposed increased level of flight and related operations under any of the alternatives. Also, Air Traffic Control at NAS Patuxent River would continue to enforce its "ten aircraft rule" for safety in the CTR. In addition, NAS Patuxent River supports an active Disaster Preparedness/Emergency Management Pro-gram to deal with aircraft mishaps, as well as other natural or manmade disasters or emergencies. The air station's Disaster Preparedness Office maintains, and annually updates, Emergency Response Information on the 33 counties in Delaware, Maryland, and Virginia that fall within a 60-mi "fly zone" around NAS Patuxent River. The Public Safety Department will update on an annual basis, and as conditions warrant, the appro-priate state firefighting institutes in Delaware, Maryland, and Virginia on the types of emergencies that their members could encounter during an aircraft mishap. The state firefighting institutes are required to train their personnel concerning the emergencies their members could encounter during any aircraft mishap.

Name/Agency	Comment Code	Comment	Response
Brainard, Ralph	P-31.1 Oral	Concerned with aircraft noise impacts...the jets go over once in a while and there's a boom, but then they're gone and you can continue your conversation again. But these drones, you're working outside and they're going on and on and on...drones are really the problem.	Through the NEPA process, the Navy has become aware of the annoyance factor associated with UAV operations over the Northern Neck of Virginia. The Navy's plan to mitigate this annoyance factor is described in FEIS Chapter 5. In essence, the plan would involve increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.
	P-31.2 Written	I have not heard any complaints about the drone noise from parts of Northumberland County other than the Wicomico River area. Perhaps the Navy would consider the possibility of spreading the wealth...I am sure that other parts of the county would not have great objection to once-a-week flights overhead all day. That might make it tolerable in the Wicomico River area.	Through the NEPA process, the Navy has become aware of the annoyance factor associated with UAV operations over the Northern Neck of Virginia. The Navy's plan to mitigate this annoyance factor is described in FEIS Chapter 5. In essence, the plan would involve increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.
	P-31.3 Written	There is the question of property values. I cannot be assured that potential buyers in the future will restrict their visitation to weekends when no drones are flying.	Property values are determined by a complex combin-ation of neighborhood characteristics (e.g., the quality of schools, local property taxes, access to transpor-tation, and the crime rate) and individual housing characteristics (e.g., age of the house, number of rooms, and amenities such as garages). Conse-quently, there are no definitive federal standards for quantifying the impact of aircraft noise on property val-ues and such an analysis is not addressed in the FEIS. The stated purpose of the proposed action evaluated in this EIS is to enhance the use of unique taxpayer-funded facilities and the skilled workforce in the Patuxent River Complex by increasing efficiencies and lowering costs to users. There is no other existing Navy or DoD facility that can fully meet the purpose and need delineated in the EIS without extensive construction and personnel relocation.

Name/Agency	Comment Code	Comment	Response
Syslo, Teri	P-32.1 Oral	What is meant by commercial and foreign business? How will that affect us over here in Northumberland County?	As discussed in Chapter 2, the Patuxent River Complex has and is currently accommodating nonmilitary customers. This nonmilitary testing may involve commercial, foreign, or nonmilitary government agencies. Further, these tests may involve flight oper-ations or may occur in the complex's unique ground test facilities. In any event, the types of tests performed for nonmilitary customers would be similar to RDT&E tests that are presently conducted for military cus-tomers and associated environmental impacts would be similar. Under the proposed action, nonmilitary customers would continue to be accommodated in the Patuxent River Complex. Nonmilitary customers would be charged for the use of the complex's facilities in accordance with DoD's commercial pricing policy. Effects on Northumberland County would be similar to existing conditions.
	P-32.2 Oral	What types of impacts would UAVs, electromagnetic pulses, etc. have?	The FEIS provides an analysis of UAV air quality and noise impacts in FEIS Subchapters 4.5 and 4.6. Radio frequency source impacts the nature and type of radio frequency sources at NAS Patuxent River and Webster Field would not change from those identified for existing conditions. To protect human health, the Radiation Safety Officer ensures that safe standoff distances are maintained at both NAS Patuxent River and Webster Field in accordance with OPNAVINST 5100.23D.
	P-32.3 Oral	Are tests new or any different from programs that are in effect now? Are you anticipating any other different types of programs in the future?	Future missions are described in Table 2-7 in FEIS Chapter 2. While the types of RDT&E missions expected to be flown in the complex in the future would be the same as currently are flown, proposed oper-ations in support of military training would accom-modate additional types of training missions on the unit, intermediate, and advanced levels (see FEIS Sub-chapter 2.3.2.1 for an explanation of training levels).
	P-32.4 Oral	Has the Pax River Research Organization reviewed the DEIS? Have they had any input into the document?	The technical experts at NAS Patuxent River have extensively reviewed both the DEIS and FEIS for accuracy and completeness. Further, the DEIS and/or its Executive Summary was distributed for review and comment to an extensive mailing list that included elected officials, federal, state, and local governmental agencies, groups and associations, and private individuals. However, the Navy is not aware of the organization that is described. If the address is provided, a copy of the FEIS will be sent for review.

Name/Agency	Comment Code	Comment	Response
Kerr, Charles	P-33.1 Oral (voice mail)	Stated that he is 100 percent in favor of the flight increases and feels they are needed...he has listened to many of the negative comments and believes many of them to be unfair, especially those regarding noise.	Thank you for your comments; they will be taken into consideration by the decision maker.
Mazetis, Dr. & Mrs. G.R.	P-34.1 Written (e-mail)	Requests that the "No Action" alternative for flight increases be adopted.	Thank you for your comments; they will be taken into consideration by the decision maker.
	P-34.2 Written (e-mail)	The drones over our area in Heathsville (Presley Creek) are too frequent, too low, and much too noisy...this compounded by the drones' additional attribute that they are relatively slow-moving and, therefore, their noise is persistent and long in duration.	Through the NEPA process, the Navy has become aware of the annoyance factor associated with UAV operations over the Northern Neck of Virginia. The Navy's plan to mitigate this annoyance factor is described in FEIS Chapter 5. In essence, the plan would involve increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.
	P-34.3 Written (e-mail)	All drone flights should be out over the Bay and very high. This additional fuel and wear and tear to the drone are cost-effective to tax-payers when the gain from the "annoyance benefit" is factored into the analysis. An additional gain to the cost-benefit analysis would be from the finite reduction in risk to the public due to accidents from land flyovers.	Although the UAV program experienced aircraft losses in the past, the reliability of the engine has substantially increased and in the last two years, no incidents have occurred. In any event, the Navy identifies UAV operating routes using detailed demographic data with the specific goal of avoiding overflights of densely populated areas. In addition, as discussed in FEIS Chapter 5, the Navy is proposing measures to mitigate UAV overflights by increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.
	P-34.4 Written (e-mail)	While we understand that pilots are instructed not to fly low enough to bother us with noise from sonic booms, it is our observation that these rules are not adhered to in a consistent manner...jets should also conduct their flights over bay waters...and at a sufficient height not to disturb ground/sea level members of the public.	Citizens who observe disruptive flight activities by Navy aircraft should file an Aircraft Disturbance Report with NAS Patuxent River. Collect calls to 301-342-3836 are accepted. NAS Patuxent River takes all aircraft disturbance reports seriously.

Name/Agency	Comment Code	Comment	Response
Stallard, Elizabeth	P-35.1 Oral (voice mail)	Has observed and heard low-flying planes in the Weems, Virginia area and recently witnessed a near col-lision of a plane taking off from the Weems airport with a plane in flight. She requested that a coord-ination effort begin that could pre-vent any accidents.	During the hours that the Navy activates the special use airspace of the CTR (normally from 7:00 am to 11:00 pm), NAS Patuxent River Air Operations Division provides radar air traffic control services for both military and civilian operations to deconflict the air traffic within the Complex including the civilian airfields identified in FEIS Subchapter 3.14. In situations where an aircraft is not under the control of NAS Patuxent River Air Operations, FAA rules require that aircraft maintain appropriate separation distances to avoid potential accidents. Citizens who observe disruptive flight activities by Navy aircraft should file an Aircraft Disturbance Report with NAS Patuxent River. Collect calls to 301-342-3836 are accepted. NAS Patuxent River takes all aircraft disturbance reports seriously.
Miller, Ron	P-36.1 Oral (voice mail)	Aircraft noise near his house in Heathsville, Virginia is already annoying and protests both the occurrence and the proposed increases in flyovers.	Though it may appear that your locality experiences a significant number of the flight operations that are conducted, existing flight operations are actually distributed throughout the CTR. However, as discussed in FEIS Chapter 5, the Navy is proposing several measures to mitigate the annoyance factor associated with UAV overflights and sonic booms that affect residents within the CTR.
	P-36.2 Oral (voice mail)	If NAS Patuxent River is in Maryland, why do aircraft from the air station fly over Virginia?	Aircraft operations from NAS Patuxent River use the airspace of the CTR. As shown in FEIS Figure 1-1, the range overlies about 1,800 sq mi of portions of Southern Maryland, Maryland's Eastern Shore, and the Northern Neck of Virginia.
Smith, Charles M.	P-37.1 Oral (voice mail)	Expressed support for Navy's proposal and feels there would only be minimal impacts on the Lancaster, Virginia area.	Thank you for your comments; they will be taken into consideration by the decision maker.
Renowitz, Joe	P-38.1 Oral (voice mail)	Concerned about noise from drones and requests that a limit be imposed on noise and/or flight hours over the Heathsville area.	Through the NEPA process, the Navy has become aware of the annoyance factor associated with UAV operations over the Northern Neck of Virginia. The Navy's plan to mitigate this annoyance factor is described in FEIS Chapter 5. In essence, the plan would involve increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.
Monahan, Edward	P-39.1 Oral	Stated that he supports the proposed action.	Thank you for your comments; they will be taken into consideration by the decision maker.
Huber, Maya	P-40.1 Oral	The proposed increase in flights would constitute increased water pollution.	Water quality issues examined in FEIS Subchapter 4.13 include spill prevention and control, stores releases, releases of Ni-Cd batteries, and groundwater withdrawals. No significant impacts were identified.

Name/Agency	Comment Code	Comment	Response
Huber, Maya (Continued)	P-40.2 Oral	Concerned with sonic booms and overflights that occur north of the boundary of the CTR.	During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5.
Hainke, Edward F.	P-41.1 Oral	Concerned with noise pollution in the St. Leonard's Creek area.	FEIS Subchapter 4.6 presents a comprehensive dis-cussion of the potential for noise impacts from a physi-ological and behavioral perspectives, including annoy-ance, speech interference, and sleep disturbance. Standard computer noise models (accepted by the USEPA and many other federal agencies) were used to simulate the noise levels that would be produced in the Patuxent River Complex for the alternatives. The modeling results showed no significant noise impacts among the three alternatives for subsonic and super-sonic aircraft operations in the CTR. Single-event noise impacts also were evaluated at more than 20 specific locations, including residences, schools, and hospitals. The results of the analysis found little difference among the alternatives with respect to overall noise levels or the potential for speech interference or sleep disturbance at all of the sensitive receptor locations.
	P-41.2 Written	In recent years, noise levels have increased at various times of the day and night, sometimes after 11 PM, particularly from slow-moving choppers.	As indicated in FEIS Chapter 2, proposed future oper-ating hours in the Patuxent River Complex would essentially be the same as current operating hours. About 97 percent of existing flight operations are flown between 7:00 am and 10:00 pm. However, some missions require later operations.
	P-41.3 Written	Annoyed by leased radial engine float planes practicing touch and go's on St. Leonard's Creek for two days from 8 am to 4 pm.	These aircraft are operated by the Department of the Interior.

Name/Agency	Comment Code	Comment	Response
Hainke, Edward F. (Continued)	P-41.4 Written	Activities at NAS Patuxent River disrupt television signals.	NAS Patuxent River is the home of the Mid-Atlantic Area Frequency Coordination Office. This office ensures effective and compatible authorized use of the radio frequency spectrum by all activities, tenants, and contractors in the Patuxent River Complex. Among the office's responsibilities is the coordination and ap-proval of all Navy electronic warfare frequency usage in the Middle Atlantic area. Radio frequency use in the complex is approved and monitored at all times. As a result, off-base interference with commercial television and radio signals does not occur except for those occasions when required by specific equipment tests. Such tests are rare occurrences, and their off-base impacts are minimized by very early morning scheduling (i.e., 2:00-3:00 am time frame) and operations of the equipment in short bursts of less than a second. Phenomena such as electrical interference from equip-ment with motors, multipath interference, and ducting could be responsible for any television and radio inter-ference that may occur in the Patuxent River Complex. The effect of these phenomena are discussed in FEIS Subchapter 4.9.1.
	P-41.5 Written	A toll-free line should be established directly to the chain of command to provide feedback and let the Navy know how they are doing as a good environmentally concerned neighbor.	The Navy is investigating the implementation of formalized procedures to ensure proper handling of, and response to, noise or aircraft disturbance reports. These procedures will involve a centralized process for receiving and addressing noise disturbance reports. An electronic database of those reports would be maintained and used by the Navy to enable corrective action to be taken, as appropriate. Comments on other activities occurring at NAS Patuxent River should be referred to the Public Affairs Office at 301-342-7512.
Egeli, Caroline	P-42.1 Oral/ Written	Concerned with air pollution from aircraft overflights since engine exhaust is one of the leading causes of airborne nitrates or acid rain. Nitrate is the heaviest contributor to an outbreak of problems in the Chesapeake Bay, such as Pfisteria.	The deposition of nitrogen compounds in the Bay is a problem of regional concern and subject to air transport phenomena from outside the region under different weather conditions. The impacts of such deposition is generally evaluated on a regional basis using regional ozone airshed model(s) and this type of analysis is generally not conducted on a project-by-project basis. Therefore, it was not assessed in the FEIS. However, the air quality analysis performed for the FEIS did find that air emissions increases related to flight operations in nearly all of the CTR would be well within the budgeted limits of Delaware, Maryland, and Virginia. For that portion of the range over Calvert County, a Clean Air Act nonattainment area for ozone, air emissions from air operations would be well below established threshold limits and a formal Air Conformity Analysis would not be required.

Name/Agency	Comment Code	Comment	Response
Egeli, Caroline (Continued)	P-42.2 Oral/ Written	Experiences intolerable noise pollution from aircraft.	FEIS Subchapter 4.6 presents a comprehensive discussion of the potential for noise impacts from a physiological and behavioral perspectives, including annoyance, speech interference, and sleep disturbance. Standard computer noise models (accepted by the USEPA and many other federal agencies) were used to simulate the noise levels that would be pro-duced in the Patuxent River Complex for the alterna-tives. The modeling results showed no significant noise impacts among the three alternatives for both subsonic and supersonic aircraft operations in the CTR. Single-event noise impacts also were evaluated at more than 20 specific locations, including residences, schools, and hospitals. The results of the analysis found little difference among the alternatives with respect to overall noise levels or the potential for speech interference or sleep disturbance at all of the sensitive receptor locations. Citizens who observe disruptive flight activities by Navy aircraft should file an Aircraft Disturbance Report with NAS Patuxent River. Collect calls to 301-342-3836 are accepted. NAS Patuxent River takes all aircraft disturbance reports seriously.
	P-42.3 Oral/ Written	Experiences intolerable electronic interference from aircraft overflights.	NAS Patuxent River is the home of the Mid-Atlantic Area Frequency Coordination Office. This office ensures effective and compatible authorized use of the radio frequency spectrum by all activities, tenants, and contractors in the Patuxent River Complex. Among the office's responsibilities is the coordination and approval of all Navy electronic warfare frequency usage in the Middle Atlantic area. Radio frequency use in the complex is approved and monitored at all times. As a result, off-base interference with commercial television and radio signals does not occur except for those occasions when required by specific equipment tests. Such tests are rare occurrences, and their off-base impacts are minimized by very early morning scheduling (i.e., 2:00-3:00 am time frame) and operations of the equipment in short bursts of less than a second. Phenomena such as electrical interference from equipment with motors, multipath interference, and ducting could be responsible for any television and radio interference that may occur in the Patuxent River Complex. The effect of these phenomena are discussed in FEIS Subchapter 4.9.1.

Name/Agency	Comment Code	Comment	Response
Grosghal, Brett	P-43.1 Oral	Concerned with potential for increased aircraft noise. Does not support increased operations in the Patuxent River Complex.	FEIS Subchapter 4.6 presents a comprehensive discussion of the potential for noise impacts from a physiological and behavioral perspectives, including annoyance, speech interference, and sleep disturbance. Standard computer noise models (accepted by the USEPA and many other federal agencies) were used to simulate the noise levels that would be pro-duced in the Patuxent River Complex for the alterna-tives. The modeling results showed no significant noise impacts among the three alternatives for both subsonic and supersonic aircraft operations in the CTR. Single-event noise impacts also were evaluated at more than 20 specific locations, including residences, schools, and hospitals. The results of the analysis found little difference among the alternatives with respect to overall noise levels or the potential for speech interference or sleep disturbance at all of the sensitive receptor locations.
Bergmark, Dr. Christine	P-44.1 Oral	Concerned with aircraft noise, particularly speech interference problems.	See response to Comment 43.1 above.
Drewes, Wolfram U.	P-45.1 Oral	Wonders why the Navy has not considered moving actual gunnery practice and dropping things to another site, specifically San Cle-mente Island or China Lake, California or other California or Nevada desert ranges.	The mission of the Patuxent River Complex is to be the Navy's principal RDT&E, engineering, and fleet sup-port activity for naval aircraft, engines, avionics, and aircraft support systems (see FEIS Chapters 1 and 2). The complex contains a number of laboratories and flight test support facilities unique to the Navy and DoD that are operated by skilled personnel (instrumented CTR with its restricted airspace, aerial and surface firing range, and three targets; 70 dedicated land-based test facilities; and the airfields at NAS Patuxent River and Webster Field). The purpose of the pro-posed action is to enhance the use of these unique taxpayer-funded facilities and skilled workforce by increasing efficiencies and lowering costs to users. This action is needed in order for the Navy to success-fully meet current and future national and global de-fense challenges posed by a post-Cold War environ-ment. There is no other existing Navy or DoD facility that can fully meet the purpose and need delineated in the EIS without extensive construction and personnel relocation. Therefore, alternate Navy facilities were not considered in this EIS.

Name/Agency	Comment Code	Comment	Response
Drewes, Wolfram U. (Continued)	P-45.2 Written	The Navy has not done adequate long-term planning in regard to its future operations by building new facilities at NAS Patuxent River and moving people to the area from existing facilities. Also showing poor planning was the proposed move of mothballed ships to NAS Patuxent River. These plans along with the proposed action will cost the taxpayer millions. The Navy should restore NAVAIR Head-quarters to Crystal City, Virginia and the facilities in Trenton, New Jersey and move the work back there from NAS Patuxent River.	Thank you for your comments; however, this comment does not directly relate to the proposed action and is beyond the scope of the FEIS.
	P-45.3 Written	The Navy claims that the sophis-ticated telemetry and theodolite measuring devices that are strung along the 20 miles of Chesapeake shoreline south of Pax are linked to the three targets within the test range area, are not available else-where. If indeed some unique testing devices are only available at Pax--ship them out to the sparsely populated areas.	Thank you for your comments; however, this comment does not directly relate to the proposed action and is beyond the scope of the FEIS.
	P-45.4 Written	There is always the danger that accidents can happen. An aircraft could crash into the LNG-liquid nitrogen storage facility that is within the test range or it could crash into the atomic energy plant at Scientist Cliffs, not to mention homes or villages near the flight paths of NAS Patuxent River. The more flights there are, the higher the risks.	FEIS Subchapters 3.14 and 4.14 discuss aircraft safety issues in detail. The impact analysis acknowledges that "...increased flight and related operations could also lead to an increased potential for mishaps in the airspace of the CTR." The document also stresses that continued adherence and emphasis on airfield safety policies and procedures and range-related safety and clearance practices (including the ten aircraft rule) would minimize the potential for mishaps with implementation of the proposed action.
Burgess, Sue & Jack	P-46.1 Written (e-mail)	Expresses full support for the proposed increase in flight hours at NAS Patuxent River and associated facilities.	Thank you for your comments; they will be taken into consideration by the decision maker.
Kane, Robert R.	P-47.1 Written	The phenomenon of sonic booms is hardly addressed in the EIS.	Sonic booms are addressed in FEIS Subchapter 4.6. During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5.

Name/Agency	Comment Code	Comment	Response
Kane, Robert R. (Continued)	P-47.2 Written	Noise pollution from drones is irritating at best.	Through the NEPA process, the Navy has become aware of the annoyance factor associated with UAV operations over the Northern Neck of Virginia. The Navy's plan to mitigate this annoyance factor is described in FEIS Chapter 5. In essence, the plan would involve increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.
	P-47.3 Written	Rural areas are discriminated against in regards to the current and enhanced levels of operation...the Navy, rather than proposing to increase operational activities, should be looking for ways to eliminate these activities in this area (Lottsburg, Virginia) which is becoming more and more populated.	See response to Comment P-47.2 above.
Morrisette, Douglas R.	P-48.1 Written	Sonic booms are causing structural damage to my house and my neighbor's houses located on the Virginia side of the Potomac River in the Harbour Point development. In one day we had three sonic booms.	During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and/or Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5. Structural damage from existing or proposed aircraft operations is not expected. The Navy could be respon-sible for repair to your home if structural damage was caused by the Navy aircraft overflights. A determination would need to be conducted through the Navy's claims process. Contact the Command Staff Judge Advocate at NAS Patuxent River at 301-342-1045.

Name/Agency	Comment Code	Comment	Response
Morrisette, Phyllis R.	P-49.1 Written	Sonic booms are causing structural damage to my house...each time a sonic boom is reported to the Navy, I have been told that the plane must have been lower than the 31,000 ft required for sonic flights, or the buck is passed to someone "using the airspace illegally." Where are the air traffic controllers? Strong disciplinary action should be taken against any aviator flying outside his authorized zone.	Citizens who observe disruptive flight activities by Navy aircraft should file an Aircraft Disturbance Report with NAS Patuxent River. Collect calls to 301-342-3836 are accepted. NAS Patuxent River takes all aircraft disturbance reports seriously. In the future, as part of its mitigation plan for the proposed action (see FEIS Chapter 5), the Navy will be establishing formalized procedures to ensure proper handling of and response to noise or aircraft disturbance reports. These proce-dures will involve a centralized process for receiving and addressing noise disturbance reports. An elec-tronic database of those reports would be maintained and used by the Navy to enable corrective action to be taken, as appropriate. Structural damage from existing or proposed aircraft operations is not expected. The Navy could be respon-sible for repair to your home if structural damage was caused by the Navy aircraft overflights. A determination would need to be conducted through the Navy's claims process. Contact the Command Staff Judge Advocate at NAS Patuxent River at 301-342-1045.
Bryan, Karl R.	P-50.1 Written	I agree that some of the aircraft noise can be quite annoying...I do not know if the base has operations procedures like the airport where the pilots are in-structed to throttle back power and climb high before full power. I do think that some of the active duty pilots are coming in too fast and maneuvering as if they were on the carrier.	All pilots are briefed on noise sensitive areas when assigned to or visiting the Patuxent River Complex. In the future, the Navy proposes to expand existing briefings on aircraft operations procedures that are conducted with all users of the CTR, and others, as appropriate, to ensure an understanding of proper procedures and FEIS mitigation measures.
	P-50.2 Written	Provide the public with the NAS Patuxent River's operational proce-dures explaining how aircraft can reduce disturbances.	The operational procedures at NAS Patuxent River are explained in the DEIS and the Integrated Management Plan. Copies of both of these documents have been placed in 18 libraries around the Chesapeake Bay for public information and review. In addition, citizens who observe disruptive flight activities by Navy aircraft should file an Aircraft Disturbance Report with NAS Patuxent River. Collect calls to 301-342-3836 are accepted. NAS Patuxent River takes all aircraft disturbance reports seriously.
	P-50.3 Written	With respect to impacts on wildlife, provide the public with examples of aircraft and wildlife living together without problems.	FEIS Subchapter 4.12 describes the impacts of aircraft noise on wildlife and fish and situations where wildlife and military operations co-exist.

Name/Agency	Comment Code	Comment	Response
Bryan, Karl R. (Continued)	P-50.4 Written	The Navy should seek to develop quieter engines or noise counter-measures (reverse noise propagation).	This comment does not directly relate to the proposed action and is beyond the scope of the FEIS.
	P-50.5 Written	If people insist on pushing valuable facilities away, then maybe the Navy should seek to purchase surrounding land as a buffer space and implement parks, wildlife pre-serves, or agricultural reservations.	Thank you for your comments; they will be taken into consideration by the decision maker.
	P-50.6 Written	The Navy should seek to develop more efficient burning fuels or engines to nullify the emissions that some people have concerns about. For your information, when I bought my house and cleaned my deck with deck wash, I decided to spray some on the house siding. The house was built in 1988 and the color was dull tan, but after spraying I noticed the bright tan color which had been covered over by a dark film. I suspect the dark film is residual JP5 from the aircraft operating over time in and around my house.	There are no jet engine operating conditions under which raw fuel would be emitted through the engine exhaust. The modern military aircraft that fly in the Patuxent River Complex are designed to emit negligible amounts of particulate; this engine characteristic minimizes the likelihood of oily particulate settling out of the atmosphere and causing an impact on the ground.
DeCapiteau, Cindi Kaiser	P-51.1 Written	The EIS has not adequately evaluated the impact of increased flights and related operations over the CTR on the quality of life in Virginia's Northern Neck.	All of the relevant environmental impacts are discussed in the FEIS at a level of detail sufficient for decision makers to accurately assess the impacts of each alternative under consideration.
	P-51.2 Written	The materials distributed by the Navy at its hearing in Heathsville, Virginia do not show that any of the 20 specific noise measurement locations were on the Northern Neck. If noise measurements were not taken here, the EIS con-clusions are based on incomplete data.	The FEIS discusses overall noise levels for all flight operations in the CTR at 20 sensitive receptors around the Chesapeake Bay. Three of these receptors are located on the Northern Neck of Virginia (Westmore-land State Park, Lewisetta Marina, and a location in Heathsville). An analysis of the potential for indoor speech interference and indoor sleep interference from single-event values due to aircraft operations was provided for each alternative (see FEIS Subchapter 4.6).

Name/Agency	Comment Code	Comment	Response
DeCapiteau, Cindi Kaiser (Continued)	P-51.3 Written	The EIS appears to have evaluated noise levels (volume) only. Volume is not the sole factor that warrants consideration. Duration and fre-quency of occurrence are also part of the context. The EIS is not measuring all the relevant factors...Furthermore, if the Navy cannot articulate standards for acceptable levels of duration and frequency, those standards must be developed and worked into the study before the EIS can be considered complete and accurate.	The length of exposure time to aircraft noise sources is automatically taken into account in the Day-Night Average Sound Level (Ldn). The increase in the number of jet operations will generally cause the Ldn at any given location to increase from its present value to some higher value. The noise impact analysis is found in FEIS Subchapter 4.6.
Immanuel, Henry W. M.	P-52.1 Written (e-mail)	I am opposed to any training expansion...any experiment might lead to an environmental or human disaster, such as the plane that crashed near Elliott Island.	Thank you for your comments; they will be taken into consideration by the decision maker.
	P-52.2 Written (e-mail)	DoD should review all future training and review the possibilities which exist presently concerning NON-LETHAL weaponry.	This comment does not directly relate to the proposed action and is beyond the scope of the FEIS.
Thompson, Robert	P-53.1 Oral (voice mail)	Stated that he supports any increase in flight hours at Pax River.	Thank you for your comments; they will be taken into consideration by the decision maker.
Cowardin, W.H.	P-54.1 Oral (voice mail)	Reported an explosion ("sonic boom") that had occurred ten minutes previously and expressed his opinion that it is ridiculous and asinine that the Navy is proposing more flights to damage the Reed-ville, Virginia community, and further that the Navy held false meetings and questions why the taxpayers should tolerate any of this.	Citizens who observe disruptive flight activities by Navy aircraft should file an Aircraft Disturbance Report with NAS Patuxent River. Collect calls to 301-342-3836 are accepted. NAS Patuxent River takes all aircraft disturbance reports seriously. With respect to the public hearings, the purpose of these meetings was to inform the public on the findings of and solicit comments on the DEIS. Comments received during the public comment period have been addressed in this FEIS and will be referred to by the decision maker in the decision making process.

Name/Agency	Comment Code	Comment	Response
Cowardin, W.H. (Continued)	P-54.2 Written	Called the noise disturbance line at NAS Patuxent River but the line was continuously busy. Is the phone taken off the hook after a sonic boom occurs? Are so many people so tired of the noise that they are all calling at the same time?	The telephone line currently used to receive aircraft disturbance reports is also used for other Navy business. In the future, as part of its mitigation plan for the proposed action (see FEIS Chapter 5), the Navy will be establishing an exclusive toll-free telephone line and formalized procedures to ensure proper handling of and response to noise or aircraft disturbance reports. These procedures will involve a centralized process for receiving and addressing noise disturbance reports. An electronic database of those reports would be maintained and used by the Navy to enable corrective action to be taken, as appropriate.
	P-54.3 Written	Sonic booms seem to really be on the increase. Sonic booms should occur over the ocean not the Bay. Provided a receipt for replacement of a window due to breakage from a sonic boom.	Structural damage from existing or proposed aircraft operations is not expected. The Navy could be respon-sible for repair to your home if structural damage was caused by the Navy aircraft overflights. A determination would need to be conducted through the Navy's claims process. Contact the Command Staff Judge Advocate at NAS Patuxent River at 301-342-1045. During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5.
	P-54.4 Written	The tables in the DEIS in relation to impact within the 65 dB DNL contour really seem out of line.	As discussed in FEIS Subchapter 3.6.1, standard computer noise models (accepted by the USEPA and many other federal agencies) were used to simulate the noise levels that would be produced in the Patuxent River Complex for the alternatives. The tables in the DEIS delineating airfield impacts (acreage, population, and dwellings) are based on the 24-hour day-night average sound level (Ldn), which has been determined to be a reliable measure of community sensitivity to aircraft noise and is the standard noise metric used in the US to measure the effects of aircraft noise. Ldn takes into account both the noise levels of all individual events that occur during a 24-hour period and the number of times those events occur. This metric is not a measure of individual, or single, noise events to which the commentor may be referring.
Mohyla, Stephen & Ruth	P-55.1 Oral (voice mail)	Submitted a formal complaint regarding sonic booms that shook his entire house.	During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5.

Name/Agency	Comment Code	Comment	Response
Mohyla, Stephen & Ruth (Continued)	P-55.2 Written	Supersonic flights should be done over the ocean and should never occur over residential areas. Those pilots who continue to hot dog it over residential areas should be severely reprimanded, as should their flight commanders.	Please see response to Comment P-55.1 above.
	P-55.3 Written	It appears that the Navy is more concerned with adverse effects on chickens than it is with the adverse effects on humans.	The FEIS provides a comprehensive discussion of the potential for aircraft noise impacts to humans from both a physiological and behavioral perspective, including the potential for annoyance, speech interference, sleep disturbance (FEIS Subchapter 4.6), as well as effects on domestic animals and wildlife (FEIS Subchapter 4.12).
	P-55.4 Written	Requests copies of several reports.	NAS Patuxent River Public Affairs Office has responded to this request.
	P-55.5 Written	We understood that increased aerial activity would not commence until the comment deadline date of July 29, 1998. It has substantially increased over the past three weeks.	Test schedules in the Patuxent River Complex are variable, subject to the availability of the airspace, aircraft, and approval of a test plan. Any increase in operations that may have been noticed by the commentor is due to these variabilities and not indicative of a proposed increase.
	P-55.6 Written	Provided a listing on sonic boom occurrences between July 7 and July 15, 1998.	Thank you for your comments; the listing provided has been investigated.
	P-55.7 Written	How often will our electricity be affected by the Navy's sensitive electronic testing?	NAS Patuxent River is the home of the Mid-Atlantic Area Frequency Coordination Office. This office ensures effective and compatible authorized use of the radio frequency spectrum by all activities, tenants, and contractors in the Patuxent River Complex. Among the office's responsibilities is the coordination and approval of all Navy electronic warfare frequency usage in the Middle Atlantic area. Radio frequency use in the complex is approved and monitored at all times. As a result, off-base interference with commercial television and radio signals does not occur except for those occasions when required by specific equipment tests. Such tests are rare occurrences, and their off-base impacts are minimized by very early morning scheduling (i.e., 2:00-3:00 am time frame) and operations of the equipment in short bursts of less than a second. Phenomena such as electrical interference from equipment with motors, multipath interference, and ducting could be responsible for any television and radio interference that may occur in the Patuxent River Complex. The effect of these phenomena are discussed in FEIS Subchapter 4.9.1.

Name/Agency	Comment Code	Comment	Response
Mohyla, Stephen & Ruth (Continued)	P-55.8 Written	How will we be compensated for decreased property value due to the increase in aerial testing?	Property values are determined by a complex combina-tion of neighborhood characteristics (e.g., the quality of schools, local property taxes, access to transportation, and the crime rate) and individual housing char-acteristics (e.g., age of the house, number of rooms, and amenities such as garages). Consequently, there are no definitive federal standards for quantifying the impact of aircraft noise on property values and such an analysis is not addressed in the FEIS. The stated purpose of the proposed action evaluated in this FEIS is to enhance the use of unique taxpayer-funded facilities and the skilled workforce in the Patuxent River Complex by increasing efficiencies and lowering costs to users. There is no other existing Navy or DoD facility that can fully meet the purpose and need delineated in the FEIS without extensive construction and personnel relocation.
	P-55.9 Written	Why Northumberland County, Virginia? Is it because the Navy considers this are a low socioeconomic environment and there can be taken advantage of? Why not limit the airspace to Maryland water and land?	The boundaries of the CTR were established more than 50 years ago during World War II and testing of Naval aircraft has been an on-going activity in the Patuxent River Complex since that time. As a result, the complex contains a number of unique laboratories and flight test support facilities and a skilled workforce. The purpose of the proposed action is to enhance the continued use of the facilities in the complex, including the CTR in order to increase efficiencies and lower costs to users as well as the taxpayer. The socioeconomic environment of the Northern Neck of Virginia was not a factor in the development of the proposed action. Though it may appear that your locality experiences a significant number of the flight operations that are conducted in CTR, existing flight operations are actually distributed throughout the CTR. However, as discussed in FEIS Chapter 5, the Navy is proposing several measures to mitigate the annoyance factor associated with UAV overflights and sonic booms that affect the Northern Neck of Virginia.
Burris, Bob	P-56.1 Oral (voice mail)	Confirmed that nothing has changed regarding sportsmens' recommendations when duck sea-son starts near Bloodsworth Island.	Operations conducted at the US Navy's Bloodsworth Island Shore Bombardment and Bombing Range are scheduled and controlled by NAB Little Creek, Norfolk, Virginia and are outside the scope of this FEIS. Comments or concerns about Bloodsworth Island should be referred to Ms. Barbara Jennings, Public Affairs Office, NAB Little Creek at (757) 464-7923.

Name/Agency	Comment Code	Comment	Response
Smith, James	P-57.1 Oral (voice mail)	Stated that he is opposed to overflights of the Northumberland County area since they are very noisy and are in the area for several hours at a time and pose a safety (crash potential) threat for the community. Flights should be restricted to the Patuxent River area.	FEIS Subchapters 3.14 and 4.14 discuss aircraft safety issues in detail. The impact analysis acknow-ledges that increased flight and related operations could also lead to an increased potential for mishaps in the airspace of the CTR. The FEIS also stresses that continued adherence and emphasis on airfield safety policies and procedures and range-related safety and clearance practices (including the ten aircraft rule) would minimize the potential for mishaps with implementation of the proposed action.
Frischkorn, George	P-58.1 Oral (voice mail)	He stated that he is in favor of increased air operations. He feels that the flights are no more of a bother than personal watercraft or the local lawnmower brigade.	Thank you for your comments; they will be taken into consideration by the decision maker.
MacLeod, Don	P-59.1 Oral (voice mail)	He stated that he supports the Navy's proposal.	Thank you for your comments; they will be taken into consideration by the decision maker.
Thompson, Rae	P-60.1 Oral (voice mail)	Although she and her husband were unable to attend the public hearings, they offered their support to the Navy's proposed action.	Thank you for your comments; they will be taken into consideration by the decision maker.
McDaniels, Molly	P-61.1 Oral (voice mail)	Stated her opposition to increases in any of the operations or flyovers in the area since there are already enough jets that come from the Martins and Dover bases.	Thank you for your comments; they will be taken into consideration by the decision maker.
Huguley, Dolores	P-62.1 Oral (voice mail)	Stated her opposition to any increase in flights and noted that jet fuel in the air is turning her white house a dingy grey color.	There are no jet engine operating conditions under which raw fuel would be emitted through the engine exhaust. The modern military aircraft that fly in the Pat-uxent River Complex are designed to emit negligible amounts of particulate; this engine characteristic mini-mizes the likelihood of oily particulate settling out of the atmosphere and causing an impact on the ground.
Slavin, Marlene	P-63.1 Written	States that despite the fact the minimum altitude of the airspace above her property is 3,500 ft, Navy pilots overfly the property just above tree top level on a regular basis.	The minimum altitude for the restricted area overlying Dorchester County is 3,500 ft and RDT&E-related flight operations in the CTR conducted by the Navy adhere to this minimum altitude. However, other military services and civilian aircraft can legally fly lower than 3,500 ft under certain circumstances. Citizens who observe disruptive flight activities by Navy aircraft should file an Aircraft Disturbance Report with NAS Patuxent River. Collect calls to 301-342-3836 are accepted. NAS Patuxent River takes all aircraft disturbance reports seriously.

Name/Agency	Comment Code	Comment	Response
Slavin, Marlene (Continued)	P-63.2 Written	She operates a Bed & Breakfast with a grass airstrip known as Loblolly Landings. They plan on purchasing an aircraft and market-ing the business to the flying com-munity, which will mean increased air traffic at Loblolly Landings. If Patuxent increases their annual flight hours as well and Naval pilots continue to fly under 500 ft there will be a potentially dangerous situation.	A copy of your letter has been forwarded to the Air Traffic Control Facility Officer for coordination.
	P-63.3 Written	To minimize the aircraft noise prob-lem in South Dorchester County could Navy pilots fly at higher altitudes?	Aircraft are flown by the Navy at altitudes necessary to meet specific mission requirements.
Kramer, Ruth & Robert	P-64.1 Written	Why can't the Navy play their war games over the waters of the Chesapeake Bay or the Atlantic Ocean without overflying the Northern Neck of Virginia?	The boundaries of the CTR were established to meet mission requirements more than 50 years ago during World War II and testing of Naval aircraft has been an on-going activity in the Patuxent River Complex since that time. As a result, the complex contains a number of unique laboratories and flight test support facilities and a skilled workforce. The proposed action would enhance the continued use of the facilities in the complex, including the CTR, in order to increase efficiencies and lower costs to users as well as the taxpayer.
	P-64.2 Written	State they oppose the possibility of sonic booms that have proven to damage homes by breaking win-dow seals, damaging plaster walls, and causing many other detrimental effects on homes.	During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5. Structural damage from existing or proposed aircraft operations is not expected. The Navy could be respon-sible for repair to your home if structural damage was caused by the Navy aircraft overflights. A determination would need to be conducted through the Navy's claims process. Contact the Command Staff Judge Advocate at NAS Patuxent River at 301-342-1045.
	P-64.3 Written	State they oppose the noise pollution caused by UAVs.	Through the NEPA process, the Navy has become aware of the annoyance factor associated with UAV operations over the Northern Neck of Virginia. The Navy's plan to mitigate this annoyance factor is described in FEIS Chapter 5. In essence, the plan would involve increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.

Name/Agency	Comment Code	Comment	Response
Kelly, James and Nelle	P-65.1 Written	The monotonous drone of UAVs is a nerve wracking sound we just cannot get away from.	Through the NEPA process, the Navy has become aware of the annoyance factor associated with UAV operations over the Northern Neck of Virginia. The Navy's plan to mitigate this annoyance factor is described in FEIS Chapter 5. In essence, the plan would involve increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.
Graybill, Roy	P-66.1 Written	The unmanned drone often spends several hours a day circling over-head with an extremely annoying and persistently loud chainsaw-type noise and is already intolerable. I certainly do not want any increase in the amount of time that drone is operated over this county and it should be significantly reduced.	Please see response to Comment P-65.1 above.
	P-66.2 Written	How about putting a muffler on the UAV to bring the noise down to a more tolerable level?	Please see response to Comment P-65.1 above.
Kesecker, Islay	P-67.1 Written	To say that the noise from aircraft flyovers of Drum Point does not have an impact is erroneous. The noise it makes is impossible to hold a conversation, talk on the telephone or listen to the radio/TV while the planes circle over head, and they often seem to circle for long periods of time.	Aircraft in your area may appear to be flying at low altitude because they may be in the landing pattern for the NAS Patuxent River airfield. Circular patterns may be related to touch-and-go operations at the airfield.
	P-67.2 Written	To say that spent fuel (or whatever it is) does not have an impact is al-o in error. It is clearly visible from the tail of the planes when they fly over. It is also highly visible and certainly on my once-white deck furniture. There is no industry (or traffic) in this immediate area that would normally create such fallout.	There are no jet engine operating conditions under which raw fuel would be emitted through the engine exhaust. The modern military aircraft that fly in the Patuxent River Complex are designed to emit negligible amounts of particulate; this engine characteristic minimizes the likelihood of oily particulate settling out of the atmosphere and causing an impact on the ground.
	P-67.3 Written	Why do many/most of the flights appear to be at treetop level? If all of this flying has to be done in this area, and the number of flights needs to be increased, why can they not be done at a higher level (altitude) and, rather than circling endless over this populated area, can't it be patterned more out over the water?	See response to Comment P-67.1 above.

Name/Agency	Comment Code	Comment	Response
Miles, A.T.	P-68.1 Written	Stated that he supports the Navy's proposed action.	Thank you for your comments; they will be taken into consideration by the decision maker.
Robinson, David L.	P-69.1 Written	States that he lives near the bridge over the Great Wicomico River and is annoyed by the drone of the UAVs. The drone has been known to drone on for hours and hours, day after day. The noise is not unlike the jet boats that receive similar complaints.	Through the NEPA process, the Navy has become aware of the annoyance factor associated with UAV operations over the Northern Neck of Virginia. The Navy's plan to mitigate this annoyance factor is described in FEIS Chapter 5. In essence, the plan would involve increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.
	P-69.2 Written	Can the drone be outfitted with a muffler, then there would be no complaint. If a muffler is not practical, maybe some more targets could be found.	Please see response to Comment P-69.1 above.
Roberts, Willard E.	P-70.1 Written	Noise, especially from the UAVs is very distressing and irritating. When traveling in other parts of the Northern Neck, he doesn't seem to hear UAV noise. Is the Burgess area being targeted in particular? If more flight time is needed, then the flight paths should be varied over a much larger pattern, or different parts of the region (example: over open water in the Chesapeake Bay where there are no homes).	Please see response to Comment P-69.1 above.
Haynie, Louis N.	P-71.1 Written	His tinnitus condition has been adversely affected by sonic booms. He must wear hearing protection when going outside and sonic booms have limited his crabbing income. If Navy pilots can't follow instructions and stay high enough, so the noise and sonic booms are bearable, the Navy should fly over the ocean where the noise won't hurt anyone.	During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5.
Anonymous	P-72.2 Written	Too many sonic booms over Northumberland County and too many hot rod fliers who should be controlled.	Please see response to Comment P-71.1 above.

Name/Agency	Comment Code	Comment	Response
Carren, Paul & Lucille	P-73.1 Written	Concerned about sonic booms and the potential long-term damage to their house. Request that they be informed of who to contact when sonic booms are experienced.	Please see response to Comment P-71.1 above. In addition, structural damage from existing or proposed aircraft operations is not expected. The Navy could be responsible for repair to your home if structural damage was caused by the Navy aircraft overflights. A determination would need to be conducted through the Navy's claims process. Contact the Command Staff Judge Advocate at NAS Patuxent River at 301-342-1045.
	P-73.2 Written	The biggest and most frequent aggravation is the drone, which flies for hours directly over their home. They definitely do not want additional drone time and strongly suggest that the drones be flown somewhere over the Bay and not over residential areas.	Through the NEPA process, the Navy has become aware of the annoyance factor associated with UAV operations over the Northern Neck of Virginia. The Navy's plan to mitigate this annoyance factor is described in FEIS Chapter 5. In essence, the plan would involve increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.
Dietrich, Lloyd & Mary Lou	P-74.1 Written (e-mail)	Experience three to five sonic booms per month caused by Navy aircraft pursuing testing protocols in the CTR. Recommend that the authorities install noise monitoring sensors at relevant sites to detect the frequency and severity of sonic booms in the test area, especially in the southern region of Northum-berland County.	During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5.
	P-74.2 Written (e-mail)	Suggest that the routine polling or interviews be conducted to de-termine the cumulative impact of repeated sonic booms.	Thank you for your comments; they will be taken into consideration by the decision maker.
	P-74.3 Written (e-mail)	Suggest that there should be no increase in aircraft activity in the Northumberland County area until the local effects of the current activity are empirically established.	All of the relevant environmental impacts are discussed in the FEIS at a level of detail sufficient for decision makers to accurately assess the impacts of each alternative under consideration.
	P-74.4 Written (e-mail)	Is there a database available that has been developed correlating the frequency and severity of sonic booms in the local area or in other naval aircraft testing areas?	The Navy is not aware of the existence of this type of database.
	P-74.5 Written (e-mail)	What procedures are available to residents pursuing claims for alleged structural residential damage?	Structural damage from existing or proposed aircraft operations is not expected. The Navy could be respon-sible for repair to your home if structural damage was caused by the Navy aircraft overflights. A determination would need to be conducted through the Navy's claims process. Contact the Command Staff Judge Advocate at NAS Patuxent River at 301-342-1045.

Name/Agency	Comment Code	Comment	Response
Timberlake, Sr., Jerry E.	P-75.1 Written (e-mail)	The continued humming of the drone aircraft is very annoying and disruptive in regards to his family enjoying their home/yard.	Through the NEPA process, the Navy has become aware of the annoyance factor associated with UAV operations over the Northern Neck of Virginia. The Navy's plan to mitigate this annoyance factor is described in FEIS Chapter 5. In essence, the plan would involve increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.
	P-75.2 Written (e-mail)	The low flying activities/habits of the jet aircraft who at times barely skim the treetops and break the sound barriers are downright dangerous and cause damage.	Citizens who observe disruptive flight activities by Navy aircraft should file an Aircraft Disturbance Report with NAS Patuxent River. Collect calls to 301-342-3836 are accepted. NAS Patuxent River takes all aircraft disturbance reports seriously.
Flore, Robert & Joan	P-76.1 Written	State they have been experiencing sonic booms that shake their house and cause damage to the structure as well as the furnishing hung on the walls. Aircraft opera-tions should be conducted at sub-sonic speeds or taken over open waters.	During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5. Structural damage from existing or proposed aircraft operations is not expected. The Navy could be respon-sible for repair to your home if structural damage was caused by the Navy aircraft overflights. A determination would need to be conducted through the Navy's claims process. Contact the Command Staff Judge Advocate at NAS Patuxent River at 301-342-1045.
Anonymous	P-77.1 Written	Very concerned with sonic booms over Northumberland County.	Please see response to Comment P-76.1 above.
Litteral, Fleming & Joyce	P-78.1 Written (e-mail)	States that they endure enough with the disturbances the way it is in Northumberland County with the noises of aircraft. Any increased activity is just adding fuel to the fire.	The mission of the Patuxent River Complex is to be the Navy's principal RDT&E, engineering, and fleet sup-port activity for naval aircraft, engines, avionics, and aircraft support systems (see FEIS Chapters 1 and 2). The complex contains a number of laboratories and flight test support facilities unique to the Navy and DoD that are operated by skilled personnel (instrumented CTR with its restricted airspace, aerial and surface firing range, and three targets; 70 dedicated land-based test facilities; and the airfields at NAS Patuxent River and Webster Field). The purpose of the pro-posed action is to enhance the use of these unique taxpayer-funded facilities and skilled workforce by increasing efficiencies and lowering costs to users. This action is needed in order for the Navy to success-fully meet current and future national and global de-fense challenges posed by a post-Cold War environ-ment. There is no other existing Navy or DoD facility that can fully meet the purpose and need delineated in the EIS without extensive construction and personnel relocation. Therefore, alternate Navy facilities were not considered in this EIS.

Name/Agency	Comment Code	Comment	Response
Buchanan, Alvie	P-79.1 Written	Protests the increased drone and jet flights over the Northern Neck of Virginia due to droning noise and sonic booms.	During the NEPA process, the Navy has become aware of the annoyance factor associated with UAV operations over the Northern Neck of Virginia. The Navy's plan to mitigate this annoyance factor is described in FEIS Chapter 5. In essence, the plan would involve increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time. In addition, a number of complaints about sonic booms were received during the NEPA process from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5.
Blankenship, Jim	P-80.1 Oral (voice mail)	Opposed to any of the proposed increases. He has had one win-dow broken in his house and heard four sound blasts today. The Navy should keep their flights out over the Bay or practice elsewhere.	During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5. Structural damage from existing or proposed aircraft operations is not expected. The Navy could be respon-sible for repair to your home if structural damage was caused by the Navy aircraft overflights. A determination would need to be conducted through the Navy's claims process. Contact the Command Staff Judge Advocate at NAS Patuxent River at 301-342-1045.
Anonymous	P-81.1 Oral (voice mail)	States that there should be no more noise in Reedville and the Navy should "play out to sea instead." NAS Patuxent River is not needed since we are not at war and have ample facilities in Norfolk, Washington, DC, Florida and all over the East Coast.	The boundaries of the CTR were established to meet mission requirements more than 50 years ago during World War II and testing of Naval aircraft has been an on-going activity in the Patuxent River Complex since that time. As a result, the complex contains a number of unique laboratories and flight test support facilities and a skilled workforce. The proposed action would enhance the continued use of the facilities in the complex, including the CTR, in order to increase efficiencies and lower costs to users as well as the taxpayer.
Westberg, Janet	P-82.1 Oral (voice mail)	Sonic booms near her house have destroyed many windows and damaged the crown moldings in several rooms.	Please see response to Comment P-80.1 above.

Name/Agency	Comment Code	Comment	Response
Powell, Joe K.	P-83.1 Written/ Oral (voice mail)	Concerned citizens of Reedville and in Northumberland County in general strongly object to the increased flight activities in the CTR. In fact we object to the flyovers at all since the Navy has plenty of room over the ocean in which to practice their "hot dogging, etc."	Please see response to Comment 81.1 above.
	P-83.2 Written/ Oral (voice mail)	The noise alone due to the sonic booms and such, let alone the possibility of a plane crashing into one's home, is grounds enough for objection. Oceana, Virginia re-quires that planes take a certain path to the ocean to reduce the noise and eliminate the possibility of crashing into homes killing people. Why can't Patuxent air base do the same?	Please see response to Comment P-80.1 above.
Powell, Joe K. (Continued)	P-83.3 Written/ Oral (voice mail)	In fact, we see no reason why the Patuxent air station should remain open in these days of budget cutting when we have such a large base in Tidewater Virginia which could easily cover the territory with ease and at less expense.	The boundaries of the CTR were established to meet mission requirements more than 50 years ago during World War II and testing of Naval aircraft has been an on-going activity in the Patuxent River Complex since that time. As a result, the complex contains a number of unique laboratories and flight test support facilities and a skilled workforce. The proposed action would enhance the continued use of the facilities in the complex, including the CTR, in order to increase efficiencies and lower costs to users as well as the taxpayer.

Name/Agency	Comment Code	Comment	Response
Price, Thomas & Elaine	P-84.1 Written (e-mail)	We believe that the noise impact over the area in which we live (Smith Point area) is a major concern...the noise levels we are experiencing are well above the 65 decibels. Where were the com-munity noise level studies done and when? Certainly they were not conducted on the dates and times which we have recorded and are included for your information. Cer-tainly these noises affect a popu-lation much greater than the 806 reported in your brochure. Which hospitals and nursing homes were studied? Which 318 dwellings were studied?	FEIS Subchapter 4.6 presents a comprehensive discussion of the potential from both a physiological and behavioral perspective, including the potential for annoyance, speech interference, sleep disturbance, and effects on domestic animals and wildlife. Stan-dard computer noise models were used to simulate the noise levels that would be produced in the Patuxent River Complex by implementing any of the alternatives. These models have been accepted by the USEPA and many other federal agencies. In the CTR, the modeling results showed that there were no significant noise impacts among the three alternatives for both subsonic and supersonic aircraft operations. The affected population (806) and dwellings (318) are located around the NAS Patuxent Airfield in St. Mary's and Calvert counties in Maryland. In addition, single-event noise impacts were evaluated at more than 20 specific locations, including resi-dences, schools, and hospitals (locations of which are delineated in Figure 3.6-8). There was little difference among the alternatives with respect to overall noise levels or the potential for speech interference or sleep disturbance at all sensitive receptor locations.
	P-84.2 Written (e-mail)	The access issue is another area of life affected by these tests. While not an insurmountable obstacle it is a consideration while enjoying the sailing on Chesapeake Bay. We have to be ever alert of the restricted areas of the Bay particularly in the middle bay area around Tangier and Solomons Island. An increase in the activities in the restricted areas to about 34 hours a month is more of an intrusion on the Bay waters.	Although the number of events requiring clearance of portions of the Bay would increase, this would not have a significant impact on boaters because: • The cleared area would only be in the immediate vicinity of or around the targets, averaging about 3 sq mi or about 0.3 percent of the surface water area under the CTR (including the prohibited areas surrounding the targets that are not available for navigation or fishing at any time). • Areas to be cleared would **exclude** Tangier Sound, Pocomoke Sound, or Hooper, Holland or Kedges straits. Further, tests/exercises would last an average of about 1-3 hours and after completion, boaters would be allowed access to the previously cleared portions of the Bay outside the prohibited areas.
Price, Thomas & Elaine (Continued)	P-84.3 Written (e-mail)	We also question the impact to the water quality when anything not naturally occurring and in natural quantities are added to the Bay's waters that we are so desperately trying to clean up--or are we?	Water quality impacts associated with the proposed action are discussed in detail in FEIS Subchapter 4.13.

Name/Agency	Comment Code	Comment	Response
Mrs. John H. Phyler	P-85.1 Written	Please change the direction of flights over my house which have caused so much damage from the sonic booms.	During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5. Structural damage from existing or proposed aircraft operations is not expected. The Navy could be respon-sible for repair to your home if structural damage was caused by the Navy aircraft overflights. A determination would need to be conducted through the Navy's claims process. Contact the Command Staff Judge Advocate at NAS Patuxent River at 301-342-1045.
Dunkle, Helena	P-86.1 Written	I can't believe flying so low over my house causing my sliding glass doors to rattle is needed. Please don't make my property untenable or lowered in value by increased flights.	Property values are determined by a complex combin-ation of neighborhood characteristics (e.g., the quality of schools, local property taxes, access to transpor-tation, and the crime rate) and individual housing char-acteristics (e.g., age of the house, number of rooms, and amenities such as garages). Consequently, there are no definitive federal standards for quantifying the impact of aircraft noise on property values and such an analysis is not addressed in the FEIS. The stated purpose of the proposed action evaluated in this FEIS is to enhance the use of unique taxpayer-funded facilities and the skilled workforce in the Patuxent River Complex by increasing efficiencies and lowering costs to users. There is no other existing Navy or DoD facility that can fully meet the purpose and need delineated in the FEIS without extensive construction and personnel relocation.
Corcoran, Thomas	P-87.1 Written	I strongly object to the noise that is caused by the aircraft that is flying in the vicinity of Somerset County (Maryland). At 11:20 am (July 29, 1998), an aircraft broke the sound barrier. Again my wife and I were startled by the double explosion sound...There is no reason for any aircraft to be flying over or near any residential area at a high rate of speed.	Please see response to Comment P-85.1 above.
Lundegard, Loyal & Doris	P-88.1 Written	The US Navy drones flying over the quiet communities of Virginia's Northern Neck should not be overlooked as an impact on the environment.	Through the NEPA process, the Navy has become aware of the annoyance factor associated with UAV operations over the Northern Neck of Virginia. The Navy's plan to mitigate this annoyance factor is described in FEIS Chapter 5. In essence, the plan would involve increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.

Name/Agency	Comment Code	Comment	Response
Appleby, Ed	P-89.1 Written (e-mail)	I say no to increased flight training over Northumberland County...Why doesn't the Navy do its training over the Atlantic Ocean? There is more than enough space out there to accommodate Patuxent's flight training. The present level could be reduced by sending it over the ocean like the Air Force.	The boundaries of the CTR were established more than 50 years ago during World War II and testing of Naval aircraft has been an on-going activity in the Patuxent River Complex since that time. As a result, the complex contains a number of unique laboratories and flight test support facilities and a skilled workforce. The purpose of the proposed action is to enhance the continued use of the facilities in the complex, including the CTR in order to increase efficiencies and lower costs to users as well as the taxpayer. Though it may appear that your locality experiences a significant number of the flight operations that are conducted, existing flight operations are actually distributed throughout the CTR.
Lindsay, Donald & Anita	P-90.1 Written	We are adamantly opposed to the proposed increase in manned or unmanned aircraft over North-umberland County, Virginia. The present number of flights cause enough havoc and distress without considering further increases. In fact, the present number of noisy flights and sonic booms should decrease.	During the NEPA process, a number of complaints about sonic booms have been received from residents in the areas of south Dorchester County, Maryland and Northumberland County, Virginia. Since these areas may be impacted by sonic booms due to ducting and/or other weather-related events, the Navy has proposed mitigation as discussed in FEIS Chapter 5.
Gromelski, Stan	P-91.1 Written	The "drone" situation is out of hand. As I write, the noise over my house is unsettling. There must be a better way to conduct the testing you need to accomplish.	Through the NEPA process, the Navy has become aware of the annoyance factor associated with UAV operations over the Northern Neck of Virginia. The Navy's plan to mitigate this annoyance factor is described in FEIS Chapter 5. In essence, the plan would involve increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.
Dingley, J.N.	P-92.1 Written	Concerned with the continual annoyance posed by UAV flights over the Northern Neck of Virginia.	Please see response to Comment P-91.1 above.
Carrigan, Neil	P-93.1 Oral (voice mail)	He doesn't agree with the acceptable level of sound and the way it is measured (the Day-Night Average). He feels that the average doesn't work; it can be very noisy during the day --130 dB --and very quiet at night--0 dB, and this would still average to over 65 dB over the 24-hour period.	As discussed in FEIS Subchapter 3.6.1, there are many ways to express the loudness of sound produced by aircraft. Among these are maximum or average maximum levels, as well as the Day-Night Average Sound Level (Ldn) used in the FEIS. The 24-hour Ldn has been determined to be a reliable measure of community sensitivity to aircraft noise and is the standard noise metric used in the US to measure the effects of aircraft noise. Ldn takes into account both the noise levels of all individual events that occur during a 24-hour period and the number of times those events occur. Furthermore, based on community noise studies undertaken by the federal government, the 65 dB DNL has been determined to be the noise level above which noise is considered to be annoying.

Name/Agency	Comment Code	Comment	Response
	P-93.2 Oral (voice mail)	Drones fly over his house all the time. The engine noise is bothersome. Since the engine noise is not necessary for training, he would think that the muffler could be improved.	Through the NEPA process, the Navy has become aware of the annoyance factor associated with UAV operations over the Northern Neck of Virginia. The Navy's plan to mitigate this annoyance factor is described in FEIS Chapter 5. In essence, the plan would involve increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.
	P-93.3 Oral (voice mail)	Sonic booms don't bother him even though they are very loud. However, several of the sliding glass doors on his house have had their thermal seals broken by the sonic booms. The glass then clouds up and you can't see through them. To replace the glass in the doors costs about $100 each.	Structural damage from existing or proposed aircraft operations is not expected. The Navy could be responsible for repair to your home if structural damage was caused by the Navy aircraft overflights. A determination would need to be conducted through the Navy's claims process. Contact the Command Staff Judge Advocate at NAS Patuxent River at 301-342-1045.
	P-93.4 Oral (voice mail)	Since the meeting on June 17, there has been a noticeable increase in the amount of jet noise in their area. Why can't these exercises be done over the ocean or someplace where no people live underneath? Is the increase in overflights the Navy's way of retaliating for all the noise complaints received at the public hearings?	Test schedules in the Patuxent River Complex are variable, subject to the availability of the airspace, aircraft, and approval of a test plan. Any increase in operations that may have been noticed by the commentor is due to these variabilities and not indicative of a proposed increase.
Anonymous	P-94.1 Oral (voice mail)	Caller states that the noise in the area is very disturbing and is unhappy because she moved out to the country to escape noise.	FEIS Subchapter 4.6 presents a comprehensive dis-cussion of the potential for noise impacts from a physi-ological and behavioral perspectives, including annoy-ance, speech interference, and sleep disturbance. Standard computer noise models (accepted by the USEPA and many other federal agencies) were used to simulate the noise levels that would be produced in the Patuxent River Complex for the alternatives. The modeling results showed no significant noise impacts among the three alternatives for subsonic and supersonic aircraft operations in the CTR. Single-event noise impacts also were evaluated at more than 20 specific locations, including residences, schools, and hospitals. The results of the analysis found little difference among the alternatives with respect to overall noise levels or the potential for speech interference or sleep disturbance at all of the sensitive receptor locations.

Name/Agency	Comment Code	Comment	Response
Vance, David & Helen	P-95.1 Oral (voice mail)	They are strongly opposed to the proposed actions, especially the drones. They feel that the persistent droning is detrimental to their rural lifestyle.	Through the NEPA process, the Navy has become aware of the annoyance factor associated with UAV operations over the Northern Neck of Virginia. The Navy's plan to mitigate this annoyance factor is described in FEIS Chapter 5. In essence, the plan would involve increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.
Perry, George L.	P-96.1 Oral (voice mail)	He lives on Blackwell's Creek off the Great Wicomico River, west of the Route 200 bridge. He feels that the droning aircraft noise is bad enough now, but if the flights increase, then the noise will become intolerable. He says that the planes circle over his house and about 1-2 years ago one crashed only about a mile away. Because of the persistent noise of the drones, it is difficult to read a book or listen to music.	Although the UAV program experienced aircraft losses in the past, the reliability of the engine has substantially increased and in the last two years, no incidents have occurred. In any event, the Navy identifies UAV operating routes using detailed demographic data with the specific goal of avoiding overflights of densely populated areas. In addition, as discussed in FEIS Chapter 5, the Navy is proposing measures to mitigate UAV overflights by increasing the area within the CTR available to UAVs for routine training purposes, thereby reducing revisit (exposure) time.
DeLavergne, William	P-97.1 Oral (voice mail)	Concerned about the frequency of unmanned flights (drones) over the Burgess, Virginia/Great Wicomico River area. He feels the flights are very annoying and that they should be decreased considerably.	See response to Comment P-95.1 above.

11 ACRONYMS

ACETEF	Air Combat Environment Test and Evaluation Facility
ACHP	Advisory Council on Historic Preservation
ACM	Air Combat Maneuver
AESO	Aircraft Environmental Support Office
AGL	Above Ground Level
AGM	Air-to-Ground Missile
AICUZ	Air Installation Compatible Use Zone
AIM	Air Intercept Missile
AIMD	Aircraft Intermediate Maintenance Department
AMRAAM	Advanced Medium Range Air-to-Air Missile
ANG	Air National Guard
AQCR	Air Quality Control Region
APU	Auxiliary Power Units
APZ	Accident Potential Zones
ARPA	Archaeological Resources Protection Act
ASEF	Aircrew Systems Evalutation Facility
ASL	Above Sea Level
ATC	Air Traffic Control
ATEF	Aircraft Test and Evaluation Facility
atm	Atmosphere
ATSDR	Agency for Toxic Substances and Disease Registry
AWQC	Ambient Water Quality Criteria
BASH	Bird/Aircraft Strike Hazard
BDU	Bomb Dummy Unit
BLM	Bureau of Land Management
BMP	Best Management Practice
BP	Before Present
BRAC	Base Closure and Realignment Act
BUR	Bottom-Up Review
CAA	Clean Air Act
CAAA	Clean Air Act Amendments of 1990
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CINCLANTFLT	Commander in Chief Atlantic Fleet
CNIL	Communication, Navigation, and Identification Laboratory
CO	Carbon monoxide
COE	Corps of Engineers (US Army)
COMNAVAIRLANT	Commander, Naval Air Forces Atlantic
CRMP	Coastal Resources Management Program (Commonwealth of Virginia)
CTR	Chesapeake Test Range
CWA	Clean Water Act
CZ	Clear Zone

CZM	Coastal Zone Management
CZMARA	Coastal Zone Management Act Reauthorization Amendments
CZMP	Coastal Zone Management Plan
DASH	Deer/Aircraft Strike Hazard
dB	Decibel
dB(A)	A-weighted Decibel
DCMP	Delaware Coastal Management Program
DDE	Delaware Department of Environment
DEIS	Draft Environmental Impact Statement
DEQ	Division of Environmental Quality
DNL	Day-Night Average Sound Levels
DoD	US Department of Defense
DOI	US Department of the Interior
DON	US Department of Navy
DOT	US Department of Transportation
DRMO	Defense Reutilization and Marketing Office
EA	Environmental Assessment
EIS	Environmental Impact Statement
EM	Electromagnetic
EMAP	Environmental Monitoring and Assessment Program
EMR	Electromagnetic Radiation
EO	Executive Order
EPA	US Environmental Protection Agency
EPCRA	Emergency Planning Community Right-to-Know Act of 1986
ER-M	Effects Range-Median
ERB	Environmental Review Board
ESA	Endangered Species Act
ESQD	Explosives Safety Quantity Distance
EW	Electronic Warfare
EWISTL	Electronic Warfare Integrated Systems Test Laboratory
FAA	Federal Aviation Administration
FACSFAC/VACAPES	Fleet Area Control and Surveillance Facility/Virginia Capes
FCLP	Field Carrier Landing Practice
FCS	Flight Control System
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration (US)
FICAN	Federal Interagency Committee on Aviation Noise
FL	Flight Level
FONSI	Finding of No Significant Impact
FR	Federal Register
ft	Feet
FY	Fiscal Year
FYDP	Future Years Defense Program
GCA	Ground Controlled Approach
GIS	Geographic Information System
GSE	Ground Support Equipment

HAP HARM HMC&M HUD	Hazardous Air Pollutant High Speed Anti-Radiation Missile Hazardous Materials Control and Management US Department of Housing and Urban Development
IAS IFR IMO IMP	Initial Assessment Study Instrument Flight Rules International Maritime Organization Integrated Management Plan
JTFEX	Joint Task Force Exercise
kHz kW kWh	Kilohertz Kilowatt Kilowatt-Hour
L_{Amax} L_{Cdn} L_{dn} L_{dnmr} L_{eq}	Maximum A-weighted Sound Level C-Weighted Day-Night Average Sound Level Day-Night Average Sound Level Onset Rate-Adjusted Monthly Day-Night Average Sound Level Equivalent Sound Level
MCAS MDE MDNR MEDEVAC MEK METCOM MFS MHz MILCON MMPA MOA MOU MRTFB MSL MSW MTR MW MWASIP MWCOG MWh	Marine Corps Air Station Maryland Department of the Environment Maryland Department of Natural Resources Medical Evacuation Methyl Ethyl Ketone St. Mary's Metropolitan Commission Manned Flight Simulator Megahertz Military Construction Marine Mammals Protection Act Military Operating Areas Memorandum of Understanding Major Range and Test Facility Base Mean Sea Level Municipal Solid Waste Military Training Routes Megawatt Metropolitan Washington Area State Implementation Plan Metropolitan Washington Council of Governments Megawatt Hours
NAAQS NAB NAS NASA NASMOD NASPAXRIVINST NATC NATOPS	National Ambient Air Quality Standards Naval Amphibious Base Naval Air Station National Aeronautics and Space Administration Navy Aviation Simulation Model Naval Air Station Patuxent River Instruction Naval Air Test Center Instruction Naval Aviation Training and Operating Procedure Standardization

NATS	Naval Aviation Training System
NAVAIR	Naval Air Systems Command
NAVFACENGCOM	Naval Facilities Engineering Command
NAVOSH	Navy Occupational Safety and Health
NAVSEA	Naval Sea Systems Command
NAWC	Naval Air Warfare Center
NAWCAD	Naval Air Warfare Center Aircraft Division
NAWCWD	Naval Air Warfare Center Weapons Division
NEPA	National Environmental Policy Act
NHESP	National Heritage and Endangered Species Program
NHL	National Historic Landmarks
NHPA	National Historic Preservation Act
NFS	National Forest Service
Ni-Cd	Nickel-cadmium
NLR	Noise Level Reduction
nm	Nautical Mile
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOTAM	Notice to Airmen
NOTW	Navy-Owned Treatment Works
NOx	Nitrogen oxides
NPS	National Park Service
NRCS	Natural Resources Conservation Service (US)
NRHP	National Register of Historic Places
NRL	Naval Research Laboratory
NSW	Naval Station Washington
NSWC	Naval Surface Warfare Center
NTHP	National Trust for Historic Preservation
NWI	National Wetland Inventory
NWR	National Wildlife Refuge
OEP	Operational Environmental Planning (Office)
OLF	Outlying Landing Field
OPNAVINST	Chief of Naval Operations Instruction
OSHA	Occupational Safety and Health Administration
OSL	Offensive Sensors Laboratory
OTC	Ozone Transport Region
OTR	Ozone Transport Commission
Pb	Lead
PCB	Polychlorinated Biphenyl
PIF	Partners-in-Flight-Aves-de las Americas Program
PL	Public Law
PM10	Particulate matter 10 microns or less in diameter
PM2.5	Particulate matter 2.5 microns or less in diameter
PPA	Pollution Prevention Act of 1990
ppm	Parts per million
PSEF	Propulsion System Evaluation Facility
psf	pounds per square foot

R-XXXX	Restricted Area
R&D	Research and Development
RCRA	Resource Conservation and Recovery Act
RDT&E	Research, Development, Test, and Evaluation
RF	Radio Frequency
ROD	Record of Decision
RONA	Record of Non-Applicability
SAR	Search and Rescue
SAV	Submerged Aquatic Vegetation
SEL	Sound Exposure Level
SHPO	State Historic Preservation Officer
SIMMOD	FAA's Airfield and Airspace Capacity Model
SIP	State Implementation Plan
SMP	Stormwater Management Plan
SO_2	Sulfur Dioxide
SOP	Standard Operating Procedure
sq ft	Square Feet
STP	Sewage Treatment Plant
SWMU	Solid Waste Management Unit
TADL	Threat Air Defense Laboratory
TAMS	TAMS Consultants, Inc.
T&E	Test and Evaluation
TPS	Test Pilot School
TSCA	Toxic Substances Control Act
TSP	Total Suspended Particulate Matter
tpy	Tons per year
UAV	Unmanned Aerial Vehicle
USAF	United States Air Force
USC	United States Code
USCG	United States Coast Guard
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFS	United States Forestry Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USHUD	United States Department of Housing and Urban Development
USMC	United States Marine Corps
UXO	Unexploded Ordnance
VAC	Virginia Administrative Code
VDEQ	Virginia Department of Environmental Quality
VFR	Visual Flight Rules
VOC	Volatile Organic Compound
VQ-4	Fleet Air Reconnaissance Squadron Four
V/STOL	Vertical/Short Takeoff and Landing
VX-1	Air Test and Evaluation Squadron One

WMA	Wildlife Management Area
WQC	Water Quality Criteria

12 GLOSSARY

Aeroacoustic: Refers to the structural flexing of an aircraft component caused by an applied vibration or shock input, such as the flexing of an aircraft wing after a store is released, or the modification of vibration pattern of the cabin structure in a helicopter induced by the firing of a mounted machine gun. This flexing can significantly impact the service life of aircraft components by accelerating metal fatigue. Testing determines how to minimize these fatigue effects to the greatest extent possible.

Airfield Event: An aircraft operation on the surface or in the vicinity of an airfield. Examples include a departure, an arrival, a touch-and-go-pass, an FCLP pass, an overhead break, a pad landing, a low approach.

Airfield Operation: An airfield event that is a landing or a takeoff. Examples include a departure, an arrival, a pad landing. Touch-and-go landings, FCLPs, and low approaches count as two airfield operations each (e.g., the "touch" and the "go").

Airspace for Special Military Use: Airspace established in coordination with the FAA for support of certain military aviation training activities, but unlike "Special Use Airspace," does not require use of either rulemaking or non-rulemaking processes for establishment (e.g., Military Training Routes.

Ambient Air Quality Standards: Measures established on a state or federal level defining limits for airborne concentrations of designated "criteria" pollutants (nitrogen dioxide, sulfur dioxide, carbon monoxide, ozone, lead, and particulate matter) to protect public health with an adequate margin of safety (primary standards) and to protect public welfare, including plant and animal life, visibility, and materials (secondary standards).

Anadromous: Pertaining to fishes that travel from their primary ocean habitats to freshwater in order to spawn (e.g., salmon, shad, and marine lampreys) (Hickman et al., 1979).

Arrival: An aircraft landing out of non-local traffic or from local training areas. The landing may be to a full stop or may continue without stopping into, for example, a touch-and-go or low approach airfield event.

Benthic: Referring to the bottom dwelling community of organisms and includes those plants and animals that creep, crawl, burrow, or attach themselves to either the sea bottom or such structures as ships, buoys, and wharf pilings (e.g., crabs, clams, and polychaete worms).

Best Management Practices: Resource management decisions based on the latest professional and technical standards for protection, enhancement, and rehabilitation of natural and cultural resources.

Biota: The flora and fauna of a region.

Bivouac: To camp.

Carrier Suitability Flight Test Operations: Operations conducted to determine aircraft compatibility with ship-based take-off, approach, and recovery equipment under various environmental conditions. Also includes performance characteristics of the aircraft during taxi, takeoff, approach, and landing.

Catadromous: Pertaining to fishes that travel from their primary freshwater habitats to saltwater in order to spawn.

Cephalopod: Any organisms of a class (Cephalopoda) of mollusks, including the squids, cuttlefishes, and octopi that have a tubular siphon under the head, a group of muscular arms around the front of the head which are usually furnished with suckers, highly developed eyes, and usually a bag of inky fluid which can be ejected for defense or concealment.

Chaff: Aggregates of metallic or metal-coated strips or cylinders that are employed as highly efficient reflectors of radio-frequency electromagentic radiation. Chaff is launched from aircraft or ships in military applications as a means to degrade the performance of radar and radar controlled weapons.

Chaff Bloom Rate: How fast the compressed chaff fibers expand into a “cloud” upon release.

Cluster Bomb: A free-fall store developed as an aircraft weapon for attacking tanks, armored vehicles, and soft targets, using the same delivery methods as conventional bombs. The system consists of a canister, bomblets, and a nose fuse. When released, the bomb free-falls and detonates above the ground to release the bomblets.

Conformity Rule: Effective since January 31, 1994 to ensure that activities of Federal agencies do not inhibit reaching goals of federal and state implementation plans. The rule requires Federal agencies to review new actions and decide whether the actions would worsen an existing NAAQS violation, cause a new NAAQS violation, delay the implementation plan attainment schedule of the NAAQS, or otherwise contradict implementation plan requirements.

Controlled Airspace: An airspace of defined dimensions within which air traffic control service is provided to Instrument Flight Rules (IFR) flights and to Visual Flight Rules (VFR) flights in accordance with the airspace classification.

Criteria Pollutants: Includes nitrogen dioxide, carbon monoxide, sulfur dioxide, ozone, lead, and particulate matter. The Clean Air Act required the USEPA to establish air quality standards for common and widespread pollutants after preparing “criteria documents” summarizing scientific knowledge on their human health effects.

Critical Habitat: The area where the species of concern resides that contains physical or biological characteristics essential to the survival of the species, or the areas surrounding such habitat which are essential to the survival of the species. However, it does not include all habitat that could be used by the species.

Critical Load Conditions - These conditions can differ widely, depending on the specific test being conducted on a test aircraft of component. Generally speaking, a design loading condition for which margins of safety indicate the structure is most likely to fail.

Crustaceans: Any organism of a large class (Crustacea) of mostly aquatic arthropods that have a chitinous or calcareous and chitinous exoskeleton, a pair of often much modified appendages on each segment, and two pairs of antennae. This class includes lobsters, shrimps, crabs, wood lice, water fleas, and barnacles.

Cultural Resources: Buildings, structures, sites, districts, and objects eligible for or included in the National Register of Historic Places; “cultural items,” including but not limited to those defined in 25 USC 3001 (reference [u]); American Indian, Eskimo, Aleut, or Native Hawaiian sacred sites for which access is protected under 42 USC 1996 (reference [d]); “archaeological resource” as defined by Section 470a-11 of 16 USC (reference [h]); and “archaeological artifact collections and associated records” defined under 36 CFR 79 (reference [e]).

Cumulative Impact: Two or more individual effects that, when considered together, are significant, or which compound or increase other environmental impacts.

Day-Night Average Sound Level: For the evaluation of community noise effects, and particularly aircraft noise effects, the Day-Night Average Sound Level (abbreviated DNL or Ldn) is used. DNL averages aircraft sound levels at a location over a 24-hour period, with a 10-decibel adjustment added to those noise events that occur between 10:00 p.m. and 7:00 a.m. (local time). This 10-decibel "penalty" represents the added intrusiveness of sounds that occur during normal sleeping hours, both because of the increased sensitivity to noise during those hours and because ambient sound levels during nighttime are typically 10 dB lower than during daytime hours.

Decoy: Includes flares, chaff, and other expendables which are used to lure away infrared weapons.

De minimis: A legal term describing an insignificant amount, often used in regulatory programs.

Departure: An aircraft taking off to non-local traffic or to local training areas. The takeoff may be after taxi from the flight line or after completing, for example, a touch-and-go or low approach airfield event.

Direct Effect (or Impact): Effects or impacts that are caused by the action and occur at the same time and same place (40 CFR 1508.8[a]).

Electronic Warfare (EW) Flight Test Operation: Evaluate the capability of the aircraft EW systems to detect, analyze, and/or counter electronic signals.

Endangered Species: Defined in 16 USC 1532 as any species that is in danger of extinction throughout all or a significant portion of its range (other than a species of the Class Insect designated as pest). Federally endangered species are listed in 50 CFR 17.11 and 17.12.

Estuarine: Relating to a water passage where the tide meets a river current; an arm of the sea at the lower end of a river. Relating to the embayment at the junction of a river with the sea, typically containing water of low salinity (Barnes, 1987).

Expendable Jammer: A countermeasures cartridge that is ejected from aircraft and emits radar-like signals to lure a radar-guided missile from its intended target.

Field Carrier Landing Practice: A training event that uses the airfield to practice landings on an aircraft carrier.

Fixed-Wing Aircraft: A generic term used to refer to the broadest class of aircraft -- those in which aerodynamic lift is generated when the airframe including the fixed- or non-rotating wing is moved through the air by forward thrust from a jet engine or engine-driven propeller. Examples of a fixed-wing aircraft flying in the Patuxent River Complex are an F/A-18E/F or a P-3C.

Flare: A burning pyrotechnic device that is formulated to maximize infrared radiation at wave lengths used by the seekers of infrared homing missiles. The flare is ejected from the aircraft as a decoy for the homing missiles. Flares are generally composed of powdered combustible material, a binder, and a trace of other compounds required for ignition and control of flare burning dynamics.

Flight: One or more aircraft departing at a base airfield, conducting one or more missions, possibly including landings and takeoffs at other airfields and returning to base.

Flight Crew Proficiency Flight Test Operation: Flights flown to maintain the skills of pilots and aircrew personnel.

Flight Hour: An hour of airborne flight time, excluding ground taxi and other ground operations.

Flying Qualities and Performance Test Operations: Determine quantitatively and qualitatively if the aircraft and its flight Control System (FCS) meet safety, performance, growth potential, and mission technical requirements.

General Aviation: That portion of civil aviation other than scheduled airlines, charter air carriers, and large aircraft commercial operators (such as Federal Express). Examples of general aviation operations range from pleasure or business flights in small single-engine aircraft to corporate flight activities in high performance aircraft such as business jets.

General Purpose Bomb: A device that has a long, slender, aerodynamically shaped body giving a low drag profile, making it suitable for external and internal carriage and release by high speed aircraft. Its purpose is to produce blast and fragmentation impacts, causing deep catering effects. It is available with or without guidance systems.

Ground Controlled Approach: A radar approach system operated from the ground by air traffic control personnel transmitting instructions to the pilot by radio.

Habitat: Place where an animal or plant normally lives, often characterized by a dominant plant form or physical characteristic.

Hannibal Target: (Latitude = 38E2'18" N, Longitude = 76E9'26" W). Located 19.1 nautical miles on the 149 degree radial of the Patuxent VORTAC. A prohibited area of 915 m (1,000 yds) surrounds the target. The ex-AMERICAN MARINER was scuttled as Hannibal Target in 1969 and is marked as a hazard to surface navigation with buoys 137 m (150 yds) northeast and southwest of the ship. Stores training is limited to inert bombs, 7 cm (2.75 in) inert rockets, and strafing (*Safety and Test Operations Manual for the Chesapeake Test Range*, NATCINST 3710.21).

Hazard Space: A predefined air and/or surface area to be cleared of all uninvolved vehicles and personnel prior to conducting a controlled mission (*Safety and Test Operations Manual for the Chesapeake Test Range*, NATCINST 3710.21).

Hooper Target: (Latitude = 38E13'0" N, Longitude = 76E19'0" W). A configuration of five visual targets located on the 142 degree radial of the Patuxent VORTAC at 6.1 nautical miles. Chesapeake Test Range operates the Hooper Target complex, while Patuxent ATC Facility authorizes the use of the airspaces (*Safety and Test Operations Manual for the Chesapeake Test Range*, NATCINST 3710.21). A prohibited area of 915 m (1,000 yds) surrounds the target.

Human Factors (Aircrew Systems) Flight Test Operations: Determines the technical suitability of aircrew station design, aircrew control and information display systems, operator workload, crew communication/coordination, survival and rescue systems, and bioenvironmental factors of the aircraft weapon system and related equipment.

Indirect Effects (or Impacts): Effects that are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effected related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems (40 CFR 1508.8[b]).

In-flight Refueling Support: Flights where fuel is transferred between two or more aircraft in flight.

Instrument Approach: A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing or to a point from which a landing may be made visually.

Instrument Flight Rules: Rules governing the procedures for conducting instrument flight.

Landing: An aircraft approach to and touch down on the airfield surface.

Local Traffic: Aircraft operating in the traffic pattern or within sight of the tower, or aircraft departing to or arriving from flight in local training areas, or aircraft executing practice instrument approaches at the airfield.

Logistic Flights: Flights flown to transport materiel or equipment to and from NAS Patuxent River.

Low Approach: An approach over an airfield or runway where the pilot intentionally does not make contact with the surface.

Maximum Sound Level: The highest A-weighted sound level measured during a single event in which the sound level changes value as time goes on (e.g., an aircraft overflight) is called the maximum A-weighted sound level or maximum sound level, for short. It is abbreviated ALM, L_{max} , or L_{Amax}. The maximum sound level is important in judging the interference caused by a noise event with conversation, TV or radio listening, sleep, or other activities.

Military Operations Area: A type of special use airspace of defined vertical and lateral dimensions established outside Class A airspace (i.e., below 5,400 m [18,000 ft] above mean sea level) to separate/segregate certain military activities from IFR traffic and to identify VFR traffic where these activities are conducted.

Military Training Route: Airspace of defined vertical and lateral dimensions established for the conduct of military flight training at airspeeds in excess of 250 knots.

Missile: A device projected so as to strike some object at a distance. Although most missiles used by modern jet warplanes (e.g., the F/A-18E/F) are powered by a solid rocket motor, other types may be powered by a turbo jet system. There are two types of missiles: air-to-air and air-to-surface. The air-to-air missiles include various missiles systems designed to intercept aircraft targets against both land and sea clutter. The air-to-surface missiles have been developed for use against tanks and a variety of hardened targets such as ships, bunkers, and aircraft shelters.

Missile Exercises: Practice releasing and targeting missiles, with or without actual drop of store (a subset of the types of operations covered under RDT&E weapons/stores separation test).

Mission: A flight or part of a flight that accomplishes a specific purpose. Often used interchangeably with "flight."

Mission Systems Flight Test Operation: Aircraft mission system are those systems, subsystems, or components that enable the aircraft to perform its intended mission. Specific mission systems include (among others): navigation, search sensors, communications, tactical control, and display. Verifies proper operational functionality of a specific mission system (or subsystem/component), as well as its interoperability with the aircraft's other systems.

Noise Metric: Refers to the unit or quantity that quantitatively measures the effect of noise on the environment.

Notice of Intent: A written notice published in the *Federal Register* that announces the intent to prepare an EIS. Also provides information about a proposed federal action, alternatives, the scoping process, and points of contact within the lead federal agency regarding the EIS.

Onset-Rate Adjusted Day-Night Average Sound Level: A noise metric that accounts for the "surprise" effect of the onset rate of aircraft noise on humans associated with aircraft operations along low-altitude Military Training Routes (MTRs) and in Military Operating Areas (MOAs) and Restricted Areas/Ranges. Because of the sporadic occurrences of aircraft overflights along MTRs, in MOAs and Restricted Areas/Ranges, the number of average daily operations is determined from the calendar month with the highest number of operations in each area. This monthly average is denoted L_{dnmr}.

Ordnance Stores: Any device intended for internal or external carriage and mounted on aircraft suspension and release equipment, whether or not the item is intended to be separated in flight from the aircraft. Examples of stores include missiles, rockets, bombs, nuclear weapons, mines, torpedoes, pyrotechnic devices, detachable fuel and spray tanks, line-source disseminators, dispensers, pods (refueling, thrust augmentation, gun, electronic counter measures, etc.), targets, cargo-drop containers, and drones (*Safety and Test Operations Manual for the Chesapeake Test Range*, NATCINST 3710.21).

pH: Physical unit commonly used to describe the acidity or alkalinity of a liquid that is measured on a scale of 0 to 14, with 7 representing neutrality, numbers less than 7 indicating acidity, and numbers greater than 7 indicating alkalinity.

Pelagic: Living in the water column (Levinton, 1982). Plants and animals that are free-floating and drift passively, or are strong swimmers; the opposite of *benthic* (Gosner, 1978).

Practice Bomb: An inert object designed to replicate the shape and weight of a live bomb. It does not contain any explosives, but may contain a signal (spotting charge) which expels smoke/flame for impact marking.

Profile: Also “flight profile” and “mission profile.” A sequence of steps that specifies the ordered elements of a flight, such as resources requested and returned, routes flown, training areas worked in and time spent there, and weather and other conditions that may abort or otherwise change the steps accomplished.

Propulsion Flight Test Operation: Determine engine operating characteristics including both ground and In-flight performance. Evaluate interface between the airframe and the propulsion system.

Reconnaissance Overflights: Transient flight through airspace to practice use of reconnaissance equipment (a subset of Logistics Flights).

Record of Decision: In regard to an EIS, the notice published in the Federal Register that contains the lead agency’s decision, and identifies both the alternatives considered and the mitigation measures to be used.

Restricted Area: A type of special use airspace within which the flight of aircraft, while not wholly prohibited, is subject to restriction.

Rotary-Wing Aircraft: A helicopter, or the category of aircraft where the lift and forward thrust that allows the machine to fly is generated by the rotating wing or rotor.

Scoping: Early consultation with federal and state agencies, and interested public to identify possible alternatives and the significant issues to be addressed in an EIS.

Search and Rescue: Flights flown to locate/recover military or civilian personnel who have been injured or lost.

Sortie: (1) In the context of squadron operations: one aircraft making one departure and arrival; (2) in the context of training area operations: one aircraft entering a region of airspace, operating there for a period of time, and leaving.

Sound Exposure Level: Sound Exposure Level (SEL) is a composite metric which represents both the intensity of a sound and its duration. It does not directly represent the sound level heard, but rather provides a measure of the net impact of the entire acoustic event. It has been well established in the scientific community that SEL measures this impact much more reliably than just the maximum sound level.

Sound Frequency: The number of times per second air vibrates or oscillates. Low-frequency sounds are characterized as rumbles or roars, while high-frequency sounds are typified by sirens or screeches.

Sound Intensity: A measure of the acoustic energy of the sound vibrations and is expressed in terms of sound pressure. The higher the sound pressure, the more energy carried by the sound and the louder the perception of that sound.

Special Use Airspace: Airspace of defined dimensions identified by an area on the surface of the earth wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities.

Spin Chute: An aircraft in an uncontrolled spin has stopped flying because there is not enough airflow (balanced and in the proper direction) over the wings to maintain lift, and there is not enough airflow over the control surfaces to "point" the aircraft in the proper direction to regain such airflow over the wings. A spin chute is a small parachute which can be deployed by an aircraft under test when it is in an uncontrolled spin – the spin chute helps to stabilize the aircraft in such a manner that the flight control surfaces regain the proper level of airflow over them to regain control and to start flying again.

Stores Separation Flight Test Operation: Determine safe and satisfactory store carriage and separation envelopes. Determine effects of weapon firings/releases.

Surficial: Of or relating to a surface.

Take: To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt any of the above.

Takeoff: An aircraft lifting off the airfield surface.

Tangier Island Target: (Latitude = 37E47'54" N, Longitude = 76E03'48" W). The Tangier Island target Danger Zone consists of a prohibited area of 915 m (1,000 yds) surrounds the target, and a restricted area contained by a circle with a 5.6 km (three nm) radius. The target consists of two scuttled cargo ships. The target is authorized for inert bombs and 7 cm (2.75 in) Folding Fin Aerial rockets with inert heads. Strafing is not authorized.

Taxi: The movement of an airplane or wheeled helicopter under its own power on the surface of an airfield.

Taxon: A taxonomic (a system of arranging animals and plants into natural, related groups based on some factor common to each, as structure, embryology, biochemistry, etc.) category or unit, as a species, genus, etc.

Theodolites: Used to determine time-space position of mission aircraft and ordnance. In conjunction with television cameras mounted on two tracking mounts, used for visual surveillance of the hazard space during ordnance missions (*Safety and Test Operations Manual for the Chesapeake Test Range*, NATCINST 3710.21).

Threatened Species: Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Threatened species are also listed in 50 CFR 17.12.

Touch-and-Go Landing: An operation by an aircraft that lands and takes off on a runway without stopping or exiting the runway.

Traffic Pattern: The traffic flow that is prescribed for aircraft landing at, taxiing on, or taking off from an airport.

Training Area: A type of mission that accomplishes a specific training requirement.

Training Event: A type of mission that accomplishes a specific training requirement.

Transit Flight Operations: Routine flights into and out of NAS Patuxent River. These flights are using the military airfield as an airport.

Visual Approach: An approach conducted on an IFR flight plan that authorizes the pilot to proceed visually and clear of clouds to the airfield, always with the airfield or the preceding aircraft in sight.

Visual Flight Rules: Rules that govern the procedures for conducting flight under visual conditions.

Warning Area: A type of special use airspace that may contain hazards to nonparticipating aircraft in international airspace.

Weapon Release (inert): Practice releasing and targeting weapons from an aircraft, with or without actual drop (a subset of the types of operations covered under RDT&E Stores Separation test).

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Increased Flight and Related Operations
in the Patuxent River Complex

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APPENDIX B

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Dear Ms. Liccese,

Although the State of Maryland has jurisdiction over areas encompassed by only two of the three Navy target areas (Hooper and Hannibal), these are considered to have a high potential for submerged cultural remains eligible for inclusion on the National Register of Historic Places. During our telephone conversations, I apprised you of the vessels either in or thought to be within these areas. A number of cannon were recovered in the 19th and early 20th centuries off Webster Field and these were commonly attributed to the remains of an eroded fort. While fortifications were extant on that property, it is more likely these guns came from a shipwreck not yet located. This is an area meriting further study. Research on the land sites has been undertaken by Dr. Julie King and she would be a useful contact about this area and the types of resources likely to be in these waters (410-586-8551). The likelihood of other submerged cultural remains not yet recorded is high and Phase I investigations are necessary.

I would strongly suggest a representative of your firm make an appointment with our Librarian, Mary-Louise DeSarran (410-514-7655) and spend time in our library, which is what most consultants do. State conflict of interest rules prohibit my staff from undertaking research on behalf of a consulting firm. For further information about the specific wrecks you noted in the Goodwin report excerpts, I would suggest obtaining a copy of the *Columbus* report. This was produced for, and is available through, the Baltimore District Corps of Engineers; please call Mr. Kenneth Baumgardt at 410-962-2894.

Please be aware that any survey undertaken in Maryland must be carried out by a qualified professional archaeologist, and performed in accordance with the Standards and Guidelines for Archaeological Investigations in Maryland (Shaffer and Cole 1994) and with Archaeology and Historic Preservation; Secretary of the Interior's Standards and Guidelines (1983). With respect to underwater survey, the scope of work must be submitted to this Office prior to implementation to ensure it is undertaken in a manner consistent with the standards currently being developed to govern underwater heritage surveys in Maryland.

Should you require copies of any of these materials, please let me know. I shall be in the field with my staff from June 9-13, but I check my voice mail daily and you can also contact Linda Durbin (410-514-7661) to direct your call if you require immediate assistance.

Sincerely,

Susan B.M. Langley, Ph.D.
State Underwater Archaeologist

/sl

cc. Beth Cole
Julie King

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL
DIVISION OF FISH & WILDLIFE
NATURAL HERITAGE PROGRAM
4876 HAY POINT LANDING ROAD
SMYRNA, DELAWARE 19977

TELEPHONE: (302) 653-2880
FAX: (302) 653-3431

Janet C. O'Neill
TAMS Consultants, Inc.
2101 Wilson Blvd. Suite 300
Arlington, VA 22201

06 October 1997

Dear Ms. O'Neill:

Thank you for soliciting the DE Natural Heritage Program for rare species information for the EIS for the Navy at the Patuxent River Complex.

Because your request of the identification of any rare species within the Sussex Co., DE portion of the Chesapeake Test Range is so broad, I have narrowed the list of species down to include only animals as they are the most potentially affected and natural communities, which harbor many of these animals and are very sensitive areas.

The area of my search was extensive and includes 12 different ortho-photo quad maps. It was difficult for me to ascertain the exact boundaries of the Test Range, so I included more area than was probably necessary.

A review of our Biological and Conservation Database has revealed the following list of animals and plant communities:

quad code	scientific name	common name	state rank	global rank
ANIMALS				
3807544	ENNEACANTHUS CHAETODON	BLACKBANDED SUNFISH	S2	G4
3807544	ENNEACANTHUS OBESUS	BANDED SUNFISH	S2	G5
3807544	LAMPROPELTIS GETULA	COMMON KINGSNAKE	S2	G5
3807544	SCINCELLA LATERALIS	GROUND SKINK	S1	G5
3807545	PSEUDOTRITON MONTANUS	EASTERN MUD SALAMANDER	S1	G5
3807546	LAMPETRA AEPYPTERA	LEAST BROOK LAMPREY	S2	G5
3807554	ACANTHARCHUS POMOTIS	MUD SUNFISH	S2	G5
3807554	AGKISTRODON CONTORTRIX	COPPERHEAD	S1	G5
3807554	CEMOPHORA COCCINEA	SCARLET SNAKE	SH	G5
3807554	DENDROICA DOMINICA	YELLOW-THROATED WARBLER	S2B	G5
3807554	ELLIPTIO FISHERIANA	NORTHERN LANCE	S2	G4
3807554	HYLA CHRYSOSCELIS	COPE'S GRAY TREEFROG	S2	G5
3807554	NOTROPIS CHALYBAEUS	IRONCOLOR SHINER	S2	G5
3807554	OPHEODRYS AESTIVUS	ROUGH GREEN SNAKE	S2	G5
3807554	STORERIA OCCIPITOMACULATA	REDBELLY SNAKE	S1	G5

3807555	ACCIPITER COOPERII	COOPER'S HAWK	S1B	G4
3807555	ANODONTA IMPLICATA	ALEWIFE FLOATER	S1	G5
3807555	BATTUS PHILENOR	PIPEVINE SWALLOWTAIL	S2	G5
3807555	BUTEO LINEATUS	RED-SHOULDERED HAWK	S2B	G5
3807555	ELAPHE GUTTATA	CORN SNAKE	S1	G5
3807555	MOXOSTOMA MACROLEPIDOTUM	SHORTHEAD REDHORSE	S2	G5
3807555	PHOEBIS SENNAE	CLOUDLESS SULPHUR	SA	G5
3807555	POANES MASSASOIT	MULBERRY WING	S1	G4
3807555	STRIX VARIA	BARRED OWL	S2	G5
3807556	ATRYTONOPSIS HIANNA	DUSTED SKIPPER	S1	G4G5
3807556	DENDROICA DOMINICA	YELLOW-THROATED WARBLER	S2B	G5
3807556	GOMPHAESCHNA FURCILLATA	HARLEQUIN DARNER	S1	G5
3807556	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	S2B	G4
3807556	HEMIDACTYLIUM SCUTATUM	FOUR-TOED SALAMANDER	S1	G5
3807556	HESPERIA METEA	COBWEB SKIPPER	SU	G4G5
3807556	HYLA CHRYSOSCELIS	COPE'S GRAY TREEFROG	S2	G5
3807556	INCISALIA IRUS	FROSTED ELFIN	S1	G4
3807556	MELANERPES ERYTHROCEPHALUS	RED-HEADED WOODPECKER	S1	G5
3807556	MITOURA GRYNEA	OLIVE HAIRSTREAK	S2	G5
3807556	MITOURA HESSELI	HESSEL'S HAIRSTREAK	S1	G3G4
3807556	PODILYMBUS PODICEPS	PIED-BILLED GREBE	S1B	G5
3807556	SETOPHAGA RUTICILLA	AMERICAN REDSTART	S1B	G5
3807564	BUTEO PLATYPTERUS	BROAD-WINGED HAWK	S1B	G5
3807564	WILSONIA CITRINA	HOODED WARBLER	S1B	G5
3807565	EGRETTA CAERULEA	LITTLE BLUE HERON	S1B	G5
3807565	NOTROPIS AMOENUS	COMELY SHINER	S2	G5
3807565	NOTURUS INSIGNIS	MARGINED MADTOM	S2	G5
3807565	PERCINA PELTATA	SHIELD DARTER	S1	G5
3807565	RIPARIA RIPARIA	BANK SWALLOW	S2B	G5
3807565	VIRGINIA VALERIAE	SMOOTH EARTH SNAKE	S1	G5
3807566	CHORDEILES MINOR	COMMON NIGHTHAWK	S2B	G5
3807566	COCCYZUS ERYTHROPTHALMUS	BLACK-BILLED CUCKOO	S1B	G5
3807566	COTTUS BAIRDI	MOTTLED SCULPIN	S1	G5
3807566	EQUISETUM HYEMALE	ROUGH HORSETAIL	S1	G5
3807574	ARGIA BIPUNCTULATA	SEEPAGE DANCER	S1	G4
3807574	COCCYZUS ERYTHROPTHALMUS	BLACK-BILLED CUCKOO	S1B	G5
3807574	NANNOTHEMIS BELLA	ELFIN SKIMMER	S1	G4
3807574	SATYRIUM LIPAROPS STRIGOSUM	STRIPED HAIRSTREAK	S1	G5T5
3807575	APELTES QUADRACUS	FOURSPINE STICKLEBACK	S2	G5
3807575	SYMPETRUM AMBIGUUM	BLUE-FACED MEADOWFLY	S1	G5
3807576	ARDEA HERODIAS	GREAT BLUE HERON	S2B	G5

COMMUNITIES

3807583 CHAMAECYPARIS THYOIDES-FRAXINUS PENNSYLVANICUS-ALNUS SPP. CEDAR-ASH-ALDER STREAMSIDE SCRUB WETLAND S2

3807554 TAXODIUM DISTICHUM SWAMP FOREST BALD CYPRESS SWAMP FOREST S2

3807556 CHAMAECYPARIS THYOIDES-ACER RUBRUM SWAMP FOREST ATLANTIC WHITE CEDAR-RED MAPLE SWAMP S2

3807565 PINUS TAEDA-QUERCUS SPP. MIXED FOREST MIXED PINE-OAK MESOPHYTIC FOREST S3

3807565 CHAMAECYPARIS THYOIDES-ALNUS MARITIMA-ILEX GLABRA SWAMP FOREST ATLANTIC WHITE CEDAR SWAMP S2

We do not have any records for the other sensitvie resources you have mentioned-waterfowl staging areas, colonial waterbird rookeries, submerged aquatic vegetation beds or oyster bars-within the area of the Test Range. We do have records for some of these areas on the Atlantic Coast, but this is outside of your area of concern.

It is our policy to charge private agencies for this information request service, so please consider this letter to be an invoice for $26.76 ($26.76/hour for one hour). This payment can be made payable to and submitted to :
DE Division of Fish and Wildlife
89 Kings Hwy.
Dover, DE 19901

If you have any other questions, please call me at (302) 653-2880.

Sincerely,

Eric Zuelke

Eric F. Zuelke
Research Assistant/Environmental Reviewer

Enclosures
CC: Karla Cassell-Carter (Fish and Wildlife Accounting)

EXPLANATION OF GLOBAL AND STATE RANKS

Ranks are based on a system developed by The Nature Conservancy to measure the rarity of a species. Each taxon is given a Global and State rank. The Global rank reflects the rarity of the species throughout the world and the State rank reflects the rarity within Delaware. State and Global ranks are used to prioritize conservation and protection efforts so that the rarest of species receive immediate attention. The primary criteria for ranking species is the number of known distinct occurrences or populations. Ranks for individual species are annually updated and are based on current knowledge.

GLOBAL RANK

G1 Critically imperiled globally because of extreme rarity (5 or fewer occurrences), or because of some factor(s) making it especially vulnerable to extinction.

G2 Imperiled globally because of rarity (6-20 occurrences), or because of some other factor(s) making it very vulnerable to extinction throughout its range.

G3 Either very rare and local throughout its range (21 to 100 occurrences), or found locally (even abundantly at some of its locations) in a restricted range (e.g. a physiographic region), or because of some other factor(s) making it vulnerable to extinction throughout its range.

G4 Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

G5 Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

GH Historically known, with the expectation that it may be rediscovered.

GX Species believed to be extinct throughout its range with no likelihood that it will be rediscovered.

GU Possibly in peril range-wide but status uncertain; more information is needed.

G? Species has not yet been ranked.

GNE Exotic in the United States (e.g. Japanese Honeysuckle).

Q If a taxon is treated as a full species, a qualifying "Q" is added after the global rank to denote its questionable taxonomic assignment.

T Global ranks containing a "T" qualifier denote that the infraspecific taxon is being ranked differently than the full species. For example, Hydrocotyle verticillata var. triradiata is ranked G5T? the full species is globally secure (G5), but the global rarity of the var. triradiata has not been determined (T?).

STATE RANK

S1 Extremely rare; typically 5 or fewer known occurrences in the state; or only a few remaining individuals; may be especially vulnerable to extirpation.

S2 Very rare; typically between 6 and 20 known occurrences; may be susceptible to becoming extirpated.

S3 Rare to uncommon; typically 21 to 50 known occurrences; S3 ranked species are not yet susceptible to becoming extirpated in the state but may be if additional populations are destroyed.

S4 Common; apparently secure under present conditions; typically 51 or more known occurrences, but may be fewer with many large populations; usually not susceptible to immediate threats.

S5 Very common; demonstrably secure under present conditions.

SU Status uncertain; a species thought to be uncommon in the state, but there is inadequate data to determine rarity. Also includes uncommon species of uncertain nativity in the state and of questionable taxonomic standing.

SH Historically known from the state but not verified for an extended period (usually 15 years); there are expectations that the species may be rediscovered.

SX Species has been determined or presumed to be extirpated. All historical occurrences have been searched, or all known sites have been destroyed, and a thorough search of potential habitat has been completed.

SE Exotic in the state, not a part of the native flora; may be native elsewhere in North America (e.g. western United States).

SR Reported from the state, but without persuasive documentation that would provide a basis for either accepting or rejecting the report.

SRF Species reported falsely (in error) from the state, but this error persists in the literature.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
P.O. Box 99
6669 Short Lane
Gloucester, Virginia 23061

October 16, 1997

Ms. Janet C O'Neill
TAMS Consultants, Inc.
2101 Wilson Boulevard
Suite 300
Arlington, Virginia 22201

Greetings:

The U.S. Fish and Wildlife Service has received your request to review the attached project for potential impacts to federally listed or proposed endangered and threatened species and designated critical habitat in Virginia pursuant to the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). Attached are lists of species with federal status and species of concern know to occur in the county(s) where your project is located. These lists were prepared by our office and are based on information obtained from previous surveys for rare and endangered species. Species of concern are those that have been identified as potentially imperiled or vulnerable throughout their range or a portion of their range. While these species are not legally protected under the Endangered Species Act, the Service provides this information for consideration in your environmental review process and to encourage efforts to avoid adverse impacts to these species. Protection of these species now may preclude them from becoming candidates for federal listing in the future.

Due to the limited staff in this office, we have had increasing difficulty in reviewing projects in a timely manner. Therefore, we request that you send the attached project to the following state agencies for review:

Plant Protection
Virginia Department of Agriculture & Consumer Services
P.O. Box 1163
Richmond, VA 23209
(804) 786-3515

Virginia Department of Game and Inland Fisheries
Environmental Services Section
P.O. Box 11104
Richmond, VA 23230
(804) 367-1000

Virginia Department of Conservation and Recreation
Division of Natural Heritage
1500 East Main Street, Suite 312
Richmond, VA 23219
(804) 786-7951

It is recommended that all of the agencies named above review the project because each maintains a different database and has differing expertise and/or regulatory responsibility. If any of these agencies determines that your project may impact a federally listed or proposed species or critical habitat, please contact this office. If you have any questions or need further assistance, please contact Cindy Schulz of this office at (804) 693-6694, extension 127.

Sincerely,

Karen L. Mayne

Karen L. Mayne
Supervisor
Virginia Field Office

Enclosures

TAMS

September 29, 1997

US Fish and Wildlife Service
177 Admiral Cochran Drive
Annapolis, MD 21401
Attn: John Wolflin, Field Supervisor

Dear Mr. Wolflin:

TAMS Consultants, Inc., is preparing an Environmental Impact Statement (EIS) for the for the Navy at the Patuxent River Complex. The Patuxent River Complex includes the NAS Patuxent River, OLF Webster Field Annex, and the airspace known as the Chesapeake Test Range (including three target areas.)

The EIS will analyze projected workload increases in flight and ground operations in support of Research, Development, Test and Evaluation (RDT&E) activities for naval aircraft acquisition programs and military training activities over the next five years. The location of the Patuxent River Complex and its components are shown on the attached maps.

The purpose of this letter is to initiate coordination with your office and to identify whether or not threatened or endangered species are known to occur within the impact area. I am requesting information on the occurrence and distribution of any known rare, threatened or endangered species, or candidates for such status, that may occur within the affected area. It would also be helpful if you could provide information on the locations of any other sensitive resources, such as waterfowl staging areas, colonial waterbird rookeries, submerged aquatic vegetation beds, oyster bars, etc.

The proposed increased RDT&E and training activities would be generally similar to activities that have been ongoing at the Complex for the past 50 years. These exercises largely involve aircraft flights within restricted airspaces, over land and water in the mid-Chesapeake Bay area . Some exercises also involve the release of inert (nonexplosive) or practice bombs, over Hooper, Hannibal, and occasionally the Tangier Island targets. Also, both flight-related and nonflight-related ground operations occur at NAS Patuxent River and OLF Webster Field Annex.

TAMS Consultants, Inc.
2101 Wilson Boulevard Suite 300 Arlington, VA 22201
(703) 243-8000 Fax (703) 875-8360

LANCASTER COUNTY, VIRGINIA
Species of Concern

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK
PLANTS		
Cypripedium kentuckiense	Kentucky lady's slipper	
Polygonum glaucum	Sea-beach knotweed	G3

Last Updated: July 7, 1997
Prepared by U.S. Fish and Wildlife Service, Virginia Field Office

LANCASTER COUNTY, VIRGINIA
Federally Listed, Proposed, and Candidate Species

SCIENTIFIC NAME	COMMON NAME	STATUS
BIRDS		
Falco peregrinus	Peregrine falcon	LE(S/A)
Falco peregrinus anatum	American peregrine falcon	LE
Haliaeetus leucocephalus	Bald eagle	LT
INVERTEBRATES		
Cicindela dorsalis dorsalis	Northeastern beach tiger beetle	LT

Last Updated: February 14, 1997
Prepared by U.S. Fish and Wildlife Service, Virginia Field Office

NORTHUMBERLAND COUNTY, VIRGINIA
Federally Listed, Proposed, and Candidate Species

SCIENTIFIC NAME	COMMON NAME	STATUS
BIRDS		
Haliaeetus leucocephalus	Bald eagle	LT
INVERTEBRATES		
Cicindela dorsalis dorsalis	Northeastern beach tiger beetle	LT

Last Updated: February 14, 1997
Prepared by U.S. Fish and Wildlife Service, Virginia Field Office

NORTHUMBERLAND COUNTY, VIRGINIA
Species of Concern

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK
None documented		

Last Updated: February 18, 1997
Prepared by U.S. Fish and Wildlife Service, Virginia Field Office

RICHMOND COUNTY, VIRGINIA
Federally Listed, Proposed, and Candidate Species

SCIENTIFIC NAME	COMMON NAME	STATUS
BIRDS		
Haliaeetus leucocephalus	Bald Eagle	LT
PLANTS		
Aeschynomene virginica	Sensitive Joint-Vetch	LT

Last Updated: February 14, 1997
Prepared by U.S. Fish and Wildlife Service, Virginia Field Office

RICHMOND COUNTY, VIRGINIA
Species of Concern

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK
VASCULAR PLANTS		
Chamaecrista fasciculata var. macrosperma	Marsh senna	G5T2

Last Updated: February 18, 1997
Prepared by U.S. Fish and Wildlife Service, Virginia Field Office

WESTMORELAND COUNTY, VIRGINIA
Federally Listed, Proposed, and Candidate Species

SCIENTIFIC NAME	COMMON NAME	STATUS
BIRDS		
Haliaeetus leucocephalus	Bald eagle	LT
PLANTS		
Aeschynomene virginica	Sensitive joint-vetch	LT

Last Updated: June 10, 1997
Prepared by U.S. Fish and Wildlife Service, Virginia Field Office

WESTMORELAND COUNTY, VIRGINIA
Species of Concern

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK
None documented		

Last Updated: February 24, 1997
Prepared by U.S. Fish and Wildlife Service, Virginia Field Office

KEY

LE - listed endangered.

LT - listed threatened.

PE - proposed endangered.

PT - proposed threatened.

EX - believed to be extirpated in Virginia.

E(S/A) - endangered due to similarity of appearance to a federally listed species.

C - CANDIDATE. The service has enough information to list the species as threatened or endangered, but this action is precluded by other listing activities.

SPECIES OF CONCERN - those species that have been identified as potentially imperiled or vulnerable throughout their range or a portion of their range.

GLOBAL RANK - the species rarity throughout its total range.

G1 - extremely rare and critically imperiled with 5 or fewer occurrences or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.

G2 - very rare and imperiled with 6 to 20 occurrences or few remaining individuals; or because of some factor(s) making it vulnerable to extinction.

G3 - either very rare and local throughout its range or found locally (abundantly at some of its locations) in a restricted range; or vulnerable to extinction because of other factors. Usually fewer than 100 occurrences are documented.

G_T_ - signifies the rank of a subspecies or variety. For example, a G5T1 would apply to a subspecies of a species that is demonstrably secure globally (G5) but the subspecies warrants a rank of T1, critically imperiled.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401

RECEIVED
OCT 24 1997
TAMS CONSULTANTS, INC.
ARLINGTON, VA

October 20, 1997

Ms. Janet C. O'Neill
TAMS Consultants, Inc.
2101 Wilson Boulevard, Suite 300
Arlington, VA 22201

RE: Endangered and Threatened Species at the Patuxent River Naval Complex and Chesapeake Test Range Airspace Maryland & Delaware

Dear Ms. O'Neill:

This responds to your September 29, 1997, request for information on the presence of species which are Federally listed or proposed for listing as endangered or threatened in the above referenced project area. We have reviewed the information you enclosed and are providing comments in accordance with Section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

The following Federally listed species are located within the footprint of the Chesapeake Test Range (as shown on the map provided):

Bald eagle *(Haliaeetus leucocephalis)*
Delmarva fox squirrel *(Sciurus niger cinereus)*
Northeastern beach tiger beetle *(Cicindela dorsalis dorsalis)*
Peregrine falcon *(Falco peregrinus anatum)*
Puritan tiger beetle *(Cicindela puritana)*
Sensitive joint-vetch *(Aeschynomene virginica)*
Swamp pink *(Helonias bullata)*

A map showing the general locations of these sprecies in Maryland and Delaware is enclosed. Please note that comments provided are limited to federally threatened and endangered species located within the states of Maryland and Delaware. For evaluation on the occurrence of Federally protected species located within the state of Virginia, a copy of your request has been forwarded to our Virginia Field Office.

This response relates only to Federally protected threatened or endangered species under our jurisdiction. For information on other rare species in the state of Maryland, you should contact Ms. Lori Byrne of the Maryland Heritage and Biodiversity Conservation Program at

(410) 260-8570. For information on rare species within the state of Delaware, Ms. Cherie Wilson of the Delaware Natural Heritage Program should be contacted at (302) 653-2880.

An additional concern of the Service is wetlands protection. Federal and state partners of the Chesapeake Bay Program have adopted an interim goal of no overall net loss of the Basin's remaining wetlands, and the long term goal of increasing the quality and quantity of the Basin's wetlands resource base. Because of this policy and the functions and values wetlands perform, the Service recommends avoiding wetland impacts. All wetlands within the project area should be identified, and if construction in wetlands is proposed, the U.S. Army Corps of Engineers, Baltimore District, should be contacted for permit requirements. They can be reached at (410) 962-3670.

We appreciate the opportunity to provide information relative to fish and wildlife issues, and thank you for your interest in these resources. If you have any questions or need further assistance, please contact Andy Moser at (410) 573-4537.

Sincerely,

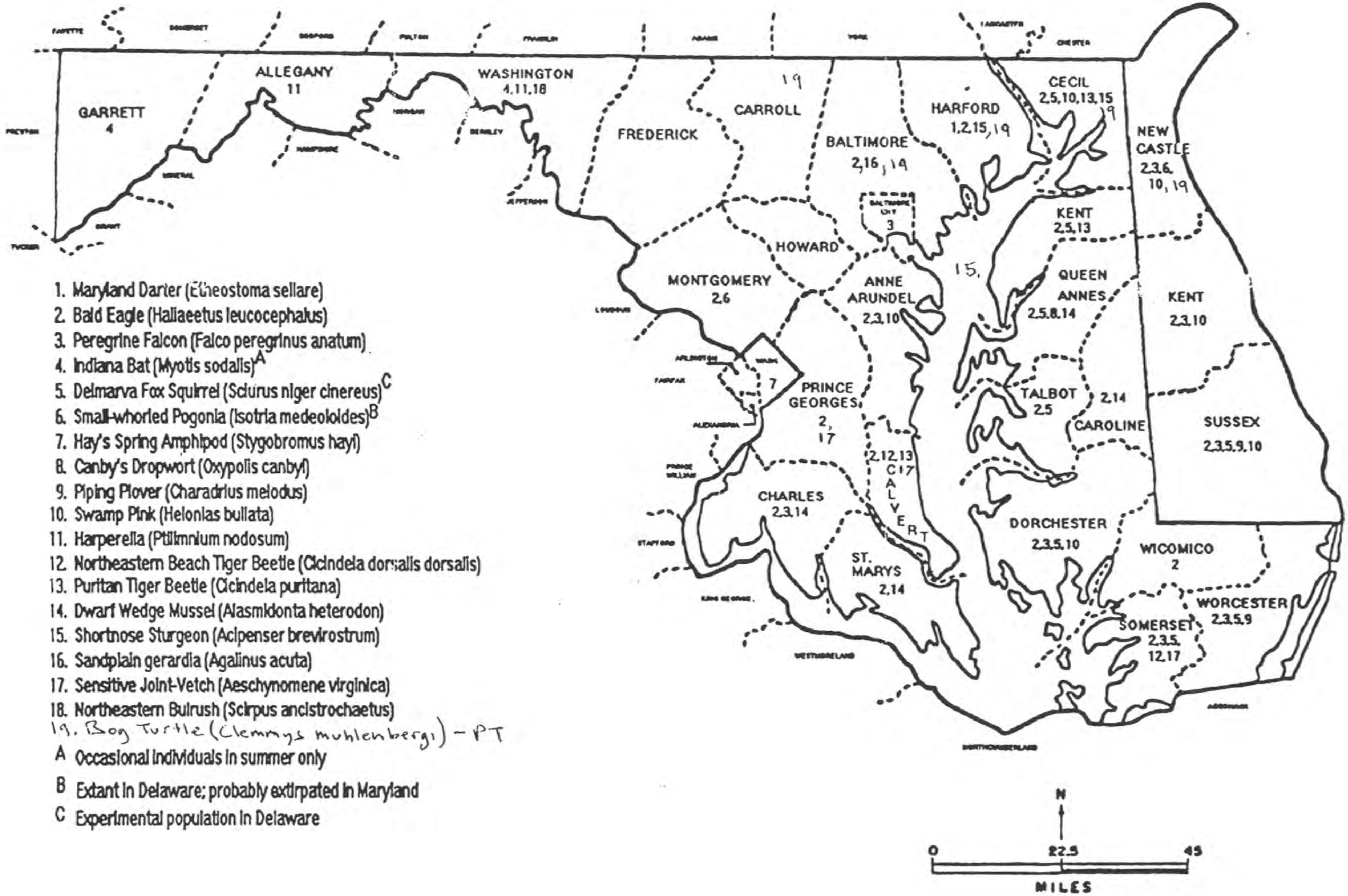
for

John P. Wolflin
Supervisor
Chesapeake Bay Field Office

Enclosure

COUNTY OCCURRENCES OF ENDANGERED AND THREATENED SPECIES IN MARYLAND, DELAWARE, AND THE DISTRICT OF COLUMBIA

DECEMBER 1994



1. Maryland Darter (Etheostoma sellare)
2. Bald Eagle (Haliaeetus leucocephalus)
3. Peregrine Falcon (Falco peregrinus anatum)
4. Indiana Bat (Myotis sodalis)[A]
5. Delmarva Fox Squirrel (Sciurus niger cinereus)[C]
6. Small-whorled Pogonia (Isotria medeoloides)[B]
7. Hay's Spring Amphipod (Stygobromus hayi)
8. Canby's Dropwort (Oxypolis canbyi)
9. Piping Plover (Charadrius melodus)
10. Swamp Pink (Helonias bullata)
11. Harperella (Ptilimnium nodosum)
12. Northeastern Beach Tiger Beetle (Cicindela dorsalis dorsalis)
13. Puritan Tiger Beetle (Cicindela puritana)
14. Dwarf Wedge Mussel (Alasmidonta heterodon)
15. Shortnose Sturgeon (Acipenser brevirostrum)
16. Sandplain gerardia (Agalinus acuta)
17. Sensitive Joint-Vetch (Aeschynomene virginica)
18. Northeastern Bulrush (Scirpus ancistrochaetus)
19. Bog Turtle (Clemmys muhlenbergi) – PT

A Occasional individuals in summer only

B Extant in Delaware; probably extirpated in Maryland

C Experimental population in Delaware

COMMONWEALTH of VIRGINIA

Reply To:
4010 West Broad Street
P.O. Box 11104
Richmond, VA 23230-1104

Department of Game and Inland Fisheries

William L. Woodfin, Jr.
Director

January 20, 1998

Ms. Janet O'Neill
TAMS Consultants, Inc.
2101 Wilson Boulevard
Suite 300
Arlington, VA 22201

RECEIVED
JAN 2 2 1998
TAMS CONSULTANTS, INC.
ARLINGTON, VA

REF: ESS LOG# 10534

Dear Ms. O'Neill:

This letter is in response to your September 29, 1997 letter regrading threatened and endangered species in the vicinity of the Patuxent River Complex and vicinity in Lancaster, Northumberland, Richmond, and Westmoreland Counties, Virginia

Information about fish and wildlife species was generated from our agency's computerized Fish and Wildlife Information System, which describes animals that are known or may occur in a particular geographic area. Field surveys may be necessary to determine the presence or absence of some of these species on or near the proposed area. Also, additional sensitive animal species may be present, but their presence has not been documented in our information system.

The federally endangered peregrine falcon (*Falco peregrinus*), federally threatened bald eagle (*Haliaeetus leucocephalus*), and the federally threatened northeastern beach tiger beetle (*Cicindela dorsalis*) have been documented nesting in the designated area. The federally endangered Kemp's Ridley sea turtle (*Lepidochelys kempii*), Atlantic green sea turtle (*Chelonia mydas*) and the loggerhead sea turtle (*Caretta caretta*) may also occur in the area. A listing of federal and state species of concern that may occur in the area is enclosed.

The Chesapeake Bay supports a large population of migratory waterfowl during the winter months. Waterfowl species can be found up and down the tributaries to the bay as well as the bay proper. Concentration area tend to fluctuate with changes in the weather. Colonial waterbird rookeries are also found in this area supporting the following species: great blue heron, herring gull, Forster tern, black-crowned night-heron, greater black-backed gull, common tern. These colonies are found on the Ewell, Great Fox Island, Lancaster and Lively USGS quadrangles.

Endangered plants and insects are under the jurisdiction of the Virginia Department of Agriculture and Consumer Services, Bureau of Plant Protection. Questions concerning sensitive plant and insect species which may be found at the project site should be directed to John Tate at (804) 786-3515.

There is a processing charge of $38.50 for our response. Please remit a check, made payable to **TREASURER OF VIRGINIA**, within 30 days to Marshall Brooks at the address listed on the first page. Include a copy of this letter or the enclosed invoice with your payment to ensure that your account is properly credited.

This letter summarizes the likelihood of the occurrence of endangered or threatened animal species at the project site. If you have additional questions in this regard, please contact me. Please note that this response does not address any other environmental concerns. These issues are analyzed by our Environmental Services Section, in conjunction with interagency review of applications for state and federal permits. If you have any questions in this regard, please contact Ray Fernald at (804) 367-8999.

The Wildlife Information Online Service (Service) is now available for access via modem and includes many query and reporting features such as those used to generate the information in this letter. The Service has numerous features that enhance the user's session, including current and comprehensive information about all of Virginia's fish and wildlife resources. Queries and reports can be completed for trout streams, anadromous fish, colonial birds, waterfowl, and species listed as threatened, endangered, candidate, or of special concern, as well as all wildlife. General locations of listed plant species are also provided through an arrangement with the Virginia Department of Agriculture and Consumer Services. System documentation and online help are also available. For more information, or to schedule a demonstration of the Service, please contact Kathy Quindlen, Online Service Coordinator, at (804) 367-9717.

Thank you for your interest in the wildlife resources of Virginia.

Sincerely,

Lisa P Sausville

Lisa P. Sausville
FWIS Wildlife Analyst

cc: R.T. Fernald

(Quadrangles search: Burgess, Ewell, Great Fox Island, Heathsville,
Kinsale, Lancaster, Lively, Lottsburg, Reedville, St. George Island)
<AND> (Designated species by status rank by common name)
Selection of 35 on 20 JAN 1998

Code..	ST	Common Name..................	Scientific Name................
030074	FE	Turtle, Kemp's Ridley sea	Lepidochelys kempii
040096	FE	Falcon, peregrine	Falco peregrinus
030072	FT	Turtle, Atlantic green sea	Chelonia mydas mydas
030071	FT	Turtle, loggerhead sea	Caretta caretta caretta
040093	FT	Eagle, bald	Haliaeetus leucocephalus leucoc
080085	FT	Beetle, northeastern beach tig	Cicindela dorsalis dorsalis
040129	ST	Sandpiper, upland	Bartramia longicauda
010032	SS	Sturgeon, Atlantic	Acipenser oxyrhynchus
030067	FS	Terrapin, northern diamondback	Malaclemys terrapin terrapin
040364	SS	Dickcissel	Spiza americana
040032	SS	Egret, great	Ardea alba egretta
040366	SS	Finch, purple	Carpodacus purpureus
040094	SS	Harrier, northern	Circus cyaneus
040029	SS	Heron, little blue	Egretta caerulea caerulea
040034	SS	Heron, tricolored	Egretta tricolor
040040	SS	Ibis, glossy	Plegadis falcinellus
040285	SS	Kinglet, golden-crowned	Regulus satrapa
040112	SS	Moorhen, common	Gallinula chloropus cachinnans
040036	SS	Night-heron, yellow-crowned	Nyctanassa violacea violacea
040262	SS	Nuthatch, red-breasted	Sitta canadensis
040204	SS	Owl, barn	Tyto alba pratincola
040020	SS	Pelican, brown	Pelecanus occidentalis caroline
040110	FS	Rail, black	Laterallus jamaicensis
040381	SS	Sparrow, saltmarsh sharp-taile	Ammodramus caudacutus diversus
040189	SS	Tern, Caspian	Sterna caspia
040180	SS	Tern, Forster's	Sterna forsteri
040186	SS	Tern, least	Sterna antillarum
040188	SS	Tern, sandwich	Sterna sandvicensis acuflavidus
040278	SS	Thrush, hermit	Catharus guttatus
040320	FS	Warbler, cerulean	Dendroica cerulea
040314	SS	Warbler, magnolia	Dendroica magnolia
040270	SS	Wren, sedge	Cistothorus platensis
040266	SS	Wren, winter	Troglodytes troglodytes
050045	SS	Otter, river	Lontra canadensis lataxina
100001	FS	Butterfly, Diana fritillary	Speyeria diana

J. Carlton Courter, III
Commissioner

COMMONWEALTH *of* VIRGINIA
Department of Agriculture and Consumer Services
Division of Consumer Protection
Office of Plant & Pest Services
PO Box 1163, Richmond, Virginia 23218
Phone: 804/786-3515 • Fax: 804/371-7793 • Hearing Impaired: 800/828-1120
http://www.state.va.us/~vdacs/vdacs.htm

February 2, 1998

Ms. Janet C. O'Neill
TAMS Consultants, Inc.
2101 Wilson Boulevard, Suite 300
Arlington, VA 22201

RE: Environmental Impact for Patuxent Priver Complex

Dear Ms. O'Neill:

This letter is in response to your request for information on listed threatened or endangered plant or insect species in the vicinity of the Putuxent River Complex that includes parts of Northumberland, Lancaster, Richmond and Westmoreland Counties in Virginia. The Virginia Department of Agriculture and Consumer Services records indicate that populations of the northeast beach tiger beetle, *Cicindela dorsalis dorsalis*, have been documented on the wide sandy shores of the Chesapeake Bay. Since the increased RDT&E and Training activities only involve flights over the shores where these populations occur, no impact to this species is anticipated. The absence of data regarding other species does not necessarily mean that no listed species occur in the area, but that our files do not currently contain information to document their presence.

The Virginia Department of Agriculture and Consumer Services has jurisdiction over listed plant and insect species only. The Virginia Department of Game and Inland Fisheries has jurisdiction over all other listed threatened or endangered species. Additional information on unique geologic formations, rare or critical habitat, rare and candidate species can be obtained from the Virginia Department of Conservation and Recreation, Division of Natural Heritage.

Thank you for your interest in the endangered or threatened plant and insect species in Virginia. If you have any questions or need any additional information, please contact me.

Sincerely,

John R. Tate
Endangered Species Coordinator

DEPARTMENT OF THE NAVY
NAVAL AIR STATION
PATUXENT RIVER, MARYLAND 20670-5409

5090
Ser 83/270
FEB 10 1999

Ms. Jo Ellen Freese
Office of Preservation Services
Division of Historical and Cultural Programs
Maryland Department of Housing and Community Development
100 Community Place
Crownsville, MD 21032-2032

Dear Ms. Freese:

This letter requests your concurrence with our determination of "No Adverse Effect" on historic properties for a proposed undertaking. The Naval Air Warfare Center, Aircraft Division (NAWCAD) at the Patuxent River Complex, St. Mary's County, Maryland is preparing an Environmental Impact Statement (EIS) to evaluate the potential effects of increasing flight and related ground operations in test areas it controls and schedules (hereinafter referred to as the proposed action). As shown in enclosure (1), the Patuxent River Complex includes all the flight and ground test facilities at Naval Air Station (NAS) Patuxent River and Out Lying Field (OLF) Webster Field Annex, as well as the Chesapeake Test Range. The infrastructure of the complex including potentially National Register eligible historic properties located on NAS Patuxent River and OLF Webster Field is used to support NAWCAD's role as the Navy's primary research, development, test, and evaluation (RDT&E), engineering, and fleet support activity for naval aircraft, engines, avionics, and aircraft support systems. The Chesapeake Test Range is a defined air space used for military training and flight operations.

The draft Environmental Impact Statement (DEIS) assesses the impacts of the "No Action Alternative" and three proposed future operations workload alternatives. The No Action Alternative would maintain the complex's current level of flight hours into the future (18,400 annually, which represents an approximate ten-year average of annual flight hours). The three workload alternatives propose increases in baseline operations by as few as 2,500 annual flight hours to as many as 6,200 annual flight hours.

The proposed action, as outlined in the three alternatives, does not require any renovations, physical alterations to any structures, or changes in building function or purpose at NAS Patuxent River or Webster Field. Rather, existing structures will be used for the same designed historic function to the maximum extent possible by utilizing Station personnel over longer workdays/workweeks. General building categories that would be affected by these longer hours would include aircraft hangars, airfield and related airport operations facilities, laboratories, maintenance facilities, and fueling facilities. The proposed increase in future operations would be less intensive than those that occurred in the 1970's during the historic high point of the Patuxent River Complex operations.

Implementation of the proposed action (as delineated in the DEIS for the Patuxent River Complex) would maintain the existing uses of the historic structures at NAS Patuxent River and Webster Field. No foreseen new construction, alteration, renovation or change in building function would be undertaken to accommodate this proposed action. Since the proposed action will not involve new construction, significant archeological resources will not be impacted. Further, the DEIS will stipulate that Section 106 consultations as required under the National Historical Preservation Act (NHPA) would be undertaken by the Navy should implementation of the proposed action lead to any unscheduled new construction, alteration, or renovation at either NAS Patuxent River or Webster Field.

NAS Patuxent River has determined that the proposed action is an "undertaking" as defined in 36 CFR 800.2(o) of the Advisory Council's regulations "Protection of Historic Property," implementing, Section 106, as amended. NAS Patuxent River has evaluated the area of potential effect of the proposed undertaking (Patuxent River Complex, including NAS Patuxent River, Webster Field, and the Chesapeake Test Range).

assessed the effect (36 CFR 800.5[a]), applied the Criteria of Effect (36 CFR 800.9[a]) to the affected resources, and determined that there is "No Adverse Effect" on historic properties.

We request concurrence with this determination of "No Adverse Effect" on historic properties. While 36 CFR 800.5(b) stipulates a 15-day period for objection to an agency determination of "No Adverse Effect," we will consider comments received within 30 days since we have not previously consulted with you on this undertaking. Unless comments are received within 30 days, we will take no further steps in the Section 106 process and will proceed with the EIS.

If you have any questions, please contact Doug Lister at (301) 342-5456/3670. If you concur with the NAS Patuxent River's determination of "No Adverse Effect," please sign enclosure (2) and return this letter to our office.

Sincerely,

R. A. Kecht

R. A. KECHTER
Captain, Civil Engineer Corps, U.S. Navy
Public Works Officer
By direction of
the Commanding Officer

Enclosure:
(1) Map of Patuxent River Complex
(2) Concurrence with the Navy's determination of "No Adverse Effect" on historic properties form

Copy to:
Richard Gallant
Marianne Graham

Subj: PROPOSED UNDERTAKING IN THE PATUXENT RIVER COMPLEX, - MARYLAND FOR INCREASING FLIGHT AND RELATED OPERATIONS

I CONCUR WITH THE NAVY'S DETERMINATION OF "NO EFFECT" ON HISTORIC PROPERTIES WITH THE IMPLEMENTATION OF THE PROPOSED INCREASE IN OPERATIONS AT NAS PATUXENT RIVER AND WEBSTER FIELD AS DEFINED IN THE DEIS. THIS COMPLETES THE NAVY'S OBLIGATION TO CONSULT WITH THE MARYLAND STATE HISTORIC PRESERVATION OFFICER UNDER SECTION 106 OF THE NHPA.

J. Rodney Little J. Cole

MARYLAND STATE HISTORIC PRESERVATION OFFICER

4/3/98

DATE

PLEASE NOTE EXCEPTIONS, IF ANY TO THIS DETERMINATION.

EXCEPTIONS:______________________________

Encl (2)

APPENDIX C

BASIS FOR ALTERNATIVE FLIGHT OPERATIONS LEVELS IN THE PATUXENT RIVER COMPLEX

APPENDIX C

BASIS FOR ALTERNATIVE FLIGHT OPERATIONS LEVELS IN THE PATUXENT RIVER COMPLEX

Prepared by Eagan, McAllister and Associates, Inc. January 1998

The Naval Air Warfare Center, Aircraft Division (NAWCAD) has undertaken the preparation of a *Final Environmental Impact Statement (FEIS) for Increased Flight and Related Operations in the Patuxent River Complex*. In addition to the No Action Alternative, this FEIS will analyze the impacts of three different workload levels of flight operations at the complex. The No Action Alternative represents a continuation of current (Fiscal Year 1996) levels of flight operations with an updated mix of aircraft and airfield procedures implemented since 1996.

In October 1997, ATAC Corporation of Sunnyvale, California published the results of a study of airfield and airspace use in the Patuxent River Complex using the Naval Aviation Simulation Model (NASMOD). This study (hereinafter NASMOD Study) focused on the airfields at NAS Patuxent River and OLF Webster Field, as well as on operations in the Chesapeake Test Range (CTR). Consequently, the NASMOD study was reviewed to determine the feasibility of its use in formulating the alternatives to be addressed by the FEIS. Specifically, this review found that:

- Current annual flight hours for the Patuxent River Complex were roughly at the same levels as shown for the NASMOD's "baseline" scenario although the mix of aircraft types and flight operations had marginally changed since Fiscal Year (FY) 1996; and

- NASMOD Scenario 3, based on a workload analysis survey of the Patuxent River Complex, was considered the most accurate assessment of future operations available and modeled a level of annual flight hours analogous to that proposed for the FEIS "Workload III Alternative."

After consultation with NAVFACENGCOM and ATAC Corporation (meeting on 10 December 1997), a decision was reached to use the NASMOD study as the source document from which to model Patuxent River Complex future flight operations. The following assumptions were used in formulating the FEIS Workload Alternatives:

- The "Baseline" data documented in the NASMOD Study accurately represented the FY96 Existing Conditions for flight operations at the Patuxent River Complex as depicted in the FEIS.

- The "No Action Alternative" represented the same number of annual flight hours as documented for FY96 Existing Conditions. The mix of aircraft was modified to reflect current (FY98) conditions. This included a lower sorties/operations per flight hour due to procedural changes in how test programs (especially the F/A-18) are now flown at the Patuxent River Complex (significantly fewer touch-and-go's, low approach, and pattern operations).

C The NASMOD Scenario 3 data were deemed to accurately represent the FEIS Workload III Alternative conditions.

C Certain on-going, high-priority test programs/activities (such as the F/A-18E/F, V-22B, Unmanned Aerial Vehicle (UAV), and Test Pilot School), were considered to be fully underway throughout all the alternatives, and as such were kept at the same level of operations under the No Action and all three Workload Alternatives.

C Approximately 2,500 additional annual flight hours of those aircraft types considered to be components of military training operations were added to each Workload Alternative except the No Action Alternative.

C Annual flight hours for normal priority RDT&E aircraft types/programs remained constant between the No Action and the Workload I Alternatives.

C For the Workload II Alternative, normal priority RDT&E aircraft type/program annual flight hours were increased by 1,850 annual flight hours above the Workload I Alternative.

C For the Workload III Alternative, normal priority RDT&E aircraft type/program annual flight hours were increased further by another 1,850 annual flight hours above those identified for the Workload II Alternative.

In summary, the formulated FEIS Workload Alternatives are depicted in the following table:

Alternative	Projected Annual Flight Hours		
	RDT&E Activities	Military Training Activities	Total
No Action	Baseline[1]	Baseline[1]	18,207
Workload I Alternative	Baseline[1]	Baseline[1]+2,500	20,709
Workload II Alternative	Baseline[1]+1,850	Baseline[1]+2,500	22,564
Workload III Alternative	Baseline[1]+3,700	Baseline[1]+2,500	24,404

Notes:
1. Adjusted NASMOD Study Baseline.

ANNUAL AIRCRAFT FLIGHT HOURS AND PATTERN HOURS AT NAS PATUXENT RIVER

Aircraft	FY96 Exist. Cnd.		No Action		Alternative I		Alternative II		Alternative III	
	Total Hours	Pattern Hours	Total Hours	Pattern Hours	Total Hours	Pattern Hours	Total Hours	Pattern Hours	Total Hours	Pattern Hours
A-10A	703	72	581	51	1381	115	1381	115	1381	115
A-6E	102	29	0	0	0	0	0	0	0	0
Beech C99	110	87	744	114	744	114	879	135	1015	156
C-5A	0	0	0	0	6	6	6	6	6	6
UC-12B	191	161	148	119	148	119	176	141	203	163
C-130	457	37	1028	159	1028	159	1216	188	1404	217
C-135	0	0	0	0	11	11	11	11	11	11
Cessna 185	35	4	34	4	34	4	34	4	34	4
E-2C/C-2A	315	117	230	85	230	85	272	101	313	116
E-6	40	40	29	29	29	29	35	35	40	40
EA-6B	204	66	179	52	179	52	211	62	244	71
F-111A	26	2	20	2	20	2	24	2	27	2
F-14	605	139	370	80	470	102	553	120	640	139
F-15	0	0	0	0	146	14	146	14	146	14
F-16	308	29	299	25	1280	108	1280	108	1280	108
F/A-18A/B/C/D	2756	755	1646	241	1966	288	2326	341	2685	394
F/A-18E	0	0	989	130	989	130	989	130	989	130
F/A-18F	0	0	397	65	397	65	397	65	397	65
Lear 24	536	59	450	43	450	43	534	51	616	59
NU-1B	137	30	139	30	139	30	139	30	139	30
P-3	1369	300	1083	239	1083	239	1282	284	1479	327
S-3	343	157	221	87	274	108	325	128	374	148
T-2C	1116	247	1110	239	1110	239	1110	239	1110	239
T-33	81	21	92	22	92	22	92	22	92	22
T-34	380	103	278	76	278	76	330	90	380	104
T-38A	913	273	916	272	916	272	916	272	916	272
T-39D	43	4	42	4	42	4	42	4	42	4
T-45	182	55	0	0	0	0	0	0	0	0
TC-4C	73	9	72	9	72	9	72	9	72	9
TF-51D	52	15	52	15	52	15	52	15	52	15
U-21F	323	142	324	147	324	147	324	147	324	147
U-6A	357	55	354	55	354	55	354	55	354	55
X-26A	141	12	138	12	138	12	138	12	138	12
H-1	521	110	388	85	419	92	496	109	571	126
SH-2	137	28	102	17	102	17	120	20	138	23
H-3	298	40	224	34	224	34	267	41	307	47
CH-46E	178	35	138	26	138	26	160	30	184	35
H-53	185	41	141	32	141	32	165	38	189	44
TH-57C	244	79	184	56	184	56	219	67	252	77
OH-58	761	57	761	57	761	57	761	57	761	57
TH-6B	957	101	970	97	970	97	970	97	970	97
H-60	2645	505	1946	375	1946	375	2303	443	2658	512
AH-64	0	0	0	0	54	25	54	25	54	25
UV-18A	51	5	50	5	50	5	50	5	50	5
UH-3	106	39	80	29	80	29	95	35	109	40
V-22	141	18	673	53	673	53	673	53	673	53
UAV	98	0	585	0	585	0	585	0	585	0
Total	18220	4078	18207	3272	20709	3572	22564	3956	24404	4335

ANNUAL FIXED-WING AND ROTARY WING FLIGHT TRACK OPERATIONS (based on Tables A-9 through A-16)

		FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
Aircraft Category	Operation Type	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*
A-10A	Other Instrument Departure (Inc. W72)	268	0	268		249	0	249		562	0	562		562	0	562		562	0	562	
	Straight-In Arrival	268	0	268		249	0	249		562	0	562		562	0	562		562	0	562	
	GCA Box	536	0	536		498	0	498		1124	0	1124		1124	0	1124		1124	0	1124	
	Total	**1072**	**0**	**1072**	***72***	**996**	**0**	**996**	***51***	**2248**	**0**	**2248**	***115***	**2248**	**0**	**2248**	***115***	**2248**	**0**	**2248**	***115***
A-6E	Departure to CTR	73	0	73		0	0	0		0	0	0		0	0	0		0	0	0	
	Departure to Warning Area (W108/W386)	12	0	12		0	0	0		0	0	0		0	0	0		0	0	0	
	Other Instrument Departure (Inc. W72)	1	0	1		0	0	0		0	0	0		0	0	0		0	0	0	
	Straight-In Arrival	23	0	23		0	0	0		0	0	0		0	0	0		0	0	0	
	Overhead Arrival	63	0	63		0	0	0		0	0	0		0	0	0		0	0	0	
	Catapult Launch/Recovery	0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
	Visual Touch-and-Go/Low Approach	482	0	482		0	0	0		0	0	0		0	0	0		0	0	0	
	GCA Box	80	0	80		0	0	0		0	0	0		0	0	0		0	0	0	
	Total	**734**	**0**	**734**	***29***	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***
Beech C99	Departure to CTR	0	0	0		304	7	311		304	7	311		358	8	366		411	9	420	
	Other Instrument Departure (Inc. W72)	592	0	592		438	0	438		438	0	438		515	0	515		592	0	592	
	Straight-In Arrival	592	0	592		488	0	488		488	0	488		574	0	574		660	0	660	
	Downwind Arrival	0	0	0		240	21	261		240	21	261		282	24	306		324	28	352	
	Total	**1184**	**0**	**1184**	***87***	**1470**	**28**	**1498**	***114***	**1470**	**28**	**1498**	***114***	**1729**	**32**	**1761**	***135***	**1987**	**37**	**2024**	***156***
C-5A	Other Instrument Departure (Inc. W72)	0	0	0		0	0	0		48	0	48		48	0	48		48	0	48	
	Straight-In Arrival	0	0	0		0	0	0		48	0	48		48	0	48		48	0	48	
	Total	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***	**96**	**0**	**96**	***6***	**96**	**0**	**96**	***6***	**96**	**0**	**96**	***6***
UC-12B	Departure to CTR	30	2	32		31	1	32		31	1	32		37	2	39		42	2	44	
	Other Instrument Departure (Inc. W72)	372	5	377		267	3	270		267	3	270		314	3	317		361	4	365	
	Straight-In Arrival	260	21	281		192	9	201		192	9	201		226	10	236		260	12	272	
	Overhead Arrival	120	8	128		95	6	101		95	6	101		112	7	119		129	8	137	
	Visual Touch-and-Go/Low Approach	2594	166	2760		1963	144	2107		1963	144	2107		2310	170	2480		2655	195	2850	
	GCA Box	112	2	114		67	4	71		67	4	71		78	5	83		90	6	96	
	Total	**3488**	**204**	**3692**	***161***	**2615**	**167**	**2782**	***119***	**2615**	**167**	**2782**	***119***	**3077**	**197**	**3274**	***141***	**3537**	**227**	**3764**	***163***
C-130	Departure to CTR	159	6	165		314	1	315		314	1	315		370	2	372		425	2	427	
	Departure to Warning Area (W108/W386)	21	0	21		13	1	14		13	1	14		15	1	16		17	1	18	
	Other Instrument Departure (Inc. W72)	13	0	13		339	0	339		339	0	339		398	0	398		458	0	458	
	Straight-In Arrival	160	10	170		639	12	651		639	12	651		752	14	766		864	16	880	
	Overhead Arrival	23	6	29		13	4	17		13	4	17		15	5	20		17	6	23	
	Visual Touch-and-Go/Low Approach	196	60	256		115	49	164		115	49	164		136	57	193		156	66	222	
	GCA Box	40	8	48		18	3	21		18	3	21		21	3	24		24	4	28	
	Total	**612**	**90**	**702**	***37***	**1451**	**70**	**1521**	***159***	**1451**	**70**	**1521**	***159***	**1707**	**82**	**1789**	***188***	**1961**	**95**	**2056**	***217***
C-135	Other Instrument Departure (Inc. W72)	0	0	0		0	0	0		180	0	180		180	0	180		180	0	180	
	Straight-In Arrival	0	0	0		0	0	0		180	0	180		180	0	180		180	0	180	
	Total	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***	**360**	**0**	**360**	***11***	**360**	**0**	**360**	***11***	**360**	**0**	**360**	***11***
Cessna 185	Departure to CTR	21	0	21		21	0	21		21	0	21		21	0	21		21	0	21	
	Downwind Arrival	21	0	21		21	0	21		21	0	21		21	0	21		21	0	21	
	Total	**42**	**0**	**42**	***4***	**42**	**0**	**42**	***4***	**42**	**0**	**42**	***4***	**42**	**0**	**42**	***4***	**42**	**0**	**42**	***4***
E-2C/C-2A	Departure to CTR	122	0	122		87	0	87		87	0	87		102	0	102		117	0	117	
	Departure to Warning Area (W108/W386)	14	0	14		13	0	13		13	0	13		15	0	15		17	0	17	
	Other Instrument Departure (Inc. W72)	122	1	123		91	1	92		91	1	92		107	2	109		123	2	125	
	Straight-In Arrival	116	2	118		95	0	95		95	0	95		111	0	111		128	0	128	
	Overhead Arrival	139	2	141		95	2	97		95	2	97		111	3	114		128	3	131	
	Visual Touch-and-Go/Low Approach	1350	0	1350		918	22	940		918	22	940		1081	26	1107		1242	30	1272	
	GCA Box	516	6	522		408	0	408		408	0	408		480	0	480		552	0	552	
	Total	**2379**	**11**	**2390**	***117***	**1707**	**25**	**1732**	***85***	**1707**	**25**	**1732**	***85***	**2007**	**31**	**2038**	***101***	**2307**	**35**	**2342**	***116***
E-6	Departure to Warning Area (W108/W386)	350	0	350		237	0	237		237	0	237		279	0	279		321	0	321	
	Other Instrument Departure (Inc. W72)	349	0	349		280	0	280		280	0	280		329	0	329		378	0	378	
	Straight-In Arrival	685	14	699		504	13	517		504	13	517		593	15	608		682	17	699	
	Total	**1384**	**14**	**1398**	***40***	**1021**	**13**	**1034**	***29***	**1021**	**13**	**1034**	***29***	**1201**	**15**	**1216**	***35***	**1381**	**17**	**1398**	***40***
EA-6B	Departure to CTR	133	0	133		104	0	104		104	0	104		122	0	122		140	0	140	
	Departure to Warning Area (W108/W386)	34	0	34		19	0	19		19	0	19		23	0	23		26	0	26	
	Other Instrument Departure (Inc. W72)	0	0	0		16	1	17		16	1	17		19	2	21		22	2	24	
	Straight-In Arrival	24	1	25		31	2	33		31	2	33		37	3	40		42	3	45	
	Overhead Arrival	139	3	142		105	2	107		105	2	107		124	3	127		142	3	145	
	Catapult Launch/Recovery	468	0	468		355	0	355		355	0	355		418	0	418		480	0	480	
	Visual Touch-and-Go/Low Approach	811	21	832		601	26	627		601	26	627		707	30	737		813	35	848	
	GCA Box	100	8	108		56	1	57		56	1	57		66	2	68		76	2	78	
	Total	**1709**	**33**	**1742**	***66***	**1287**	**32**	**1319**	***52***	**1287**	**32**	**1319**	***52***	**1516**	**40**	**1556**	***62***	**1741**	**45**	**1786**	***71***
F-111A	Departure to CTR	18	0	18		13	0	13		13	0	13		16	0	16		18	0	18	
	Overhead Arrival	18	0	18		13	0	13		13	0	13		16	0	16		18	0	18	
	Total	**36**	**0**	**36**	***2***	**26**	**0**	**26**	***2***	**26**	**0**	**26**	***2***	**32**	**0**	**32**	***2***	**36**	**0**	**36**	***2***

ANNUAL FIXED-WING AND ROTARY WING FLIGHT TRACK OPERATIONS (based on Tables A-9 through A-16)

		FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
Aircraft Category	Operation Type	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*
F-14	Departure to CTR	366	0	366		208	0	208		265	0	265		311	0	311		358	0	358	
	Departure to Warning Area (W108/W386)	68	0	68		41	0	41		53	0	53		62	0	62		71	0	71	
	Other Instrument Departure (Inc. W72)	19	4	23		25	1	26		32	1	33		37	2	39		43	2	45	
	Straight-In Arrival	101	4	105		68	1	69		87	1	88		102	2	104		117	2	119	
	Overhead Arrival	351	1	352		204	2	206		260	2	262		306	3	309		352	3	355	
	Catapult Launch/Recovery	144	0	144		63	0	63		80	0	80		94	0	94		108	0	108	
	Visual Touch-and-Go/Low Approach	2651	9	2660		1499	14	1513		1911	18	1929		2248	21	2269		2584	24	2608	
	GCA Box	62	0	62		27	0	27		34	0	34		40	0	40		46	0	46	
	Total	**3762**	**18**	**3780**	***139***	**2135**	**18**	**2153**	***80***	**2722**	**22**	**2744**	***102***	**3200**	**28**	**3228**	***120***	**3679**	**31**	**3710**	***139***
F-15	Other Instrument Departure (Inc. W72)	0	0	0		0	0	0		66	0	66		66	0	66		66	0	66	
	Straight-In Arrival	0	0	0		0	0	0		66	0	66		66	0	66		66	0	66	
	GCA Box	0	0	0		0	0	0		132	0	132		132	0	132		132	0	132	
	Total	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***	**264**	**0**	**264**	***14***	**264**	**0**	**264**	***14***	**264**	**0**	**264**	***14***
F-16	Departure to CTR	10	0	10		2	0	2		10	0	10		10	0	10		10	0	10	
	Other Instrument Departure (Inc. W72)	104	0	104		120	0	120		518	0	518		518	0	518		518	0	518	
	Straight-In Arrival	105	0	105		120	0	120		519	0	519		519	0	519		519	0	519	
	Overhead Arrival	9	0	9		2	0	2		9	0	9		9	0	9		9	0	9	
	GCA Box	208	0	208		240	0	240		1036	0	1036		1036	0	1036		1036	0	1036	
	Total	**436**	**0**	**436**	***29***	**484**	**0**	**484**	***25***	**2092**	**0**	**2092**	***108***	**2092**	**0**	**2092**	***108***	**2092**	**0**	**2092**	***108***
F/A-18A-D	Departure to CTR	1846	1	1847		1035	0	1035		1236	0	1236		1455	0	1455		1672	0	1672	
	Departure to Warning Area (W108/W386)	612	0	612		323	0	323		386	0	386		454	0	454		522	0	522	
	Other Instrument Departure (Inc. W72)	43	0	43		8	0	8		10	0	10		11	0	11		13	0	13	
	Straight-In Arrival	718	26	744		277	4	281		331	4	335		390	5	395		448	6	454	
	Overhead Arrival	1678	80	1758		1060	25	1085		1267	30	1297		1490	35	1525		1713	40	1753	
	Catapult Launch/Recovery	108	0	108		15	0	15		18	0	18		21	0	21		24	0	24	
	Visual Touch-and-Go/Low Approach	11654	550	12204		2701	124	2825		3228	149	3377		3798	175	3973		4365	201	4566	
	GCA Box	1162	40	1202		300	0	300		358	0	358		421	0	421		484	0	484	
	Total	**17821**	**697**	**18518**	***755***	**5719**	**153**	**5872**	***241***	**6834**	**183**	**7017**	***288***	**8040**	**215**	**8255**	***341***	**9241**	**247**	**9488**	***394***
F/A-18E	Departure to CTR	0	0	0		493	0	493		493	0	493		493	0	493		493	0	493	
	Departure to Warning Area (W108/W386)	0	0	0		396	0	396		396	0	396		396	0	396		396	0	396	
	Straight-In Arrival	0	0	0		164	0	164		164	0	164		164	0	164		164	0	164	
	Overhead Arrival	0	0	0		725	0	725		725	0	725		725	0	725		725	0	725	
	Total	**0**	**0**	**0**	***0***	**1778**	**0**	**1778**	***130***	**1778**	**0**	**1778**	***130***	**1778**	**0**	**1778**	***130***	**1778**	**0**	**1778**	***130***
F/A-18F	Departure to CTR	0	0	0		157	0	157		157	0	157		157	0	157		157	0	157	
	Departure to Warning Area (W108/W386)	0	0	0		91	0	91		91	0	91		91	0	91		91	0	91	
	Other Visual Departure	0	0	0		414	0	414		414	0	414		414	0	414		414	0	414	
	Overhead Arrival	0	0	0		243	5	248		243	5	248		243	5	248		243	5	248	
	Downwind Arrival	0	0	0		414	0	414		414	0	414		414	0	414		414	0	414	
	Catapult Launch/Recovery	0	0	0		324	0	324		324	0	324		324	0	324		324	0	324	
	Total	**0**	**0**	**0**	***0***	**1643**	**5**	**1648**	***65***	**1643**	**5**	**1648**	***65***	**1643**	**5**	**1648**	***65***	**1643**	**5**	**1648**	***65***
Lear 24	Departure to CTR	353	0	353		260	0	260		260	0	260		306	0	306		352	0	352	
	Straight-In Arrival	82	0	82		59	0	59		59	0	59		70	0	70		80	0	80	
	Overhead Arrival	271	0	271		201	0	201		201	0	201		237	0	237		272	0	272	
	Visual Touch-and-Go/Low Approach	400	0	400		296	0	296		296	0	296		348	0	348		400	0	400	
	Total	**1106**	**0**	**1106**	***59***	**816**	**0**	**816**	***43***	**816**	**0**	**816**	***43***	**961**	**0**	**961**	***51***	**1104**	**0**	**1104**	***59***
NU-1B	Departure to CTR	72	0	72		72	0	72		72	0	72		72	0	72		72	0	72	
	Straight-In Arrival	72	0	72		71	0	71		71	0	71		71	0	71		71	0	71	
	Overhead Arrival	0	0	0		1	0	1		1	0	1		1	0	1		1	0	1	
	Visual Touch-and-Go/Low Approach	576	0	576		574	0	574		574	0	574		574	0	574		574	0	574	
	Total	**720**	**0**	**720**	***30***	**718**	**0**	**718**	***30***	**718**	**0**	**718**	***30***	**718**	**0**	**718**	***30***	**718**	**0**	**718**	***30***
P-3	Departure to CTR	722	12	734		511	11	522		511	11	522		601	13	614		691	15	706	
	Departure to Warning Area (W108/W386)	172	1	173		138	0	138		138	0	138		163	0	163		187	0	187	
	Other Instrument Departure (Inc. W72)	170	2	172		182	1	183		182	1	183		214	2	216		246	2	248	
	Straight-In Arrival	960	113	1073		754	86	840		754	86	840		887	101	988		1019	116	1135	
	Overhead Arrival	2	4	6		4	1	5		4	1	5		4	1	5		5	1	6	
	Visual Touch-and-Go/Low Approach	2608	112	2720		1782	83	1865		1782	83	1865		2097	97	2194		2410	112	2522	
	GCA Box	1210	18	1228		1001	18	1019		1001	18	1019		1178	21	1199		1354	24	1378	
	Total	**5844**	**262**	**6106**	***300***	**4372**	**200**	**4572**	***239***	**4372**	**200**	**4572**	***239***	**5144**	**235**	**5379**	***284***	**5912**	**270**	**6182**	***327***
S-3	Departure to CTR	116	3	119		70	1	71		87	1	88		102	1	103		117	1	118	
	Departure to Warning Area (W108/W386)	94	4	98		65	2	67		81	3	84		95	3	98		109	4	113	
	Other Instrument Departure (Inc. W72)	160	3	163		91	1	92		113	1	114		133	1	134		153	1	154	
	Other Visual Departure	20	0	20		0	0	0		0	0	0		0	0	0		0	0	0	
	Straight-In Arrival	114	14	128		66	10	76		82	12	94		97	14	111		111	16	127	
	Overhead Arrival	239	13	252		145	9	154		180	11	191		211	13	224		243	15	258	
	Downwind Arrival	20	0	20		0	0	0		0	0	0		0	0	0		0	0	0	
	Visual Touch-and-Go/Low Approach	2524	154	2678		1409	115	1524		1749	143	1892		2058	168	2226		2365	193	2558	
	GCA Box	196	46	242		123	8	131		152	10	162		179	12	191		206	14	220	
	Total	**3483**	**237**	**3720**	***157***	**1969**	**146**	**2115**	***87***	**2444**	**181**	**2625**	***108***	**2875**	**212**	**3087**	***128***	**3304**	**244**	**3548**	***148***

ANNUAL FIXED-WING AND ROTARY WING FLIGHT TRACK OPERATIONS (based on Tables A-9 through A-16)

Aircraft	Operation Type	FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
Category		Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*
T-2C	Departure to CTR	790	1	791		788	2	790		788	2	790		788	2	790		788	2	790	
	Departure to Warning Area (W108/W386)	1	0	1		2	0	2		2	0	2		2	0	2		2	0	2	
	Other Instrument Departure (Inc. W72)	3	0	3		3	0	3		3	0	3		3	0	3		3	0	3	
	Straight-In Arrival	109	2	111		94	1	95		94	1	95		94	1	95		94	1	95	
	Overhead Arrival	682	3	685		693	7	700		693	7	700		693	7	700		693	7	700	
	Visual Touch-and-Go/Low Approach	3547	18	3565		3644	22	3666		3644	22	3666		3644	22	3666		3644	22	3666	
	GCA Box	582	14	596		468	8	476		468	8	476		468	8	476		468	8	476	
	Total	**5714**	**38**	**5752**	***247***	**5692**	**40**	**5732**	***239***	**5692**	**40**	**5732**	***239***	**5692**	**40**	**5732**	***239***	**5692**	**40**	**5732**	***239***
T-33	Departure to CTR	61	0	61		62	0	62		62	0	62		62	0	62		62	0	62	
	Other Instrument Departure (Inc. W72)	1	0	1		0	0	0		0	0	0		0	0	0		0	0	0	
	Straight-In Arrival	50	0	50		50	0	50		50	0	50		50	0	50		50	0	50	
	Overhead Arrival	12	0	12		12	0	12		12	0	12		12	0	12		12	0	12	
	Visual Touch-and-Go/Low Approach	500	0	500		500	0	500		500	0	500		500	0	500		500	0	500	
	Total	**624**	**0**	**624**	***21***	**624**	**0**	**624**	***22***	**624**	**0**	**624**	***22***	**624**	**0**	**624**	***22***	**624**	**0**	**624**	***22***
T-34	Departure to CTR	295	0	295		220	0	220		220	0	220		258	0	258		297	0	297	
	Overhead Arrival	295	0	295		220	0	220		220	0	220		258	0	258		297	0	297	
	Visual Touch-and-Go/Low Approach	1412	0	1412		1049	0	1049		1049	0	1049		1234	0	1234		1418	0	1418	
	Total	**2002**	**0**	**2002**	***103***	**1489**	**0**	**1489**	***76***	**1489**	**0**	**1489**	***76***	**1750**	**0**	**1750**	***90***	**2012**	**0**	**2012**	***104***
T-38A	Departure to CTR	764	0	764		768	0	768		768	0	768		768	0	768		768	0	768	
	Other Instrument Departure (Inc. W72)	144	0	144		139	0	139		139	0	139		139	0	139		139	0	139	
	Straight-In Arrival	215	0	215		200	0	200		200	0	200		200	0	200		200	0	200	
	Overhead Arrival	693	0	693		707	0	707		707	0	707		707	0	707		707	0	707	
	Visual Touch-and-Go/Low Approach	3798	0	3798		3930	0	3930		3930	0	3930		3930	0	3930		3930	0	3930	
	GCA Box	726	0	726		648	0	648		648	0	648		648	0	648		648	0	648	
	Total	**6340**	**0**	**6340**	***273***	**6392**	**0**	**6392**	***272***	**6392**	**0**	**6392**	***272***	**6392**	**0**	**6392**	***272***	**6392**	**0**	**6392**	***272***
T-39D	Departure to CTR	30	0	30		30	0	30		30	0	30		30	0	30		30	0	30	
	Straight-In Arrival	18	0	18		11	0	11		11	0	11		11	0	11		11	0	11	
	Overhead Arrival	12	0	12		19	0	19		19	0	19		19	0	19		19	0	19	
	Total	**60**	**0**	**60**	***4***	**60**	**0**	**60**	***4***	**60**	**0**	**60**	***4***	**60**	**0**	**60**	***4***	**60**	**0**	**60**	***4***
T-45	Departure to CTR	180	0	180		0	0	0		0	0	0		0	0	0		0	0	0	
	Other Instrument Departure (Inc. W72)	1	0	1		0	0	0		0	0	0		0	0	0		0	0	0	
	Straight-In Arrival	38	0	38		0	0	0		0	0	0		0	0	0		0	0	0	
	Overhead Arrival	143	0	143		0	0	0		0	0	0		0	0	0		0	0	0	
	Visual Touch-and-Go/Low Approach	1010	0	1010		0	0	0		0	0	0		0	0	0		0	0	0	
	GCA Box	54	0	54		0	0	0		0	0	0		0	0	0		0	0	0	
	Total	**1426**	**0**	**1426**	***55***	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***
TC-4C	Departure to CTR	42	0	42		42	0	42		42	0	42		42	0	42		42	0	42	
	Straight-In Arrival	21	0	21		21	0	21		21	0	21		21	0	21		21	0	21	
	Overhead Arrival	21	0	21		21	0	21		21	0	21		21	0	21		21	0	21	
	Visual Touch-and-Go/Low Approach	48	0	48		66	0	66		66	0	66		66	0	66		66	0	66	
	GCA Box	18	0	18		6	0	6		6	0	6		6	0	6		6	0	6	
	Total	**150**	**0**	**150**	***9***	**156**	**0**	**156**	***9***	**156**	**0**	**156**	***9***	**156**	**0**	**156**	***9***	**156**	**0**	**156**	***9***
TF-51D	Departure to CTR	36	0	36		36	0	36		36	0	36		36	0	36		36	0	36	
	Overhead Arrival	36	0	36		36	0	36		36	0	36		36	0	36		36	0	36	
	Visual Touch-and-Go/Low Approach	216	0	216		216	0	216		216	0	216		216	0	216		216	0	216	
	Total	**288**	**0**	**288**	***15***	**288**	**0**	**288**	***15***	**288**	**0**	**288**	***15***	**288**	**0**	**288**	***15***	**288**	**0**	**288**	***15***
U-21F	Departure to CTR	133	0	133		131	0	131		131	0	131		131	0	131		131	0	131	
	Other Instrument Departure (Inc. W72)	0	0	0		1	0	1		1	0	1		1	0	1		1	0	1	
	Other Visual Departure	150	0	150		151	0	151		151	0	151		151	0	151		151	0	151	
	Straight-In Arrival	265	0	265		270	0	270		270	0	270		270	0	270		270	0	270	
	Overhead Arrival	18	0	18		13	0	13		13	0	13		13	0	13		13	0	13	
	Visual Touch-and-Go/Low Approach	1644	0	1644		1502	0	1502		1502	0	1502		1502	0	1502		1502	0	1502	
	GCA Box	426	0	426		546	0	546		546	0	546		546	0	546		546	0	546	
	Total	**2636**	**0**	**2636**	***142***	**2614**	**0**	**2614**	***147***	**2614**	**0**	**2614**	***147***	**2614**	**0**	**2614**	***147***	**2614**	**0**	**2614**	***147***
U-6A	Departure to CTR	91	0	91		90	0	90		90	0	90		90	0	90		90	0	90	
	Other Visual Departure	71	0	71		70	0	70		70	0	70		70	0	70		70	0	70	
	Straight-In Arrival	101	0	101		101	0	101		101	0	101		101	0	101		101	0	101	
	Downwind Arrival	61	0	61		59	0	59		59	0	59		59	0	59		59	0	59	
	Visual Touch-and-Go/Low Approach	808	0	808		808	0	808		808	0	808		808	0	808		808	0	808	
	Total	**1132**	**0**	**1132**	***55***	**1128**	**0**	**1128**	***55***	**1128**	**0**	**1128**	***55***	**1128**	**0**	**1128**	***55***	**1128**	**0**	**1128**	***55***

ANNUAL FIXED-WING AND ROTARY WING FLIGHT TRACK OPERATIONS (based on Tables A-9 through A-16)

Aircraft Category	Operation Type	FY96 Existing Cond. Day 0700-2200	FY96 Night 2200-0700	FY96 Total Ops	FY96 *Pattern Hours*	No Action Day 0700-2200	No Action Night 2200-0700	No Action Total Ops	No Action *Pattern Hours*	Alternative I Day 0700-2200	Alt I Night 2200-0700	Alt I Total Ops	Alt I *Pattern Hours*	Alternative II Day 0700-2200	Alt II Night 2200-0700	Alt II Total Ops	Alt II *Pattern Hours*	Alternative III Day 0700-2200	Alt III Night 2200-0700	Alt III Total Ops	Alt III *Pattern Hours*
V-22	Departure to CTR					295	8	303		295	8	303		295	8	303		295	8	303	
	Other Visual Departure					0	0	0		0	0	0		0	0	0		0	0	0	
*Data from	*Departure - Runway	102	0	102																	
Rotary Wing	Straight-In Arrival					134	0	134		134	0	134		134	0	134		134	0	134	
Section	*Overhead Arrival	6	0	6		0	0	0		0	0	0		0	0	0		0	0	0	
	Downwind Arrival					156	13	169		156	13	169		156	13	169		156	13	169	
	*Full Stop Visual Landing	96	0	96																	
	*Visual Touch-and-Go/Grass Operations	60	0	60																	
	Visual Touch-and-Go/Low Approach	0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
	Total	**264**	**0**	**264**	***18***	**585**	**21**	**606**	***53***	**585**	**21**	**606**	***53***	**585**	**21**	**606**	***53***	**585**	**21**	**606**	***53***
X-26A	Departure to CTR	61	0	61		59	0	59		59	0	59		59	0	59		59	0	59	
	Downwind Arrival	61	0	61		59	0	59		59	0	59		59	0	59		59	0	59	
	Total	**122**	**0**	**122**	***12***	**118**	**0**	**118**	***12***	**118**	**0**	**118**	***12***	**118**	**0**	**118**	***12***	**118**	**0**	**118**	***12***
H-1	Departure West	87	4	91		70	3	73		76	4	80		90	4	94		103	5	108	
	Departure Southeast	71	2	73		40	1	41		43	1	44		50	1	51		58	1	59	
	Departure Northeast	242	0	242		163	1	164		177	1	178		208	1	209		239	1	240	
	Departure - Runway	0	0	0		82	0	82		89	0	89		104	0	104		120	0	120	
	Arrival Northwest	252	18	270		176	18	194		191	20	211		224	23	247		258	27	285	
	Arrival Northeast	85	8	93		53	7	60		58	7	65		68	9	77		78	10	88	
	Arrival South	40	3	43		22	1	23		24	1	25		28	2	30		32	2	34	
	Full Stop Visual Landing	0	0	0		22	60	82		24	65	89		28	77	105		32	88	120	
	Visual Touch-and-Go/Grass Operations	1010	216	1226		696	163	859		753	176	929		886	207	1093		1018	238	1256	
	GCA Patterns	364	0	364		202	0	202		219	0	219		258	0	258		296	0	296	
	Total	**2151**	**251**	**2402**	***110***	**1526**	**254**	**1780**	***85***	**1654**	**275**	**1929**	***92***	**1944**	**324**	**2268**	***109***	**2234**	**372**	**2606**	***126***
SH-2	Departure West	16	0	16		17	0	17		17	0	17		20	0	20		23	0	23	
	Departure Southeast	20	0	20		13	0	13		13	0	13		16	0	16		18	0	18	
	Departure Northeast	69	0	69		50	0	50		50	0	50		59	0	59		68	0	68	
	Arrival Northwest	71	4	75		50	5	55		50	5	55		59	6	65		68	7	75	
	Arrival Northeast	23	1	24		13	1	14		13	1	14		16	2	18		18	2	20	
	Arrival South	6	0	6		10	0	10		10	0	10		12	0	12		14	0	14	
	Visual Touch-and-Go/Grass Operations	176	2	178		189	18	207		189	18	207		223	21	244		256	24	280	
	GCA Patterns	112	0	112		38	0	38		38	0	38		45	0	45		52	0	52	
	Total	**493**	**7**	**500**	***28***	**380**	**24**	**404**	***17***	**380**	**24**	**404**	***17***	**450**	**29**	**479**	***20***	**517**	**33**	**550**	***23***
H-3	Departure West	47	0	47		27	0	27		27	0	27		32	0	32		37	0	37	
	Departure Southeast	29	0	29		25	0	25		25	0	25		30	0	30		34	0	34	
	Departure Northeast	104	0	104		81	0	81		81	0	81		95	0	95		109	0	109	
	Arrival Northwest	125	5	130		86	5	91		86	5	91		101	6	107		116	7	123	
	Arrival Northeast	29	1	30		25	1	26		25	1	26		30	2	32		34	2	36	
	Arrival South	19	1	20		16	0	16		16	0	16		18	0	18		21	0	21	
	Visual Touch-and-Go/Grass Operations	448	22	470		317	18	335		317	18	335		372	21	393		428	24	452	
	GCA Patterns	104	0	104		124	0	124		124	0	124		146	0	146		168	0	168	
	Total	**905**	**29**	**934**	***40***	**701**	**24**	**725**	***34***	**701**	**24**	**725**	***34***	**824**	**29**	**853**	***41***	**947**	**33**	**980**	***47***
CH-46E	Departure West	27	4	31		23	1	24		23	1	24		27	2	29		31	2	33	
	Departure Southeast	23	1	24		14	3	17		14	3	17		17	3	20		19	4	23	
	Departure Northeast	93	2	95		70	0	70		70	0	70		82	0	82		94	0	94	
	Arrival Northwest	102	4	106		79	3	82		79	3	82		93	3	96		107	4	111	
	Arrival Northeast	19	7	26		13	4	17		13	4	17		16	4	20		18	5	23	
	Arrival South	15	3	18		8	4	12		8	4	12		10	4	14		11	5	16	
	Visual Touch-and-Go/Grass Operations	302	140	442		201	62	263		201	62	263		237	73	310		272	84	356	
	GCA Patterns	84	0	84		53	9	62		53	9	62		63	10	73		72	12	84	
	Total	**665**	**161**	**826**	***35***	**461**	**86**	**547**	***26***	**461**	**86**	**547**	***26***	**545**	**99**	**644**	***30***	**624**	**116**	**740**	***35***
H-53	Departure West	36	2	38		30	0	30		30	0	30		35	0	35		40	0	40	
	Departure Southeast	19	0	19		18	0	18		18	0	18		21	0	21		24	0	24	
	Departure Northeast	95	0	95		65	0	65		65	0	65		77	0	77		88	0	88	
	Arrival Northwest	100	6	106		70	1	71		70	1	71		83	2	85		95	2	97	
	Arrival Northeast	27	8	35		30	3	33		30	3	33		35	3	38		40	4	44	
	Arrival South	11	0	11		7	1	8		7	1	8		8	2	10		9	2	11	
	Visual Touch-and-Go/Grass Operations	466	154	620		451	50	501		451	50	501		531	59	590		610	68	678	
	GCA Patterns	104	4	108		106	0	106		106	0	106		125	0	125		144	0	144	
	Total	**858**	**174**	**1032**	***41***	**777**	**55**	**832**	***32***	**777**	**55**	**832**	***32***	**915**	**66**	**981**	***38***	**1050**	**76**	**1126**	***44***
TH-57C	Departure West	66	2	68		50	1	51		50	1	51		58	1	59		67	1	68	
	Departure Southeast	29	1	30		18	1	19		18	1	19		21	2	23		24	2	26	
	Departure Northeast	88	0	88		69	1	70		69	1	70		81	1	82		93	1	94	
	Arrival Northwest	89	7	96		72	5	77		72	5	77		84	6	90		97	7	104	
	Arrival Northeast	71	8	79		46	7	53		46	7	53		54	9	63		62	10	72	
	Arrival South	10	1	11		7	1	8		7	1	8		9	2	11		10	2	12	
	Visual Touch-and-Go/Grass Operations	872	116	988		602	96	698		602	96	698		708	113	821		814	130	944	
	GCA Patterns	350	6	356		209	25	234		209	25	234		245	30	275		282	34	316	
	Total	**1575**	**141**	**1716**	***79***	**1073**	**137**	**1210**	***56***	**1073**	**137**	**1210**	***56***	**1260**	**164**	**1424**	***67***	**1449**	**187**	**1636**	***77***

ANNUAL FIXED-WING AND ROTARY WING BASIC OPERATIONS

Aircraft	Operation Type	FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
Category		Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*
A-10A	Instrument Touch-and-Go/Low Approach	1072	0	1072		989	0	989		2248	0	2248		2248	0	2248		2248	0	2248	
	Total	**1072**	**0**	**1072**	***72***	**989**	**0**	**989**	***51***	**2248**	**0**	**2248**	***115***	**2248**	**0**	**2248**	***115***	**2248**	**0**	**2248**	***115***
A-6E	Departure	86	0	86		0	0	0		0	0	0		0	0	0		0	0	0	
	Full Stop Visual Landing	77	0	77		0	0	0		0	0	0		0	0	0		0	0	0	
	Full Stop Instrument Landing	9	0	9		0	0	0		0	0	0		0	0	0		0	0	0	
	Visual Touch-and-Go/Low Approach	468	0	468		0	0	0		0	0	0		0	0	0		0	0	0	
	Instrument Touch-and-Go/Low Approach	94	0	94		0	0	0		0	0	0		0	0	0		0	0	0	
	Total	**734**	**0**	**734**	***29***	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***
Beech C99	Departure	592	0	592		742	4	746		742	4	746		873	4	877		1003	5	1008	
	Full Stop Visual Landing	296	0	296		498	24	522		498	24	522		586	28	614		673	32	705	
	Full Stop Instrument Landing	296	0	296		230	0	230		230	0	230		271	0	271		311	0	311	
	Total	**1184**	**0**	**1184**	***87***	**1470**	**28**	**1498**	***114***	**1470**	**28**	**1498**	***114***	**1730**	**32**	**1762**	***135***	**1987**	**37**	**2024**	***156***
C-5A	Departure	0	0	0		0	0	0		48	0	48		48	0	48		48	0	48	
	Full Stop Instrument Landing	0	0	0		0	0	0		48	0	48		48	0	48		48	0	48	
	Total	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***	**96**	**0**	**96**	***6***	**96**	**0**	**96**	***6***	**96**	**0**	**96**	***6***
UC-12B	Departure	402	7	409		298	4	302		298	4	302		351	5	356		403	6	409	
	Full Stop Visual Landing	276	23	299		204	13	217		204	13	217		240	16	256		276	18	294	
	Full Stop Instrument Landing	102	8	110		81	4	85		81	4	85		96	4	100		110	5	115	
	Visual Touch-and-Go/Low Approach	2484	162	2646		1899	138	2037		1899	138	2037		2234	162	2396		2568	186	2754	
	Instrument Touch-and-Go/Low Approach	224	4	228		133	9	142		133	9	142		157	10	167		180	12	192	
	Total	**3488**	**204**	**3692**	***161***	**2615**	**168**	**2783**	***119***	**2615**	**168**	**2783**	***119***	**3078**	**197**	**3275**	***141***	**3537**	**227**	**3764**	***163***
C-130	Departure	193	6	199		666	2	668		666	2	668		783	3	786		900	3	903	
	Full Stop Visual Landing	165	14	179		639	13	652		639	13	652		752	15	767		864	17	881	
	Full Stop Instrument Landing	18	2	20		13	4	17		13	4	17		15	4	19		17	5	22	
	Visual Touch-and-Go/Low Approach	196	60	256		115	49	164		115	49	164		136	57	193		156	66	222	
	Instrument Touch-and-Go/Low Approach	40	8	48		18	3	21		18	3	21		21	3	24		24	4	28	
	Total	**612**	**90**	**702**	***37***	**1451**	**71**	**1522**	***159***	**1451**	**71**	**1522**	***159***	**1707**	**82**	**1789**	***188***	**1961**	**95**	**2056**	***217***
C-135	Departure	0	0	0		0	0	0		180	0	180		180	0	180		180	0	180	
	Full Stop Instrument Landing	0	0	0		0	0	0		180	0	180		180	0	180		180	0	180	
	Total	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***	**360**	**0**	**360**	***11***	**360**	**0**	**360**	***11***	**360**	**0**	**360**	***11***
Cessna 185	Departure	21	0	21		21	0	21		21	0	21		21	0	21		21	0	21	
	Full Stop Visual Landing	21	0	21		21	0	21		21	0	21		21	0	21		21	0	21	
	Total	**42**	**0**	**42**	***4***	**42**	**0**	**42**	***4***	**42**	**0**	**42**	***4***	**42**	**0**	**42**	***4***	**42**	**0**	**42**	***4***
E-2C/C-2A	Departure	258	1	259		190	1	191		190	1	191		224	2	226		257	2	259	
	Full Stop Visual Landing	163	2	165		114	2	116		114	2	116		134	3	137		154	3	157	
	Full Stop Instrument Landing	92	2	94		75	0	75		75	0	75		89	0	89		102	0	102	
	Visual Touch-and-Go/Low Approach	1340	0	1340		902	22	924		902	22	924		1061	26	1087		1220	30	1250	
	Instrument Touch-and-Go/Low Approach	526	6	532		424	0	424		424	0	424		499	0	499		574	0	574	
	Total	**2379**	**11**	**2390**	***117***	**1705**	**25**	**1730**	***85***	**1705**	**25**	**1730**	***85***	**2007**	**31**	**2038**	***101***	**2307**	**35**	**2342**	***116***
E-6	Departure	699	0	699		517	0	517		517	0	517		608	0	608		699	0	699	
	Full Stop Instrument Landing	685	14	699		504	13	517		504	13	517		593	15	608		682	17	699	
	Total	**1384**	**14**	**1398**	***40***	**1021**	**13**	**1034**	***29***	**1021**	**13**	**1034**	***29***	**1201**	**15**	**1216**	***35***	**1381**	**17**	**1398**	***40***
EA-6B	Departure	401	0	401		300	0	300		300	0	300		353	0	353		406	0	406	
	Full Stop Visual Landing	386	4	390		290	5	295		290	5	295		341	6	347		392	7	399	
	Full Stop Instrument Landing	10	1	11		5	0	5		5	0	5		6	0	6		7	0	7	
	Visual Touch-and-Go/Low Approach	788	20	808		586	22	608		586	22	608		689	26	715		792	30	822	
	Instrument Touch-and-Go/Low Approach	124	8	132		106	6	112		106	6	112		125	7	132		144	8	152	
	Total	**1709**	**33**	**1742**	***66***	**1287**	**33**	**1320**	***52***	**1287**	**33**	**1320**	***52***	**1514**	**39**	**1553**	***62***	**1741**	**45**	**1786**	***71***
F-111A	Departure	18	0	18		13	0	13		13	0	13		16	0	16		18	0	18	
	Full Stop Visual Landing	18	0	18		13	0	13		13	0	13		16	0	16		18	0	18	
	Total	**36**	**0**	**36**	***2***	**26**	**0**	**26**	***2***	**26**	**0**	**26**	***2***	**32**	**0**	**32**	***2***	**36**	**0**	**36**	***2***
F-14	Departure	513	0	513		287	0	287		368	0	368		433	0	433		498	0	498	
	Full Stop Visual Landing	503	2	505		280	3	283		359	4	363		423	4	427		486	5	491	
	Full Stop Instrument Landing	8	0	8		4	0	4		5	0	5		6	0	6		7	0	7	
	Visual Touch-and-Go/Low Approach	2616	8	2624		1476	12	1488		1892	16	1908		2225	19	2244		2558	22	2580	
	Instrument Touch-and-Go/Low Approach	122	8	130		75	2	77		96	3	99		113	3	116		130	4	134	
	Total	**3762**	**18**	**3780**	***139***	**2122**	**17**	**2139**	***80***	**2720**	**23**	**2743**	***102***	**3200**	**26**	**3226**	***120***	**3679**	**31**	**3710**	***139***
F-15	Instrument Touch-and-Go/Low Approach	0	0	0		0	0	0		264	0	264		264	0	264		264	0	264	
	Total	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***	**264**	**0**	**264**	***14***	**264**	**0**	**264**	***14***	**264**	**0**	**264**	***14***
F-16	Departure	10	0	10		2	0	2		10	0	10		10	0	10		10	0	10	
	Full Stop Visual Landing	10	0	10		2	0	2		10	0	10		10	0	10		10	0	10	
	Instrument Touch-and-Go/Low Approach	416	0	416		477	0	477		2072	0	2072		2072	0	2072		2072	0	2072	
	Total	**436**	**0**	**436**	***29***	**481**	**0**	**481**	***25***	**2092**	**0**	**2092**	***108***	**2092**	**0**	**2092**	***108***	**2092**	**0**	**2092**	***108***

ANNUAL FIXED-WING AND ROTARY WING BASIC OPERATIONS

Aircraft	Operation Type	FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
Category		Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*
F/A-18A-D	Departure	2555	1	2556		1378	0	1378		1641	0	1641		1931	0	1931		2219	0	2219	
	Full Stop Visual Landing	2275	116	2391		1179	34	1213		1404	41	1445		1652	48	1700		1899	55	1954	
	Full Stop Instrument Landing	151	14	165		162	3	165		193	3	196		227	3	230		261	4	265	
	Visual Touch-and-Go/Low Approach	11290	510	11800		2670	114	2784		3178	136	3314		3739	160	3899		4298	184	4482	
	Instrument Touch-and-Go/Low Approach	1554	52	1606		350	3	353		417	3	420		491	3	494		564	4	568	
	Total	**17825**	**693**	**18518**	***755***	**5739**	**154**	**5893**	***241***	**6833**	**183**	**7016**	***288***	**8040**	**214**	**8254**	***341***	**9241**	**247**	**9488**	***394***
F/A-18E	Departure	0	0	0		889	0	889		889	0	889		889	0	889		889	0	889	
	Full Stop Visual Landing	0	0	0		725	0	725		725	0	725		725	0	725		725	0	725	
	Full Stop Instrument Landing	0	0	0		164	0	164		164	0	164		164	0	164		164	0	164	
	Total	**0**	**0**	**0**	***0***	**1778**	**0**	**1778**	***130***	**1778**	**0**	**1778**	***130***	**1778**	**0**	**1778**	***130***	**1778**	**0**	**1778**	***130***
F/A-18F	Departure	0	0	0		824	0	824		824	0	824		824	0	824		824	0	824	
	Full Stop Visual Landing	0	0	0		819	5	824		819	5	824		819	5	824		819	5	824	
	Total	**0**	**0**	**0**	***0***	**1643**	**5**	**1648**	***65***	**1643**	**5**	**1648**	***65***	**1643**	**5**	**1648**	***65***	**1643**	**5**	**1648**	***65***
Lear 24	Departure	353	0	353		260	0	260		260	0	260		306	0	306		352	0	352	
	Full Stop Visual Landing	321	0	321		238	0	238		238	0	238		280	0	280		322	0	322	
	Full Stop Instrument Landing	32	0	32		22	0	22		22	0	22		26	0	26		30	0	30	
	Visual Touch-and-Go/Low Approach	398	0	398		290	0	290		290	0	290		341	0	341		392	0	392	
	Instrument Touch-and-Go/Low Approach	2	0	2		6	0	6		6	0	6		7	0	7		8	0	8	
	Total	**1106**	**0**	**1106**	***59***	**816**	**0**	**816**	***43***	**816**	**0**	**816**	***43***	**960**	**0**	**960**	***51***	**1104**	**0**	**1104**	***59***
NU-1B	Departure	72	0	72		72	0	72		72	0	72		72	0	72		72	0	72	
	Full Stop Visual Landing	72	0	72		72	0	72		72	0	72		72	0	72		72	0	72	
	Visual Touch-and-Go/Low Approach	576	0	576		574	0	574		574	0	574		574	0	574		574	0	574	
	Total	**720**	**0**	**720**	***30***	**718**	**0**	**718**	***30***	**718**	**0**	**718**	***30***	**718**	**0**	**718**	***30***	**718**	**0**	**718**	***30***
P-3	Departure	1064	15	1079		831	13	844		831	13	844		978	15	993		1124	17	1141	
	Full Stop Visual Landing	737	86	823		578	59	637		578	59	637		680	70	750		782	80	862	
	Full Stop Instrument Landing	223	33	256		177	29	206		177	29	206		209	34	243		240	39	279	
	Visual Touch-and-Go/Low Approach	2534	110	2644		1723	81	1804		1723	81	1804		2027	96	2123		2330	110	2440	
	Instrument Touch-and-Go/Low Approach	1286	18	1304		1065	15	1080		1065	15	1080		1253	17	1270		1440	20	1460	
	Total	**5844**	**262**	**6106**	***300***	**4374**	**197**	**4571**	***239***	**4374**	**197**	**4571**	***239***	**5147**	**232**	**5379**	***284***	**5916**	**266**	**6182**	***327***
S-3	Departure	390	10	400		237	3	240		292	4	296		344	5	349		395	6	401	
	Full Stop Visual Landing	289	20	309		172	13	185		212	16	228		250	18	268		287	21	308	
	Full Stop Instrument Landing	82	9	91		49	6	55		61	8	69		71	10	81		82	11	93	
	Visual Touch-and-Go/Low Approach	2518	152	2670		1397	115	1512		1725	142	1867		2029	167	2196		2332	192	2524	
	Instrument Touch-and-Go/Low Approach	204	46	250		125	8	133		154	10	164		181	12	193		208	14	222	
	Total	**3483**	**237**	**3720**	***157***	**1980**	**145**	**2125**	***87***	**2444**	**180**	**2624**	***108***	**2875**	**212**	**3087**	***128***	**3304**	**244**	**3548**	***148***
T-2C	Departure	794	1	795		793	2	795		793	2	795		793	2	795		793	2	795	
	Full Stop Visual Landing	714	3	717		720	7	727		720	7	727		720	7	727		720	7	727	
	Full Stop Instrument Landing	76	2	78		67	1	68		67	1	68		67	1	68		67	1	68	
	Visual Touch-and-Go/Low Approach	3540	18	3558		3624	22	3646		3624	22	3646		3624	22	3646		3624	22	3646	
	Instrument Touch-and-Go/Low Approach	590	14	604		488	8	496		488	8	496		488	8	496		488	8	496	
	Total	**5714**	**38**	**5752**	***247***	**5692**	**40**	**5732**	***239***	**5692**	**40**	**5732**	***239***	**5692**	**40**	**5732**	***239***	**5692**	**40**	**5732**	***239***
T-33	Departure	62	0	62		62	0	62		62	0	62		62	0	62		62	0	62	
	Full Stop Visual Landing	62	0	62		62	0	62		62	0	62		62	0	62		62	0	62	
	Visual Touch-and-Go/Low Approach	460	0	460		450	0	450		450	0	450		450	0	450		450	0	450	
	Instrument Touch-and-Go/Low Approach	40	0	40		50	0	50		50	0	50		50	0	50		50	0	50	
	Total	**624**	**0**	**624**	***21***	**624**	**0**	**624**	***22***	**624**	**0**	**624**	***22***	**624**	**0**	**624**	***22***	**624**	**0**	**624**	***22***
T-34	Departure	295	0	295		220	0	220		220	0	220		258	0	258		297	0	297	
	Full Stop Visual Landing	295	0	295		220	0	220		220	0	220		258	0	258		297	0	297	
	Visual Touch-and-Go/Low Approach	1412	0	1412		1049	0	1049		1049	0	1049		1234	0	1234		1418	0	1418	
	Total	**2002**	**0**	**2002**	***103***	**1489**	**0**	**1489**	***76***	**1489**	**0**	**1489**	***76***	**1750**	**0**	**1750**	***90***	**2012**	**0**	**2012**	***104***
T-38A	Departure	908	0	908		907	0	907		907	0	907		907	0	907		907	0	907	
	Full Stop Visual Landing	768	0	768		783	0	783		783	0	783		783	0	783		783	0	783	
	Full Stop Instrument Landing	140	0	140		124	0	124		124	0	124		124	0	124		124	0	124	
	Visual Touch-and-Go/Low Approach	3738	0	3738		3858	0	3858		3858	0	3858		3858	0	3858		3858	0	3858	
	Instrument Touch-and-Go/Low Approach	786	0	786		720	0	720		720	0	720		720	0	720		720	0	720	
	Total	**6340**	**0**	**6340**	***273***	**6392**	**0**	**6392**	***272***	**6392**	**0**	**6392**	***272***	**6392**	**0**	**6392**	***272***	**6392**	**0**	**6392**	***272***
T-39D	Departure	30	0	30		30	0	30		30	0	30		30	0	30		30	0	30	
	Full Stop Visual Landing	14	0	14		20	0	20		20	0	20		20	0	20		20	0	20	
	Full Stop Instrument Landing	16	0	16		10	0	10		10	0	10		10	0	10		10	0	10	
	Total	**60**	**0**	**60**	***4***	**60**	**0**	**60**	***4***	**60**	**0**	**60**	***4***	**60**	**0**	**60**	***4***	**60**	**0**	**60**	***4***
T-45	Departure	181	0	181		0	0	0		0	0	0		0	0	0		0	0	0	
	Full Stop Visual Landing	178	0	178		0	0	0		0	0	0		0	0	0		0	0	0	
	Full Stop Instrument Landing	3	0	3		0	0	0		0	0	0		0	0	0		0	0	0	
	Visual Touch-and-Go/Low Approach	972	0	972		0	0	0		0	0	0		0	0	0		0	0	0	
	Instrument Touch-and-Go/Low Approach	92	0	92		0	0	0		0	0	0		0	0	0		0	0	0	
	Total	**1426**	**0**	**1426**	***55***	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***

ANNUAL FIXED-WING AND ROTARY WING BASIC OPERATIONS

Aircraft Category	Operation Type	FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
		Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*	Day 0700-2200	Night 2200-0700	Total Ops	*Pattern Hours*
TC-4C	Departure	42	0	42		42	0	42		42	0	42		42	0	42		42	0	42	
	Full Stop Visual Landing	42	0	42		39	0	39		39	0	39		39	0	39		39	0	39	
	Full Stop Instrument Landing	0	0	0		3	0	3		3	0	3		3	0	3		3	0	3	
	Visual Touch-and-Go/Low Approach	48	0	48		66	0	66		66	0	66		66	0	66		66	0	66	
	Instrument Touch-and-Go/Low Approach	18	0	18		6	0	6		6	0	6		6	0	6		6	0	6	
	Total	**150**	**0**	**150**	***9***	**156**	**0**	**156**	***9***	**156**	**0**	**156**	***9***	**156**	**0**	**156**	***9***	**156**	**0**	**156**	***9***
TF-51D	Departure	36	0	36		36	0	36		36	0	36		36	0	36		36	0	36	
	Full Stop Visual Landing	36	0	36		36	0	36		36	0	36		36	0	36		36	0	36	
	Visual Touch-and-Go/Low Approach	216	0	216		216	0	216		216	0	216		216	0	216		216	0	216	
	Total	**288**	**0**	**288**	***15***	**288**	**0**	**288**	***15***	**288**	**0**	**288**	***15***	**288**	**0**	**288**	***15***	**288**	**0**	**288**	***15***
U-21F	Departure	283	0	283		283	0	283		283	0	283		283	0	283		283	0	283	
	Full Stop Visual Landing	210	0	210		191	0	191		191	0	191		191	0	191		191	0	191	
	Full Stop Instrument Landing	73	0	73		92	0	92		92	0	92		92	0	92		92	0	92	
	Visual Touch-and-Go/Low Approach	1510	0	1510		1388	0	1388		1388	0	1388		1388	0	1388		1388	0	1388	
	Instrument Touch-and-Go/Low Approach	560	0	560		660	0	660		660	0	660		660	0	660		660	0	660	
	Total	**2636**	**0**	**2636**	***142***	**2614**	**0**	**2614**	***147***	**2614**	**0**	**2614**	***147***	**2614**	**0**	**2614**	***147***	**2614**	**0**	**2614**	***147***
U-6A	Departure	162	0	162		160	0	160		160	0	160		160	0	160		160	0	160	
	Full Stop Visual Landing	162	0	162		160	0	160		160	0	160		160	0	160		160	0	160	
	Visual Touch-and-Go/Low Approach	808	0	808		808	0	808		808	0	808		808	0	808		808	0	808	
	Total	**1132**	**0**	**1132**	***55***	**1128**	**0**	**1128**	***55***	**1128**	**0**	**1128**	***55***	**1128**	**0**	**1128**	***55***	**1128**	**0**	**1128**	***55***
V-22	Departure					295	8	303		295	8	303		295	8	303		295	8	303	
	*Pad Departure	102	0	102																	
*Data from	*Full Stop Visual Landing	102	0	102		253	13	266		253	13	266		253	13	266		253	13	266	
Rotary Wing	Full Stop Instrument Landing					37	0	37		37	0	37		37	0	37		37	0	37	
Section	*Visual Touch-and-Go/Grass Operations	60	0	60																	
	Visual Touch-and-Go/Low Approach					0	0	0		0	0	0		0	0	0		0	0	0	
	Total	**264**	**0**	**264**	***18***	**585**	**21**	**606**	***53***	**585**	**21**	**606**	***53***	**585**	**21**	**606**	***53***	**585**	**21**	**606**	***53***
X-26A	Departure	61	0	61		59	0	59		59	0	59		59	0	59		59	0	59	
	Full Stop Visual Landing	61	0	61		59	0	59		59	0	59		59	0	59		59	0	59	
	Total	**122**	**0**	**122**	***12***	**118**	**0**	**118**	***12***	**118**	**0**	**118**	***12***	**118**	**0**	**118**	***12***	**118**	**0**	**118**	***12***
H-1	Pad Departure	400	6	406		272	5	277		296	5	301		348	6	354		400	7	407	
	Departure - Runway	0	0	0		82	0	82		89	0	89		104	0	104		120	0	120	
	Pad Arrival	377	29	406		250	27	277		272	29	301		320	34	354		368	39	407	
	Full Stop Visual Landing	0	0	0		22	60	82		24	65	89		28	77	105		32	88	120	
	Visual Touch-and-Go/Grass Operations	1010	216	1226		693	162	855		753	176	929		886	207	1093		1018	238	1256	
	Instrument Touch-and-Go/Low Approach	364	0	364		201	0	201		219	0	219		258	0	258		296	0	296	
	Total	**2151**	**251**	**2402**	***110***	**1520**	**254**	**1774**	***85***	**1653**	**275**	**1928**	***92***	**1944**	**324**	**2268**	***109***	**2234**	**372**	**2606**	***126***
SH-2	Pad Departure	105	0	105		81	0	81		81	0	81		95	0	95		109	0	109	
	Pad Arrival	100	5	105		74	7	81		74	7	81		87	8	95		100	9	109	
	Visual Touch-and-Go/Grass Operations	176	2	178		189	18	207		189	18	207		223	21	244		256	24	280	
	Instrument Touch-and-Go/Low Approach	112	0	112		38	0	38		38	0	38		45	0	45		52	0	52	
	Total	**493**	**7**	**500**	***28***	**382**	**25**	**407**	***17***	**382**	**25**	**407**	***17***	**450**	**29**	**479**	***20***	**517**	**33**	**550**	***23***
H-3	Pad Departure	180	0	180		133	0	133		133	0	133		157	0	157		180	0	180	
	Pad Arrival	173	7	180		126	7	133		126	7	133		149	8	157		171	9	180	
	Visual Touch-and-Go/Grass Operations	448	22	470		317	18	335		317	18	335		372	21	393		428	24	452	
	Instrument Touch-and-Go/Low Approach	104	0	104		124	0	124		124	0	124		146	0	146		168	0	168	
	Total	**905**	**29**	**934**	***40***	**700**	**25**	**725**	***34***	**700**	**25**	**725**	***34***	**824**	**29**	**853**	***41***	**947**	**33**	**980**	***47***
CH-46E	Pad Departure	143	7	150		106	4	110		106	4	110		125	5	130		144	6	150	
	Pad Arrival	136	14	150		101	10	111		101	10	111		118	12	130		136	14	150	
	Visual Touch-and-Go/Grass Operations	302	140	442		201	62	263		201	62	263		237	73	310		272	84	356	
	Instrument Touch-and-Go/Low Approach	84	0	84		53	9	62		53	9	62		63	10	73		72	12	84	
	Total	**665**	**161**	**826**	***35***	**461**	**85**	**546**	***26***	**461**	**85**	**546**	***26***	**543**	**100**	**643**	***30***	**624**	**116**	**740**	***35***
H-53	Pad Departure	150	2	152		112	0	112		112	0	112		132	0	132		152	0	152	
	Pad Arrival	138	14	152		106	6	112		106	6	112		125	7	132		144	8	152	
	Visual Touch-and-Go/Grass Operations	466	154	620		451	50	501		451	50	501		531	59	590		610	68	678	
	Instrument Touch-and-Go/Low Approach	104	4	108		106	0	106		106	0	106		125	0	125		144	0	144	
	Total	**858**	**174**	**1032**	***41***	**775**	**56**	**831**	***32***	**775**	**56**	**831**	***32***	**913**	**66**	**979**	***38***	**1050**	**76**	**1126**	***44***
TH-57C	Pad Departure	183	3	186		136	3	139		136	3	139		160	3	163		184	4	188	
	Pad Arrival	170	16	186		125	14	139		125	14	139		147	17	164		169	19	188	
	Visual Touch-and-Go/Grass Operations	872	116	988		602	96	698		602	96	698		708	113	821		814	130	944	
	Instrument Touch-and-Go/Low Approach	354	2	356		210	24	234		210	24	234		247	28	275		284	32	316	
	Total	**1579**	**137**	**1716**	***79***	**1073**	**137**	**1210**	***56***	**1073**	**137**	**1210**	***56***	**1262**	**161**	**1423**	***67***	**1451**	**185**	**1636**	***77***
OH-58	Pad Departure	459	0	459		460	0	460		460	0	460		460	0	460		460	0	460	
	Pad Arrival	445	14	459		447	13	460		447	13	460		447	13	460		447	13	460	
	Total	**904**	**14**	**918**	***57***	**907**	**13**	**920**	***57***	**907**	**13**	**920**	***57***	**907**	**13**	**920**	***57***	**907**	**13**	**920**	***57***

ANNUAL FIXED-WING AND ROTARY WING BASIC OPERATIONS

		FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
Aircraft Category	**Operation Type**	**Day** 0700-2200	**Night** 2200-0700	**Total Ops**	***Pattern Hours***	**Day** 0700-2200	**Night** 2200-0700	**Total Ops**	***Pattern Hours***	**Day** 0700-2200	**Night** 2200-0700	**Total Ops**	***Pattern Hours***	**Day** 0700-2200	**Night** 2200-0700	**Total Ops**	***Pattern Hours***	**Day** 0700-2200	**Night** 2200-0700	**Total Ops**	***Pattern Hours***
TH-6B	Pad Departure	642	0	642		641	0	641		641	0	641		641	0	641		641	0	641	
	Pad Arrival	639	3	642		635	6	641		635	6	641		635	6	641		635	6	641	
	Visual Touch-and-Go/Grass Operations	178	0	178		148	4	152		148	4	152		148	4	152		148	4	152	
	Instrument Touch-and-Go/Low Approach	162	0	162		140	4	144		140	4	144		140	4	144		140	4	144	
	Total	**1621**	**3**	**1624**	***101***	**1564**	**14**	**1578**	***97***	**1564**	**14**	**1578**	***97***	**1564**	**14**	**1578**	***97***	**1564**	**14**	**1578**	***97***
H-60	Pad Departure	1919	32	1951		1421	23	1444		1421	23	1444		1671	27	1698		1921	31	1952	
	Pad Arrival	1830	121	1951		1361	82	1443		1361	82	1443		1602	97	1699		1841	111	1952	
	Visual Touch-and-Go/Grass Operations	8802	1056	9858		7058	808	7866		7058	808	7866		8303	950	9253		9544	1092	10636	
	Instrument Touch-and-Go/Low Approach	1358	32	1390		950	49	999		950	49	999		1117	57	1174		1284	66	1350	
	Total	**13909**	**1241**	**15150**	***505***	**10790**	**962**	**11752**	***375***	**10790**	**962**	**11752**	***375***	**12693**	**1131**	**13824**	***443***	**14590**	**1300**	**15890**	***512***
AH-64	Departure - Runway	0	0	0		0	0	0		122	0	122		122	0	122		122	0	122	
	Full Stop Visual Landing	0	0	0		0	0	0		34	88	122		34	88	122		34	88	122	
	Total	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***	**156**	**88**	**244**	***25***	**156**	**88**	**244**	***25***	**156**	**88**	**244**	***25***
UV-18A	Pad Departure	52	0	52		52	0	52		52	0	52		52	0	52		52	0	52	
	Pad Arrival	52	0	52		52	0	52		52	0	52		52	0	52		52	0	52	
	Total	**104**	**0**	**104**	***5***	**104**	**0**	**104**	***5***	**104**	**0**	**104**	***5***	**104**	**0**	**104**	***5***	**104**	**0**	**104**	***5***
UH-3	Pad Departure	123	18	141		92	12	104		92	12	104		109	14	123		125	16	141	
	Pad Arrival	110	31	141		75	29	104		75	29	104		89	34	123		102	39	141	
	Visual Touch-and-Go/Grass Operations	1026	230	1256		704	229	933		704	229	933		828	270	1098		952	310	1262	
	Total	**1259**	**279**	**1538**	***39***	**871**	**270**	**1141**	***29***	**871**	**270**	**1141**	***29***	**1026**	**318**	**1344**	***35***	**1179**	**365**	**1544**	***40***
V-22	Pad Departure	0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
*Moved to	Full Stop Visual Landing	0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
Fixed Wing	Visual Touch-and-Go/Grass Operations	0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
Section	**Total**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***
	Fixed-Wing Total (A-1/A-3/A-5/A-7)	**66574**	**1600**	**68174**	***3038***	**49403**	**917**	**50320**	***2459***	**55149**	**987**	**56136**	***2727***	**60139**	**1146**	**61285**	***2989***	**65104**	**1310**	**66414**	***3247***
	Rotary-Wing Total (A-2/A-4/A-6/A-8)	**24448**	**2296**	**26744**	***1040***	**19147**	**1841**	**20988**	***813***	**19436**	**1950**	**21386**	***845***	**22386**	**2273**	**24659**	***967***	**25323**	**2595**	**27918**	***1088***
	AIRFIELD TOTAL	**91022**	**3896**	**94918**	***4078***	**68550**	**2758**	**71308**	***3272***	**74585**	**2937**	**77522**	***3572***	**82525**	**3419**	**85944**	***3956***	**90427**	**3905**	**94332**	***4335***

CTR UTILIZATION

TABLE B-1/B-18
Annual R-4002/R-4006 Sorties and Flight Hours

Aircraft Category	FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
	Sorties			Hours	Sorties			Hours	Sorties			Hours	Sorties			Hours	Sorties			Hours
	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total
A-10A	16	0	16	13	8	0	8	6	18	0	18	14	18	0	18	14	18	0	18	14
EA-6B	0	0	0	0	17	1	18	3	17	1	18	3	20	1	21	4	23	1	24	5
F-14	16	0	16	3	15	0	15	2	22	0	22	3	26	0	26	4	30	0	30	5
F-15	0	0	0	0	0	0	0	0	6	0	6	5	6	0	6	5	6	0	6	5
F-16	5	0	5	4	10	0	10	8	43	0	43	35	43	0	43	35	43	0	43	35
F/A-18A-D	5	0	5	6	2	0	2	2	2	0	2	2	2	0	2	2	2	0	2	2
S-3	6	0	6	4	2	0	2	2	3	0	3	3	3	0	3	3	3	0	3	3
TC-4C	11	0	11	11	12	0	12	12	12	0	12	12	12	0	12	12	12	0	12	12
UAV	0	0	0	0	50	0	50	31	50	0	50	31	50	0	50	31	50	0	50	31
TOTAL	59	0	59	41	116	1	117	66	173	1	174	108	180	1	181	110	187	1	188	112

TABLE B-2/B-19
Annual R-4005 Sorties and Flight Hours

Aircraft Category	FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
	Sorties			Hours	Sorties			Hours	Sorties			Hours	Sorties			Hours	Sorties			Hours
	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total
Beech C99	0	0	0	0	63	7	70	46	63	7	70	46	75	8	83	54	86	9	95	62
E-2C	8	0	8	13	5	0	5	9	5	0	5	9	6	0	6	10	7	0	7	12
F-111A	4	0	4	5	3	0	3	3	3	0	3	3	3	0	3	4	3	0	3	4
F/A-18A-D	27	0	27	35	21	0	21	25	25	0	25	30	29	0	29	36	33	0	33	42
H-1	2	0	2	2	1	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1
H-3	1	0	1	1	3	0	3	3	3	0	3	3	4	0	4	4	4	0	4	4
CH-46E	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H-53	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H-60	10	0	10	8	8	0	8	5	8	0	8	5	9	0	9	6	10	0	10	7
S-3	4	0	4	7	2	0	2	2	3	0	3	3	3	0	3	4	3	0	3	5
T-38A	7	0	7	6	10	0	10	11	10	0	10	11	10	0	10	11	10	0	10	11
T-39D	7	0	7	9	5	0	5	6	5	0	5	6	5	0	5	6	5	0	5	6
TOTAL	72	0	72	88	121	7	128	111	126	7	133	117	145	8	153	136	162	9	171	154

TABLE B-3/B-20
Annual R-4005N Sorties and Flight Hours

Aircraft Category	FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
	Sorties			Hours	Sorties			Hours	Sorties			Hours	Sorties			Hours	Sorties			Hours
	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total
E-2C	1	0	1	1	2	0	2	2	2	0	2	2	2	0	2	2	2	0	2	2
H-1	8	0	8	7	26	0	26	23	28	0	28	25	33	0	33	29	38	0	38	33
SH-2	5	0	5	4	1	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1
H-3	2	0	2	2	4	0	4	3	4	0	4	3	5	0	5	4	6	0	6	5
CH-46E	2	0	2	2	1	1	2	2	1	1	2	2	1	1	2	2	1	1	2	2
H-53	1	0	1	1	3	0	3	3	3	0	3	3	3	0	3	3	3	0	3	3
TH-57C	2	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H-60	25	2	27	25	14	1	15	14	14	1	15	14	17	1	18	16	19	1	20	18
AH-64	0	0	0	0	0	0	0	0	34	0	34	29	34	0	34	29	34	0	34	29
TOTAL	46	2	48	44	51	2	53	48	87	2	89	79	96	2	98	86	104	2	106	93

CTR UTILIZATION

TABLE B-4/B-21
Annual R-4005N/R-4006 Sorties and Flight Hours

Aircraft Category	FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
	Sorties			Hours	Sorties			Hours	Sorties			Hours	Sorties			Hours	Sorties			Hours
	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total
F-14	87	0	87	63	52	0	52	38	66	0	66	48	78	0	78	57	90	0	90	66
F/A-18A-D	114	0	114	89	39	0	39	30	47	0	47	36	55	0	55	43	63	0	63	50
T-45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S-3	2	0	2	2	3	0	3	2	3	0	3	2	3	0	3	2	3	0	3	2
TOTAL	203	0	203	154	94	0	94	70	116	0	116	86	136	0	136	102	156	0	156	118

TABLE B-5/B-22
Annual R-4005N/R-4006/R-4008 Sorties and Flight Hours

Aircraft Category	FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
	Sorties			Hours	Sorties			Hours	Sorties			Hours	Sorties			Hours	Sorties			Hours
	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total
A-6E	8	0	8	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EA-6B	2	0	2	2	1	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1
F-14	148	2	150	119	90	8	98	78	114	10	124	99	135	12	147	117	156	14	170	135
F/A-18A-D	110	8	118	85	302	18	320	267	359	22	381	319	425	26	451	377	491	30	521	435
F/A-18E	0	0	0	0	291	0	291	317	291	0	291	317	291	0	291	317	291	0	291	317
F/A-18F	0	0	0	0	8	0	8	7	8	0	8	7	8	0	8	7	8	0	8	7
S-3	0	0	0	0	3	2	5	5	4	3	7	6	5	3	8	7	6	3	9	8
TOTAL	268	10	278	213	695	28	723	675	777	35	812	749	865	41	906	826	953	47	1000	903

TABLE B-6/B-23
Annual R-4005S Sorties and Flight Hours

Aircraft Category	FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
	Sorties			Hours	Sorties			Hours	Sorties			Hours	Sorties			Hours	Sorties			Hours
	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total
F-14	3	0	3	4	1	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1
F/A-18A-D	11	0	11	13	4	0	4	6	5	0	5	7	6	0	6	8	7	0	7	9
H-1	5	0	5	5	5	0	5	4	5	0	5	4	6	0	6	5	7	0	7	6
SH-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H-3	2	0	2	2	1	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1
CH-46E	1	0	1	1	2	0	2	2	2	0	2	2	2	0	2	2	2	0	2	2
H-53	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TH-57C	1	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1
H-60	37	1	38	36	25	1	26	25	25	1	26	25	30	1	31	29	35	1	36	34
P-3	3	3	6	6	0	3	3	3	0	3	3	3	0	3	3	3	0	3	3	3
T-39D	6	0	6	8	5	0	5	6	5	0	5	6	5	0	5	6	5	0	5	6
TC-4C	0	0	0	0	3	0	3	5	3	0	3	5	3	0	3	5	3	0	3	5
TOTAL	70	4	74	77	47	4	51	54	48	4	52	55	55	4	59	61	62	4	66	68

CTR UTILIZATION

TABLE B-7/B-24
Annual R-4005S/R-4006 Sorties and Flight Hours

Aircraft Category	FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*
	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*
F/A-18A-D	12	0	12	***11***	3	0	3	***3***	3	0	3	***3***	4	0	4	***4***	4	0	4	***4***
T-45	4	0	4	***3***	0	0	0	***0***	0	0	0	***0***	0	0	0	***0***	0	0	0	***0***
TOTAL	16	0	16	***14***	3	0	3	***3***	3	0	3	***3***	4	0	4	***4***	4	0	4	***4***

TABLE B-8/B-25
Annual R-4005W Sorties and Flight Hours

Aircraft Category	FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*
	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*
Cessna 185	21	0	21	***31***	21	0	21	***30***	21	0	21	***30***	21	0	21	***30***	21	0	21	***30***
H-1	6	2	8	***10***	4	1	5	***3***	4	1	5	***3***	5	1	6	***4***	6	1	7	***4***
SH-2	0	0	0	***0***	1	0	1	***1***	1	0	1	***1***	1	0	1	***1***	1	0	1	***1***
H-3	0	0	0	***0***	2	0	2	***0***	2	0	2	***0***	2	0	2	***0***	2	0	2	***0***
CH-46E	3	1	4	***5***	2	3	5	***6***	2	3	5	***6***	3	4	7	***7***	3	4	7	***8***
H-53	1	0	1	***0***	2	0	2	***3***	2	0	2	***3***	3	0	3	***4***	3	0	3	***4***
TH-57C	1	1	2	***2***	2	2	4	***2***	2	2	4	***2***	2	2	4	***3***	2	2	4	***3***
H-60	15	8	23	***26***	8	4	12	***14***	8	4	12	***14***	10	4	14	***17***	11	5	16	***19***
TF-51D	9	0	9	***9***	10	0	10	***10***	10	0	10	***10***	10	0	10	***10***	10	0	10	***10***
U-21F	2	0	2	***2***	5	0	5	***6***	5	0	5	***6***	5	0	5	***6***	5	0	5	***6***
U-6A	57	0	57	***21***	57	0	57	***21***	57	0	57	***21***	57	0	57	***21***	57	0	57	***21***
UAV	19	0	19	***18***	100	0	100	***35***	100	0	100	***35***	100	0	100	***35***	100	0	100	***35***
X-26A	57	0	57	***21***	57	0	57	***21***	57	0	57	***21***	57	0	57	***21***	57	0	57	***21***
TOTAL	191	12	203	***145***	271	10	281	***152***	271	10	281	***152***	276	11	287	***159***	278	12	290	***162***

TABLE B-9/B-26
Annual R-4005W/R-4006 Sorties and Flight Hours

Aircraft Category	FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*
	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*
F-14	5	0	5	***4***	1	0	1	***1***	1	0	1	***1***	1	0	1	***1***	1	0	1	***1***
F/A-18A-D	96	0	96	***108***	22	0	22	***26***	26	0	26	***31***	30	0	30	***36***	35	0	35	***42***
T-2C	2	0	2	***2***	5	0	5	***5***	5	0	5	***5***	5	0	5	***5***	5	0	5	***5***
T-38A	2	0	2	***2***	1	0	1	***1***	1	0	1	***1***	1	0	1	***1***	1	0	1	***1***
T-45	16	0	16	***14***	0	0	0	***0***	0	0	0	***0***	0	0	0	***0***	0	0	0	***0***
UAV	5	0	5	***11***	33	0	33	***41***	33	0	33	***41***	33	0	33	***41***	33	0	33	***41***
TOTAL	126	0	126	***141***	62	0	62	***74***	66	0	66	***79***	70	0	70	***84***	75	0	75	***90***

CTR UTILIZATION

TABLE B-10/B-27
Annual R-4005W/R-4006/R-4008 Sorties and Flight Hours

Aircraft	FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
Category	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*
	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*
F/A-18A-D	70	0	70	***67***	0	0	0	***0***	0	0	0	***0***	0	0	0	***0***	0	0	0	***0***
TOTAL	70	0	70	***67***	0	0	0	***0***	0	0	0	***0***	0	0	0	***0***	0	0	0	***0***

TABLE B-11/B-28
Annual R-4005W/Webster Field Sorties and Flight Hours

Aircraft	FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
Category	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*
	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*
A-6E	4	0	4	***1***	0	0	0	***0***	0	0	0	***0***	0	0	0	***0***	0	0	0	***0***
EA-6B	0	0	0	***0***	17	1	18	***4***	17	1	18	***4***	20	1	21	***4***	23	1	24	***5***
F-14	12	4	16	***4***	16	2	18	***3***	21	2	23	***4***	24	2	26	***4***	28	2	30	***5***
H-1	86	0	86	***30***	42	0	42	***15***	45	0	45	***16***	53	0	53	***19***	61	0	61	***22***
SH-2	24	0	24	***8***	23	0	23	***10***	23	0	23	***10***	28	0	28	***11***	32	0	32	***13***
H-3	31	0	31	***13***	31	0	31	***15***	31	0	31	***15***	36	0	36	***17***	42	0	42	***20***
CH-46E	20	0	20	***7***	10	0	10	***4***	10	0	10	***4***	11	0	11	***4***	13	0	13	***5***
H-53	19	0	19	***6***	21	0	21	***7***	21	0	21	***7***	24	0	24	***8***	28	0	28	***9***
TH-57C	38	0	38	***11***	15	0	15	***4***	15	0	15	***4***	17	0	17	***5***	20	0	20	***6***
OH-58	123	0	123	***195***	120	0	120	***192***	120	0	120	***192***	120	0	120	***192***	120	0	120	***192***
TH-6B	165	0	165	***227***	174	0	174	***239***	174	0	174	***239***	174	0	174	***239***	174	0	174	***239***
H-60	209	1	210	***163***	163	0	163	***127***	163	0	163	***127***	192	0	192	***151***	222	0	222	***174***
NU-1B	23	0	23	***29***	30	0	30	***36***	30	0	30	***36***	30	0	30	***36***	30	0	30	***36***
P-3	37	0	37	***67***	25	0	25	***45***	25	0	25	***45***	29	0	29	***53***	34	0	34	***61***
T-34	21	0	21	***22***	14	0	14	***14***	14	0	14	***14***	17	0	17	***17***	19	0	19	***19***
UV-18A	12	0	12	***11***	16	0	16	***14***	16	0	16	***14***	16	0	16	***14***	16	0	16	***14***
U-21F	34	0	34	***42***	39	0	39	***46***	39	0	39	***46***	39	0	39	***46***	39	0	39	***46***
U-6A	87	0	87	***154***	88	0	88	***155***	88	0	88	***155***	88	0	88	***155***	88	0	88	***155***
UAV	97	0	97	***69***	370	0	370	***388***	370	0	370	***388***	370	0	370	***388***	370	0	370	***388***
X-26A	57	0	57	***102***	57	0	57	***102***	57	0	57	***102***	57	0	57	***102***	57	0	57	***102***
TOTAL	1099	5	1104	***1161***	1271	3	1274	***1420***	1279	3	1282	***1422***	1345	3	1348	***1465***	1416	3	1419	***1511***

ANNUAL FIXED-WING AND ROTARY WING FLIGHT TRACK OPERATIONS (based on Tables A-9 through A-16)

		FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
Aircraft Category	**Operation Type**	**Day** 0700-2200	**Night** 2200-0700	**Total Ops**	***Pattern Hours***	**Day** 0700-2200	**Night** 2200-0700	**Total Ops**	***Pattern Hours***	**Day** 0700-2200	**Night** 2200-0700	**Total Ops**	***Pattern Hours***	**Day** 0700-2200	**Night** 2200-0700	**Total Ops**	***Pattern Hours***	**Day** 0700-2200	**Night** 2200-0700	**Total Ops**	***Pattern Hours***
OH-58	Departure Southeast	123	0	123		121	0	121		121	0	121		121	0	121		121	0	121	
	Departure Northeast	336	0	336		339	0	339		339	0	339		339	0	339		339	0	339	
	Arrival Northwest	322	14	336		326	13	339		326	13	339		326	13	339		326	13	339	
	Arrival South	123	0	123		121	0	121		121	0	121		121	0	121		121	0	121	
	Total	**904**	**14**	**918**	***57***	**907**	**13**	**920**	***57***	**907**	**13**	**920**	***57***	**907**	**13**	**920**	***57***	**907**	**13**	**920**	***57***
TH-6B	Departure West	125	0	125		112	0	112		112	0	112		112	0	112		112	0	112	
	Departure Southeast	165	0	165		174	0	174		174	0	174		174	0	174		174	0	174	
	Departure Northeast	352	0	352		355	0	355		355	0	355		355	0	355		355	0	355	
	Arrival Northwest	388	0	388		388	3	391		388	3	391		388	3	391		388	3	391	
	Arrival Northeast	89	0	89		74	2	76		74	2	76		74	2	76		74	2	76	
	Arrival South	162	3	165		173	1	174		173	1	174		173	1	174		173	1	174	
	Visual Touch-and-Go/Grass Operations	178	0	178		148	4	152		148	4	152		148	4	152		148	4	152	
	GCA Patterns	162	0	162		140	4	144		140	4	144		140	4	144		140	4	144	
	Total	**1621**	**3**	**1624**	***101***	**1564**	**14**	**1578**	***97***	**1564**	**14**	**1578**	***97***	**1564**	**14**	**1578**	***97***	**1564**	**14**	**1578**	***97***
H-60	Departure West	278	6	284		229	9	238		229	9	238		270	10	280		310	12	322	
	Departure Southeast	163	11	174		107	4	111		107	4	111		126	5	131		145	6	151	
	Departure Northeast	1478	15	1493		1084	10	1094		1084	10	1094		1275	11	1286		1466	13	1479	
	Arrival Northwest	845	36	881		620	22	642		620	22	642		729	26	755		838	30	868	
	Arrival Northeast	730	66	796		563	51	614		563	51	614		662	60	722		761	69	830	
	Arrival South	255	19	274		179	9	188		179	9	188		211	10	221		242	12	254	
	Visual Touch-and-Go/Grass Operations	8802	1056	9858		7058	808	7866		7058	808	7866		8303	950	9253		9544	1092	10636	
	GCA Patterns	1358	32	1390		945	53	998		945	53	998		1112	63	1175		1278	72	1350	
	Total	**13909**	**1241**	**15150**	***505***	**10785**	**966**	**11751**	***375***	**10785**	**966**	**11751**	***375***	**12688**	**1135**	**13823**	***443***	**14584**	**1306**	**15890**	***512***
AH-64	Departure - Runway	0	0	0		0	0	0		122	0	122		122	0	122		122	0	122	
	Full Stop Visual Landing	0	0	0		0	0	0		34	88	122		34	88	122		34	88	122	
	Total	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***	**156**	**88**	**244**	***25***	**156**	**88**	**244**	***25***	**156**	**88**	**244**	***25***
UV-18A	Departure Southeast	12	0	12		12	0	12		12	0	12		14	0	14		16	0	16	
	Departure Northeast	40	0	40		27	0	27		27	0	27		31	0	31		36	0	36	
	Arrival Northwest	40	0	40		27	0	27		27	0	27		31	0	31		36	0	36	
	Arrival South	12	0	12		12	0	12		12	0	12		14	0	14		16	0	16	
	Total	**104**	**0**	**104**	***5***	**78**	**0**	**78**	***5***	**78**	**0**	**78**	***5***	**90**	**0**	**90**	***5***	**104**	**0**	**104**	***5***
UH-3	Departure West	20	3	23		17	1	18		17	1	18		20	2	22		23	2	25	
	Departure Southeast	1	0	1		3	0	3		3	0	3		3	0	3		4	0	4	
	Departure Northeast	102	15	117		72	10	82		72	10	82		85	12	97		98	14	112	
	Arrival Northwest	36	12	48		24	13	37		24	13	37		29	15	44		33	17	50	
	Arrival Northeast	73	19	92		48	16	64		48	16	64		57	19	76		65	22	87	
	Arrival South	1	0	1		3	0	3		3	0	3		3	0	3		4	0	4	
	Visual Touch-and-Go/Grass Operations	1026	230	1256		704	229	933		704	229	933		828	270	1098		952	310	1262	
	Total	**1259**	**279**	**1538**	***39***	**871**	**269**	**1140**	***29***	**871**	**269**	**1140**	***29***	**1025**	**318**	**1343**	***35***	**1179**	**365**	**1544**	***40***
V-22	Departure - Runway	0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
*Moved to	Overhead Arrival	0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
Fixed Wing	Full Stop Visual Landing	0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
Section	Visual Touch-and-Go/Grass Operations	0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
	Total	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***	**0**	**0**	**0**	***0***
	Fixed-Wing Total (A-9/A-11/A-13/A-15)	**66570**	**1604**	**68174**	***3038***	**49395**	**918**	**50313**	***2459***	**55152**	**987**	**56139**	***2727***	**60137**	**1153**	**61290**	***2989***	**65100**	**1314**	**66414**	***3247***
	Rotary-Wing Total (A-10/A-12/A-14/A-16)	**24444**	**2300**	**26744**	***1040***	**19123**	**1842**	**20965**	***813***	**19407**	**1951**	**21358**	***845***	**22368**	**2279**	**24647**	***967***	**25315**	**2603**	**27918**	***1088***
	AIRFIELD TOTAL	**91014**	**3904**	**94918**	***4078***	**68518**	**2760**	**71278**	***3272***	**74559**	**2938**	**77497**	***3572***	**82505**	**3432**	**85937**	***3956***	**90415**	**3917**	**94332**	***4335***

CTR UTILIZATION

TABLE B-12/B-29
Annual R-4006 Sorties and Flight Hours

Aircraft	FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
Category	Sorties			Hours	Sorties			Hours	Sorties			Hours	Sorties			Hours	Sorties			Hours
	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total
A-6E	60	0	60	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Beech C99	0	0	0	23	493	10	503	409	493	10	503	409	584	12	596	483	674	14	688	558
UC-12B	30	2	32	30	31	2	33	29	31	2	33	29	36	2	38	35	42	2	44	40
C-130	159	6	165	420	119	1	120	494	119	1	120	494	141	1	142	585	163	1	164	675
E-2C	114	0	114	184	81	0	81	134	81	0	81	134	95	0	95	159	110	0	110	183
EA-6B	67	0	67	70	64	1	65	59	64	1	65	59	76	1	77	69	88	1	89	80
F-111A	14	0	14	19	11	0	11	15	11	0	11	15	13	0	13	18	15	0	15	21
F-14	128	4	132	121	81	0	81	79	103	0	103	100	121	0	121	118	140	0	140	136
F-16	8	0	8	10	2	0	2	2	8	0	8	10	8	0	8	10	8	0	8	10
F/A-18A-D	720	1	721	778	249	0	249	317	297	0	297	379	351	0	351	449	405	0	405	518
H-1	28	0	28	32	18	0	18	21	20	0	20	23	23	0	23	27	27	0	27	31
SH-2	10	0	10	12	6	0	6	7	6	0	6	7	7	0	7	9	8	0	8	10
H-3	14	0	14	16	10	0	10	11	10	0	10	11	11	0	11	13	13	0	13	15
CH-46E	8	0	8	9	6	0	6	7	6	0	6	7	7	0	7	8	8	0	8	9
H-53	4	0	4	5	2	0	2	2	2	0	2	2	2	0	2	2	2	0	2	2
TH-57C	6	0	6	6	7	0	7	8	7	0	7	8	9	0	9	10	10	0	10	11
H-60	41	1	42	47	29	0	29	32	29	0	29	32	35	0	35	38	40	0	40	44
Lear 24	353	0	353	477	270	0	270	362	270	0	270	362	320	0	320	429	369	0	369	495
NU-1B	0	0	0	0	1	0	1	2	1	0	1	2	1	0	1	2	1	0	1	2
P-3	466	11	477	974	337	12	349	779	337	12	349	779	398	14	412	921	460	16	476	1064
S-3	101	3	104	165	62	1	63	117	77	1	78	144	91	1	92	171	105	1	106	197
T-2C	663	2	665	712	640	2	642	686	640	2	642	686	640	2	642	686	640	2	642	686
T-33	62	0	62	60	70	0	70	68	70	0	70	68	70	0	70	68	70	0	70	68
T-34	295	0	295	255	217	0	217	188	217	0	217	188	256	0	256	223	296	0	296	257
T-38A	573	0	573	483	592	0	592	497	592	0	592	497	592	0	592	497	592	0	592	497
T-39D	11	0	11	14	19	0	19	25	19	0	19	25	19	0	19	25	19	0	19	25
T-45	160	0	160	110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TC-4C	31	0	31	53	27	0	27	46	27	0	27	46	27	0	27	46	27	0	27	46
TF-51D	27	0	27	28	26	0	26	27	26	0	26	27	26	0	26	27	26	0	26	27
U-21F	97	0	97	137	88	0	88	125	88	0	88	125	88	0	88	125	88	0	88	125
UAV	0	0	0	0	126	0	126	61	126	0	126	61	126	0	126	61	126	0	126	61
V-22	105	0	105	123	184	2	186	362	184	2	186	362	184	2	186	362	184	2	186	362
TOTAL	4355	30	4385	5410	3868	31	3899	4971	3961	31	3992	5091	4357	35	4392	5676	4756	39	4795	6255

TABLE B-13/B-30
Annual R-4006/R-6609 Sorties and Flight Hours

Aircraft	FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
Category	Sorties			Hours	Sorties			Hours	Sorties			Hours	Sorties			Hours	Sorties			Hours
	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total
H-1	4	0	4	4	3	0	3	2	3	0	3	2	4	0	4	3	4	0	4	3
SH-2	1	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1
H-3	4	0	4	4	2	0	2	2	2	0	2	2	3	0	3	3	3	0	3	3
CH-46E	4	0	4	3	2	0	2	2	2	0	2	2	2	0	2	2	2	0	2	2
H-53	6	0	6	5	3	0	3	3	3	0	3	3	4	0	4	4	4	0	4	4
TH-57C	6	0	6	5	5	0	5	4	5	0	5	4	6	0	6	5	7	0	7	6
H-60	16	0	16	14	10	0	10	8	10	0	10	8	11	0	11	10	13	0	13	11
TOTAL	41	0	41	36	26	0	26	22	26	0	26	22	31	0	31	28	34	0	34	30

TABLE B-14/B-31
Annual R-4006/R-4008 Sorties and Flight Hours

Aircraft Category	FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
	Sorties			Hours	Sorties			Hours	Sorties			Hours	Sorties			Hours	Sorties			Hours
	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total
A-10A	514	0	514	***577***	435	0	435	***487***	1036	0	1036	***1167***	1036	0	1036	***1167***	1036	0	1036	***1167***
A-6E	31	0	31	***28***	0	0	0	***0***	0	0	0	***0***	0	0	0	***0***	0	0	0	***0***
C-130	0	0	0	***0***	187	0	187	***375***	187	0	187	***375***	222	0	222	***443***	256	0	256	***512***
EA-6B	61	0	61	***66***	53	0	53	***56***	53	0	53	***56***	62	0	62	***67***	72	0	72	***77***
F-14	137	0	137	***145***	80	0	80	***85***	101	0	101	***108***	120	0	120	***127***	138	0	138	***147***
F-15	0	0	0	***0***	0	0	0	***0***	108	0	108	***122***	108	0	108	***122***	108	0	108	***122***
F-16	221	0	221	***249***	223	0	223	***256***	971	0	971	***1094***	971	0	971	***1094***	971	0	971	***1094***
F/A-18A-D	744	4	748	***805***	586	10	596	***724***	698	12	710	***865***	825	14	839	***1023***	953	16	969	***1181***
F/A-18E	0	0	0	***0***	249	0	249	***542***	249	0	249	***542***	249	0	249	***542***	249	0	249	***542***
F/A-18F	0	0	0	***0***	185	0	185	***325***	185	0	185	***325***	185	0	185	***325***	185	0	185	***325***
Lear 24	0	0	0	***0***	40	0	40	***45***	40	0	40	***45***	48	0	48	***54***	55	0	55	***62***
P-3	3	0	3	***11***	3	0	3	***10***	3	0	3	***10***	4	0	4	***12***	4	0	4	***14***
S-3	6	0	6	***8***	5	0	5	***6***	6	0	6	***8***	7	0	7	***10***	8	0	8	***11***
T-2C	208	0	208	***155***	229	0	229	***180***	229	0	229	***180***	229	0	229	***180***	229	0	229	***180***
T-38A	182	0	182	***149***	165	0	165	***135***	165	0	165	***135***	165	0	165	***135***	165	0	165	***135***
T-39D	6	0	6	***8***	1	0	1	***1***	1	0	1	***1***	1	0	1	***1***	1	0	1	***1***
T-45	2	0	2	***0***	0	0	0	***0***	0	0	0	***0***	0	0	0	***0***	0	0	0	***0***
TOTAL	2115	4	2119	***2201***	2441	10	2451	***3227***	4032	12	4044	***5033***	4232	14	4246	***5302***	4430	16	4446	***5570***

TABLE B-15/B-32
Annual R-6609 Sorties and Flight Hours

Aircraft Category	FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
	Sorties			Hours	Sorties			Hours	Sorties			Hours	Sorties			Hours	Sorties			Hours
	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total
A-10A	52	0	52	***41***	48	0	48	***37***	108	0	108	***85***	108	0	108	***85***	108	0	108	***85***
EA-6B	0	0	0	***0***	17	1	18	***4***	17	1	18	***4***	20	1	21	***4***	23	1	24	***5***
F-14	16	0	16	***3***	17	0	17	***3***	22	0	22	***4***	26	0	26	***4***	30	0	30	***5***
F-15	0	0	0	***0***	0	0	0	***0***	6	0	6	***5***	6	0	6	***5***	6	0	6	***5***
F-16	20	0	20	***16***	10	0	10	***8***	42	0	42	***33***	42	0	42	***33***	42	0	42	***33***
F/A-18A-D	5	0	5	***4***	6	0	6	***5***	7	0	7	***6***	8	0	8	***7***	9	0	9	***8***
UAV	0	0	0	***0***	100	0	100	***29***	100	0	100	***29***	100	0	100	***29***	100	0	100	***29***
TOTAL	93	0	93	***64***	198	1	199	***86***	302	1	303	***166***	310	1	311	***167***	318	1	319	***170***

TABLE B-16/B-33
Annual R-4007 Sorties and Flight Hours

Aircraft Category	FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*
	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*
Beech C99	0	0	0	***0***	198	12	210	***175***	198	12	210	***175***	235	14	249	***207***	271	16	287	***239***
H-1	107	4	111	***96***	81	4	85	***78***	87	4	91	***84***	103	4	107	***99***	119	5	124	***114***
SH-2	20	0	20	***18***	21	0	21	***20***	21	0	21	***20***	24	0	24	***23***	28	0	28	***27***
H-3	111	10	121	***126***	77	5	82	***84***	77	5	82	***84***	91	6	97	***100***	105	7	112	***115***
CH-46E	33	4	37	***30***	32	2	34	***29***	32	2	34	***29***	37	2	39	***34***	43	2	45	***39***
H-53	49	2	51	***44***	36	0	36	***32***	36	0	36	***32***	42	0	42	***37***	49	0	49	***43***
TH-57C	60	2	62	***45***	52	1	53	***43***	52	1	53	***43***	62	1	63	***50***	71	1	72	***58***
OH-58	223	0	223	***350***	219	0	219	***343***	219	0	219	***343***	219	0	219	***343***	219	0	219	***343***
TH-6B	179	0	179	***268***	181	0	181	***270***	181	0	181	***270***	181	0	181	***270***	181	0	181	***270***
H-60	329	5	334	***335***	261	8	269	***278***	261	8	269	***278***	308	10	318	***329***	356	11	367	***380***
P-3	8	0	8	***11***	5	0	5	***7***	5	0	5	***7***	6	0	6	***9***	7	0	7	***10***
T-33	0	0	0	***0***	2	0	2	***2***	2	0	2	***2***	2	0	2	***2***	2	0	2	***2***
UV-18A	40	0	40	***35***	36	0	36	***31***	36	0	36	***31***	36	0	36	***31***	36	0	36	***31***
U-6A	4	0	4	***6***	2	0	2	***3***	2	0	2	***3***	2	0	2	***3***	2	0	2	***3***
V-22	0	0	0	***0***	148	2	150	***258***	148	2	150	***258***	148	2	150	***258***	148	2	150	***258***
X-26A	4	0	4	***6***	2	0	2	***3***	2	0	2	***3***	2	0	2	***3***	2	0	2	***3***
TOTAL	1167	27	1194	***1370***	1353	34	1387	***1656***	1359	34	1393	***1662***	1498	39	1537	***1798***	1639	44	1683	***1935***

TABLE B-17/B-34
Annual Other CTR Sorties and Flight Hours

Aircraft Category	FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*
	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*
H-1	207	1	208	***225***	144	1	145	***156***	156	1	157	***169***	185	1	186	***200***	213	1	214	***231***
SH-2	59	0	59	***66***	41	0	41	***45***	41	0	41	***45***	49	0	49	***54***	56	0	56	***62***
H-3	90	0	90	***94***	67	0	67	***71***	67	0	67	***71***	79	0	79	***84***	91	0	91	***97***
CH-46E	84	2	86	***85***	59	0	59	***60***	59	0	59	***60***	70	0	70	***71***	81	0	81	***82***
H-53	81	0	81	***81***	59	0	59	***59***	59	0	59	***59***	69	0	69	***69***	80	0	80	***80***
TH-57C	87	1	88	***93***	62	1	63	***66***	62	1	63	***66***	73	1	74	***78***	84	1	85	***90***
OH-58	113	0	113	***159***	120	0	120	***169***	120	0	120	***169***	120	0	120	***169***	120	0	120	***169***
TH-6B	248	0	248	***361***	247	0	247	***364***	247	0	247	***364***	247	0	247	***364***	247	0	247	***364***
H-60	1542	21	1563	***1486***	1130	15	1145	***1068***	1130	15	1145	***1068***	1336	18	1354	***1264***	1543	21	1564	***1459***
NU-1B	51	0	51	***78***	46	0	46	***71***	46	0	46	***71***	46	0	46	***71***	46	0	46	***71***
U-6A	71	0	71	***121***	70	0	70	***120***	70	0	70	***120***	70	0	70	***120***	70	0	70	***120***
UH-3	43	5	48	***67***	32	4	36	***51***	32	4	36	***51***	38	5	43	***60***	44	6	50	***69***
TOTAL	2676	30	2706	***2916***	2077	21	2098	***2300***	2089	21	2110	***2313***	2382	25	2407	***2604***	2675	29	2704	***2894***

CTR UTILIZATION

TABLE B-35
Annual Pattern Flight Hours in the CTR

Aircraft Category	FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
	Sorties			Hours	Sorties			Hours	Sorties			Hours	Sorties			Hours	Sorties			Hours
	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total	0700-2200	2200-0700	Total	Total
A-10A				72				51				115				115				115
A-6E				29				0				0				0				0
Beech C99				87				114				114				135				156
UC-12B				161				119				119				141				163
C-130				37				159				159				188				217
C-135				0				0				11				11				11
Cessna 185				4				4				4				4				4
C-5A				0				0				6				6				6
E-2C				117				85				85				101				116
E-6				40				29				29				35				40
EA-6B				66				52				52				62				71
F-111A				2				2				2				2				2
F-14				139				80				102				120				139
F-15				0				0				14				14				14
F-16				29				25				108				108				108
F/A-18A-D				755				241				288				341				394
F/A-18E				0				130				130				130				130
F/A-18F				0				65				65				65				65
H-1				110				85				92				109				126
SH-2				28				17				17				20				23
H-3				40				34				34				41				47
CH-46E				35				26				26				30				35
H-53				41				32				32				38				44
TH-57C				79				56				56				67				77
OH-58				57				57				57				57				57
TH-6B				101				97				97				97				97
H-60				505				375				375				443				512
AH-64				0				0				25				25				25
Lear 24				59				43				43				51				59
NP-3D				106				78				78				93				107
NU-1B				30				30				30				30				30
P-3				194				161				161				191				220
S-3				157				87				108				128				148
T-2C				247				239				239				239				239
T-33				21				22				22				22				22
T-34				103				76				76				90				104
T-38A				273				272				272				272				272
T-39D				4				4				4				4				4
T-45				55				0				0				0				0
TC-4C				9				9				9				9				9
TF-51D				15				15				15				15				15
UV-18A				5				5				5				5				5
U-21F				142				147				147				147				147
U-6A				55				55				55				55				55
UH-3				39				29				29				35				40
V-22				18				53				53				53				53
X-26A				12				12				12				12				12
TOTAL				4078				3272				3572				3956				4335

CTR UTILIZATION

TABLE B-36
Annual Total Flight Hours in the CTR

Aircraft Category	FY96 Existing Cond.				No Action				Alternative I				Alternative II				Alternative III			
	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*	Sorties			*Hours*
	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*	0700-2200	2200-0700	Total	*Total*
TOTAL				***18220***				***18207***				***20709***				***22564***				***24404***

APPENDIX D

NASMOD OVERVIEW

APPENDIX D

NASMOD OVERVIEW

D.1 Introduction

The Department of the Navy (DoN) has developed a simulation model for use in analyzing problems and issues related to airfield and special use airspace operations. The Navy Aviation Simulation Model (NASMOD) provides the DoN with the capability to conduct simulation analyses that:

C Quantitatively assess airfield and airspace capacity in support of proposed operational alternatives;

C Calculate the impacts of changes in special use airspace on both military and civilian operations;

C Analyze the operational impacts of interaction between military and civilian aircraft;

C Analyze pilot training system resource requirements including airfields, airspace, instructors, syllabus, aircraft type, maintenance, fuel, and operating costs; and

C Analyze the impacts of using alternative aircraft types to meet training and operational objectives.

NASMOD merges the capabilities of the Federal Aviation Administration's (FAA) SIMMOD model with enhancements to the Navy's Naval Aviation Training System (NATS) model developed in 1986. SIMMOD, an advanced state-of-the-art model that simulates both airfield and airspace traffic operations, has been used extensively by the FAA in studies and analyses aimed at planning for operational changes in the National Airspace System. The model has proven to be extremely valuable as a tool for analyzing airport and airspace problems, identifying potential solutions, and quantitatively assessing the delay, capacity, traffic loading, and operating cost impacts of potential operational alternatives. Recently, the Navy and the FAA incorporated several key improvements into SIMMOD, including the capability to model dynamic runway plan changes and touch-and-go, FCLP, and GCA operations.

SIMMOD was designed to address en route or IFR traffic. The Navy's NATS model was developed to address VFR traffic in the training environment. NASMOD combines these capabilities and includes other features necessary to model military aviation operations, such as special ground operations (hover and taxi to ordnance loading areas, high power run-up areas, and hot refueling pits) and the unique vertical and short takeoff and landing (V/STOL) characteristics and operating procedures of the AV-8B aircraft. The new capabilities introduced in NASMOD permit analysis of all Navy and Marine Corps aviation training operations—in the training command, in the fleet replacement squadrons, in the fleet and operating squadrons—and management and utilization of special use airspace areas.

Thus, NASMOD provides the Navy with a tool to evaluate a wide array of proposed special use airspace alternatives and training requirements, the capability to quantify impacts on other users of the National Airspace System (commercial and general aviation), and the ability to work with the FAA to mutually resolve critical special use airspace issues. In addition, the Navy now has the capability to evaluate various base closure and realignment alternatives by addressing impacts of airfield and airspace capacity, training requirements, and operational alternatives.

The NASMOD system has three primary components:

1. *A Graphical User Interface*. The Graphical User Interface facilitates data entry and management. NASMOD operates on a SUN workstation in the UNIX operating system. The user interface is window-based and mouse-driven. The system provides tools for building the airfield and airspace network, including routes and runways, for building the profiles of training missions that are used to complete Navy training requirements or syllabus objectives, for entering flight schedule data from the Official Airline Guides (OAG), for digitizing airfield and airspace charts, and for editing the database.

2. *A Simulation Processor*. The simulation processor simulates mission scheduling and operations, based on user input. Users may simulate multiple day periods. There are three major components of the simulation processor that are executed for each simulated day:

    a. The **Scheduler**, which selects the missions to be performed each simulated day and devises a conflict-free schedule of missions for that day. This component simulates scheduling performed by squadrons and by airspace and range scheduling authorities, such as a fleet area control and scheduling facility (FACSFAC).

    b. The **Operations and Traffic Simulator**, which simulates the day's flight and mission operations, including the utilization of special use airspace areas and interactions between civilian and military traffic.

    c. The **Performance Calculator**, which computes detailed and summary measures of daily squadron, airfield, and airspace operations and utilization performance, based on simulated results of the Scheduler and the Operations and Traffic Simulator.

3. *Results Analysis Tools*. NASMOD includes all of SIMMOD's tabular and graphical report generation capabilities, including a flight animation that visually replays simulated aircraft movements on the ground and through the airspace. NASMOD also provides database query tools to assist the analyst in extracting information from the system's output database and setting up reports.

This appendix discusses the Simulation Processor, focusing on the Scheduler and the Operations and Traffic Simulator, and includes an example of the graphical animation capabilities is in the form of computer display snapshots with corresponding descriptions.

D.2 Simulation Processor

The Simulation Processor components work in tandem: the Scheduler processes the inputs to derive a mission schedule, which serves as input for the Operations and Traffic Simulator. Typically, analysts use NASMOD to study military operations for a multiple-day period, such as one year. A one-year simulation period provides results that account for seasonal variations in activity and the impacts of airwing deployment schedules. During a multiple-day simulation period, the Scheduler considers the dynamic output of the previous day from the Operations and Traffic Simulator in addition to the static database inputs.

D.2.1 The Scheduler

NASMOD's Scheduler generates the schedule of missions that is the input for the Operations and Traffic Simulator. Based on the input data, the schedule of missions reflects squadrons' requirements and preferences, as well as airspace limits. In fact, the Scheduler is a two-step process. During the first step, the Scheduler determines the events squadrons desire to perform, and devises a schedule to accomplish those events; during this step NASMOD's Scheduler performs the functions of a squadron scheduler. During the second step, the Scheduler considers all squadrons' schedules and the resulting requests for airspace, and resolves any conflicts; during this step, NASMOD's Scheduler performs the functions of a scheduling authority or central scheduler.

D.2.2 Squadron Scheduler

A squadron has a set of events that it is required to perform; those events must be performed at a certain frequency. The frequency at which those events are performed may vary, depending on the squadron's deployment cycle. On each simulated date, the Scheduler computes the average number of each event that the squadron must do. Next, the Scheduler selects a target number of the event to schedule; that target number reflects the amount performed on previous days. When a squadron has not performed a certain event for several days, it builds a backlog in that event; as a result, on subsequent days the target number of that event increases.

For each event the Scheduler targets for scheduling, it selects a profile that completes that event. The profile contains the sequence of requests the mission makes. A profile may contain several paths—several different sets of requests that the mission might make. Each set might request different activity areas, for example. The Scheduler selects one path, which contains one set of requests. Based on the selected path and the expected transit times, the Scheduler projects a mission length.

Every profile is associated with a range of starting times—times at which missions may begin performing the profile. In addition, a squadron has a specific number of aircraft available and a maximum rate at which it launches those aircraft, such as ten per hour. The Scheduler attempts to schedule all targeted events, subject to the limits imposed by the launch rate, aircraft availability, mission lengths, and profile starting times.

The resulting schedule represents the missions the squadron would like to accomplish that day, subject to internal aircraft availability and launch rate constraints but with no consideration to requests made by other squadrons or to airspace constraints.

D.2.3 Central Scheduler

During this second step of the scheduling process, the Scheduler resolves conflicts for airspace usage. As a result of the squadron scheduling process, multiple missions may be scheduled to use the same airspace simultaneously; in fact, the number of missions scheduled to use an airspace may exceed capacity or safety limits that airspace operators impose. To resolve these conflicts, the Scheduler ranks all missions, scheduling higher-priority missions first. (Users may create any number of mission ranks in terms of several criteria, including event, aircraft type, and days until deployment.) When the Scheduler determines that the squadrons are requesting that more missions use an airspace or other activity area than are permitted at any one time, it attempts to reschedule the surplus missions. First, the Scheduler attempts to schedule such a mission at that same activity area at a later time. If that is not possible, the Scheduler attempts to schedule the mission along a different path in its profile, if any are specified. If the mission cannot be scheduled at a later time or at an alternate area, the Scheduler cancels the mission; that event is added to the squadron's backlog, increasing the likelihood that the event will be scheduled on a subsequent day.

The resulting schedule becomes the input for the Operations and Traffic Simulator. Note that this schedule created by the central scheduling process may violate squadron launch requirements or aircraft availability. These violations, variations in travel time, and the interactive effects of non-centrally scheduled missions can lead to simulated activity area usage that differs from scheduled usage.

D.2.4 Other Capabilities

In addition to the basic two-step algorithm for scheduling missions, the Scheduler offers users many capabilities to influence the schedule. When devising the squadrons preferred scheduled, the Scheduler considers many special types of events. For instance, the Scheduler can schedule detachments on pre-specified dates or on dates when the squadron's backlog reaches a pre-determined level. The events during a detachment may be pre-specified or determined by the Scheduler. In addition to detachments, the Scheduler may schedule multiple-day events that possibly occur away from the squadron's home base, such as events performed during cross-country missions. The Scheduler may also limit the dates on which events are performed. For example, the Scheduler might schedule carrier qualification missions only during the two-week period prior to the date on which a carrier is available.

Similarly, during the central scheduling process, the Scheduler considers various types of area usage. Missions may request the area for exclusive use, in which case only missions with which it is coordinated are permitted in the area, or missions may request the area for co-use, in which case either a pre-specified number of aircraft is permitted in the area or a pre-specified volume of the area may be used. (The scheduler permits missions to act as an equivalent number of aircraft, which may differ from the actual number of aircraft; a two-plane Formation flight, for instance, may act as one aircraft.) The Scheduler can also require that certain squadrons use areas during pre-specified time periods, even blocking other squadrons from using the area during those periods.

Finally, the Scheduler determines the sunrise and sunset times, and selects the weather conditions for each activity area on the simulated day. The Scheduler calculates the sunrise and sunset times based on the area's latitude and longitude and the day of the year. The Scheduler selects the weather intensities for each of the three weather types, based on the probabilistic data input by NASMOD analysts. Specifically, analysts enter the probability that each weather condition occurs at an area throughout the day during various seasons of the year.

D.3 The Operations and Traffic Simulator

NASMOD's Operations and Traffic Simulator (Simulator) is an extension of the SIMMOD simulation program; NASMOD includes additional capabilities to reflect military operations.

SIMMOD (and hence NASMOD) is a fast-time, Monte-Carlo computer simulation model. Users create operational scenarios, including a node-link network that represents the airfield structure and the airspace route system, and a flight schedule. The model tracks movements of individual aircraft traveling through the node-link network. As it tracks aircraft, the model detects potential violations of separation standards, flow constraints, or operating procedures, and takes air traffic control actions to resolve these potential conflicts and to ensure that all procedural rules are met. The model maintains various statistics relating to travel and delay times, airspace sector occupancy levels, and airport usage. See the *SIMMOD Version 2.0 Reference Manual* for further discussion of the logic and structure of flight simulation in SIMMOD.

NASMOD adds capabilities to monitor the usage and availability of scarce resources — such as aircraft, instructors, and TACTS pods—and activity areas—such as military operating areas and special use airspace. To make use of these features, NASMOD introduces the concept of a "mission." Missions can fly routes, can acquire and prepare a specific number of a scarce resources, and can use a certain volume of an activity area for a specific amount of time. While flying a route, a mission is called a "flight;" thus, a mission may be composed of a sequence of flights. Missions are scheduled in the model by NASMOD's Scheduler. Some flights are pre-defined outside the model in the database (e.g., to represent commercial traffic). The Simulator then "plays out" each day's schedule of missions and flights.

During the simulation, missions make requests. There are four types of requests:

1. Requests to obtain or release scarce or tangible resources, such as aircraft, instructors, or TACTS pods. A mission requests a specific number of units, and takes a certain amount of time to prepare the resource units once they are acquired (or the mission takes a certain amount of time to return the resource units and prepare them for the next mission).

2. Requests to use an activity area, such as a military operating area, warning area, target range, or fuel pit. A mission requests a specific volume of airspace (or other unit of capacity) in the activity area and uses that volume for a certain amount of time. The volume and the amount of time are dependent upon the activity conducted. The maneuvers associated with a FAM activity, for instance, may take longer than those associated with a FORM activity.

3. Requests to fly an airspace route. The model handles the mission as a flight on an airspace route. The mission's flight interacts with other flights, which may also be missions, and the model imposes appropriate air traffic control actions.

4. Requests to taxi between two ground activity areas, such as a fuel pit and a pad. The model creates a special ground movement "flight" when a mission wishes to taxi between two ground nodes at a modeled airfield. The mission interacts with other aircraft taxiing at the airfield.

Any of these requests may be coordinated. At coordinated requests, two or more missions join to complete the request together. A coordinated airspace route request, for example, can represent a section flight. The sequence of requests that a mission makes is pre-defined in its mission profile.

The Simulator monitors each mission's progress as it proceeds through its mission profile, taking corrective action as necessary. At requests for tangible resources, for example, the Simulator checks that the resource is available before allowing the mission to acquire and prepare the resource; missions will be delayed in a queue if there is not enough available. Similarly, although the Scheduler devises a schedule that should avoid airspace conflicts, delayed and unscheduled missions may impose unexpected demand for airspace resources; thus, missions might be forced to wait for entry into an activity area.

Furthermore, the Simulator evaluates several constraints at each profile step. These constraints include accumulated mission delay (representing remaining fuel reserve), the amount of daylight remaining (if daylight is required for a mission activity), equipment failure, and weather conditions that affect the ability of the mission to be completed. When a constraint is violated the mission aborts its current request. For some violated constraints, the mission may enter permanent abort mode, in which case it makes no new requests to acquire resources or use activity areas. Alternatively, a particular step can specify an abort profile; missions in abort mode transition to the abort profile and execute that profile's sequence of requests.

For example, NASMOD allows users to specify three weather types. A weather condition is modeled as a distinct intensity of each of the three weather types. At each mission profile step requesting a resource or activity, the mission checks the current intensities of each weather type; if the current intensity of any one weather type exceeds the mission's threshold intensity for that type, the mission aborts the request. Because each mission may have a unique profile, with different weather threshold intensities, users can easily create one or more missions that are more weather sensitive than other missions.

Thus, by combining resource and activity requests that are constrained in various ways and by using abort profiles, analysts can use NASMOD to model a variety of scenarios, including simple training missions or complex fleet training exercises with alternative return-to-base maneuvers.

For example, NASMOD is fully capable of modeling an AV–8B rolling vertical landing and hot refueling. During such a landing, the aircraft approaches the runway at a slower-than-normal speed, requiring greater separation with following aircraft than during a regular landing. A NASMOD analyst would separate that landing flight into two flight segment requests: during the initial segment the mission acts as a regular aircraft, and during the final approach segment, the mission acts as a special aircraft type that has longer runway occupancy times and for which the model imposes greater separations with other aircraft. After the landing, the aircraft taxis to the ground activity area associated with the fuel pit, where it requests another activity representing refueling. Following completion of that activity, the mission makes a request to taxi to a pad, another ground activity area, where it departs to perform further activities.

The Operations and Traffic Simulator produces several output files. One of these contains step-by-step information about the execution of each mission. Figure D-1 shows a hypothetical mission profile that might be produced by the Scheduler and read by the Simulator. During the simulation, each step in the profile, or each mission request, is executed sequentially. Table D-1 on the following page translates that mission profile, explaining how the series of steps might correspond to an actual military training mission.

D.3.1 The Performance Calculator

The data files generated by the Operations and Traffic Simulator are in a highly detailed yet “raw” format. The Performance Calculator processes these files to produce an extensive database with tables that summarize travel actions (both on the ground and in the air), area usage, resource usage, and squadron satisfaction of training requirements. This database can subsequently be searched using formal database querying techniques in order to extract the desired results. Further data processing is generally required in order to render the results into a readable format.

D.4 Animation Snapshots

Much of the information that describes how the airspace, airfield, and squadrons function is non-visual; requirements, rules, and procedures are textual database entries. However, the software user interface provides graphical depiction of the spatial relationships between the airfield, airspace, aircraft in flight, and the operating areas. In addition, the software can generate an animation replay of a simulated day on the computer display. This tool is important for visual verification of the accuracy of modeled operations.

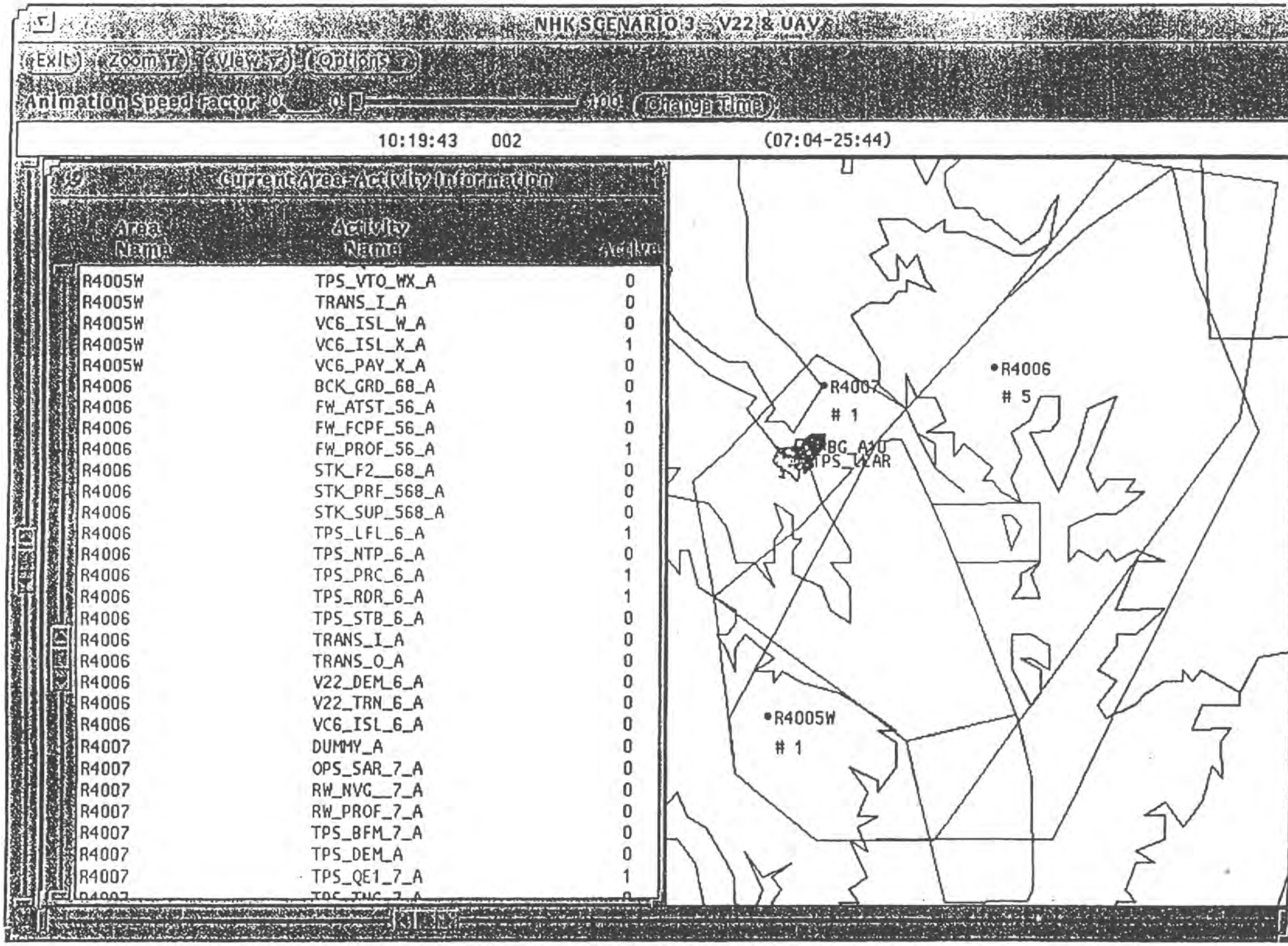
Figure D-2 presents an animation snapshot of the Chesapeake Test Range airspace. NASMOD does not attempt to model the actual flight tracks of aircraft while they are within the various training areas but, instead, logs the time every aircraft enters and departs such areas. The analyst can then choose to display area labels when viewing an animation. When an aircraft enters a modeled area, the counter associated with an area label is incremented. The counter simply lets the analyst know how many aircraft are within the specific training area at that instant. The counter is decremented when an aircraft leaves an area. Such labels and counters are shown in Figure D-2. At the instant of the snapshot (10:19:43 local), there are five aircraft within R-4006, one aircraft in R-4005W, and one in R-4007. Two aircraft icons are seen in close proximity to the airfield. A section flight of A-10 aircraft are conducting GCA touch-and-go operations, and a TPS Lear jet is holding just short of Runway 06, awaiting departure clearance.

Sample Profile

```
    VFA-1.FAM_PROF     #17
1   01 0 0 0 MOA.WXCHECK.NAS NONE 0 0 0 0 20 0 0
2   01 1 0 0 VFA-1.AIRCRAFT.FA18.NAS NONE 0 -1080 0 0
3   00 26 ? ? NAS 0 -1080 0       NAS_MOA_V
4   01 100 2940 3240 MOA NONE 3240 -1080 0 0 20 0 0
5   00 15 ? ? XXX 0 -1080 0       MOA_NAS_INI_V
6   01 0 0 0 NASFCLPPAT_RES ABORT_NASRTGPAT_1TNG_PROF
       0 -1080 0 1 50 0 0
7   01 1 0 0 NASLTGPAT_RES ABORT_NASRTGPAT_1TNG_PROF
       0 -1080 0 99 50 0 0
8   00 53 ? ? XXX 0 -1080 0       NAS_INI_LBRK
9   01 10 0 0 NASLTGPAT NONE 0 -600 0 0
       50 0 0
10  00 20 ? ? XXX 0 -600 0      NAS_LBRK_NASLTGPAT
11  01 -1 0 0 NASLTGPAT_RES NONE 0 -1080 0 0 50 0 0
12  00 24 ? ? NAS 0 -1080 0       NASLTGPAT_LAND
13  01 -1 4800 4800 VFA-1.AIRCRAFT.FA18.NAS NONE 0 -1080 0 0
```

Figure D-1

Animation Snapshot of the Chesapeake Test Range



Area Name	Activity Name	Active
R4005W	TPS_VTO_WX_A	0
R4005W	TRANS_I_A	0
R4005W	VC6_ISL_W_A	0
R4005W	VC6_ISL_X_A	1
R4005W	VC6_PAY_X_A	0
R4006	BCK_GRD_68_A	0
R4006	FW_ATST_56_A	1
R4006	FW_FCPF_56_A	0
R4006	FW_PROF_56_A	1
R4006	STK_F2__68_A	0
R4006	STK_PRF_568_A	0
R4006	STK_SUP_568_A	0
R4006	TPS_LFL_6_A	1
R4006	TPS_NTP_6_A	0
R4006	TPS_PRC_6_A	1
R4006	TPS_RDR_6_A	1
R4006	TPS_STB_6_A	0
R4006	TRANS_I_A	0
R4006	TRANS_O_A	0
R4006	V22_DEM_6_A	0
R4006	V22_TRN_6_A	0
R4006	VC6_ISL_6_A	0
R4007	DUMMY_A	0
R4007	OPS_SAR_7_A	0
R4007	RW_NVG__7_A	0
R4007	RW_PROF_7_A	0
R4007	TPS_BFM_7_A	0
R4007	TPS_DEM_A	0
R4007	TPS_QE1_7_A	1

Figure D-2

Table D-1

Profile Description

Profile Step	Step Description
1	Check weather at activity area; if the weather exceeds a specified intensity (20), cancel the mission.
2	Request a F/A-18 aircraft from squadron VFA-1. If none is immediately available, wait up to 1080 seconds (18 minutes), and then cancel the mission.
3	Fly the route NAS_MOA_V from NAS to MOA.
4	Perform an activity at the MOA that requires 100 volume units. The activity takes between 2940 and 3240 seconds (49 to 54 minutes). Before commencing the activity, check the amount of daylight remaining; if there is not at least 54 minutes of day remaining, do not perform the activity (go to the next profile step). If the area is not immediately available, wait up to 18 minutes for it to become available, and then go to the next profile step. If the weather intensity at the activity area exceeds 20, do not perform the activity; instead, go to the next profile step.
5	Fly the route MOA_NAS_INI_V from the MOA to the initial point at NAS.
6	Check the pattern for FCLPs. If FCLPs are being conducted, go (“abort”) to the right pattern to do touch-and-go landings.
7	Try to enter the left touch-and-go pattern. If full, abort to the right pattern to do touch-and-go landings.
8	Fly the route NAS_INI_LBRK from the initial through the left break.
9	Request the touch-and-go activity.
10	Fly the route NAS_LBRK_NASLTGPAT from the break through the first replication of the pattern.
11	Check out of the pattern, allowing others to enter.
12	Fly the route NASLTGPAT_LAND, which brings the aircraft to a full-stop landing.
13	Return the F/A-18 aircraft to VFA-1. Take 80 minutes to do maintenance on the aircraft before returning it to service for other missions to use.

Information" in the figure. The items in red are activities that are occurring at that instant during the animated replay of the simulation. This can be verified on the main animation display by observing the corresponding area labels and counters.

Figure D-3 is a NASMOD animation snapshot of the computer display that shows the NAWC Patuxent River airfield. Note the positions of the various aircraft. The symbology conveys information about each aircraft. The attitude of an aircraft icon shows the general direction of travel. A number of labels may be displayed for each icon as described in the following text box.

Potential Labels Displayed for Aircraft Icon

STK_FA18 Squadron—Strike Directorate F/A-18(C/D)

10Altitude—10 hundred feet (i.e., 1000 feet)

152 ktSpeed—152 nautical miles per hour, true airspeed

The animation can also identify the nature of the aircraft behavior by a user-selected color. In Figure D-3, blue denotes arriving or en route aircraft, green denotes departing aircraft, and red denotes holding aircraft. Note that the icons are not intended to reflect the actual size of the aircraft.

In the snapshot, there are three aircraft in the air and two moving on the airfield. The Lear jet (TPS_LEAR) is on final for Runway 6. The two Strike F/A-18 (STK_F18) aircraft have just performed an overhead break and are on the downwind leg for full-stop arrivals to Runway 6 as well. The S-3 aircraft from Force Warfare (FW_S3) has just landed and is taxiing back to the line. Finally, the TPS F/A-18 is taxiing from the TPS hangar area to depart the airfield on Runway 6.

Animation Snapshot of the NAS Patuxent River Airfield

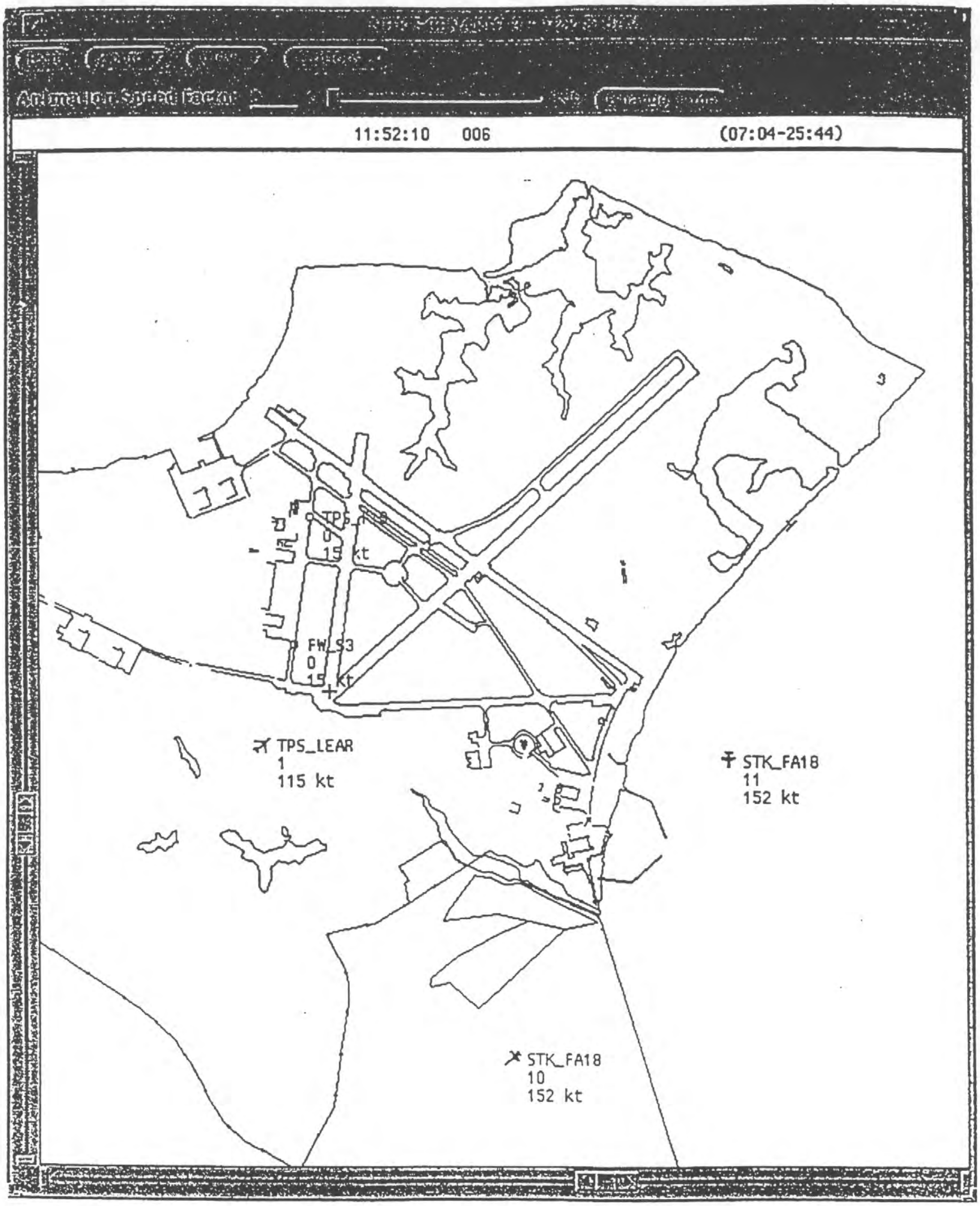


Figure D-3

APPENDIX E

AIR QUALITY

APPENDIX E

AIR QUALITY ANALYSIS

This appendix describes the procedures and methodologies used for determining the total net change in annual criteria pollutant emissions resulting from proposed Patuxent River Complex operations. (Given the large amount of tabular data relative to text in this appendix, all tables are presented at the end of the text.) These estimated net emission changes were determined for the following reasons:

- From a NEPA perspective, evaluating air pollutant emissions impact on regional basis from proposed air field operations within all restricted areas of Chesapeake Test Range (CTR); and

- From a general conformity applicability perspective, making an applicability determination pursuant to the General Conformity rule for aircraft operations within the restricted area R-4007A that would have impact on the ozone nonattainment area in Calvert County, Maryland.

Air emissions calculated in this document from operations in the Patuxent River Complex include:

- Aircraft engine emissions;

- Other mobile source emissions from ground support equipment (GSE) and maintenance runups; and

- Stationary source emissions from boilers, jet engine test cells, etc.

The resulting air pollutant emission levels were calculated for the following scenarios:

- Existing conditions (FY 1996);

- No Action Alternative;

- Operational Workload I Alternative;

- Operational Workload II Alternative; and

- Operational Workload III Alternative.

For each alternative, the total emission level of each criteria pollutant was first calculated. The total net emission change for each of the alternatives was then determined based on the emission difference between that alternative and the No Action Alternative.

The Patuxent River Complex operations would occur within Maryland, Virginia and Delaware, which are part of the northeast ozone transport region. The air emissions from the operations would have an effect on a regional level. All operations would take place within an ozone *attainment* area except for limited R-4007A operations that would occur in Calvert County, Maryland, which is an ozone *nonattainment* area.

The USEPA has developed the general conformity rule that is applicable to federal action that occurs in nonattainment areas. If the total project nonattainment emissions in nonattainment areas would be 1) below the de minimis levels established in 40 CFR Part 93 and 2) less than ten percent of regional emission budget, the project air quality impact is considered not significant on both local and regional levels, and a formal conformity analysis would not be necessary for the project.

In order to determine the project air quality impact, the total net changes in NO_x and VOC emissions from Patuxent River Complex aircraft operations that would occur in the ozone nonattainment area were first compared with the de minimis level and then compared with the available SIP future target emission levels established for the Washington, DC-MD-VA serious ozone nonattainment area.

Total air pollutant emissions and total net change in emissions over the No Action Alternative are summarized in Tables E-1 to E-5. Total emissions and total net change in emissions over the No Action Alternative that would occur in Calvert County ozone nonattainment area are summarized in Table E-6. Based on the emission estimates, the impact from increased operations for any of the alternatives would not be significant.

The following sections detail the methodologies, assumptions and procedures employed for emission estimates for each identified emission source.

E.1 Aircraft

Aircraft engine emissions were estimated using the methods, emission factors, time-in-mode (TIM) values, and aircraft/engine operation data obtained from the following references:

- The Procedures of Emission Inventory Preparation, Volume IV: Mobile Sources (USEPA, 1992);
- Aircraft engine emission factors developed by the Navy's Aircraft Environmental Support Office (AESO, 1993 and Coffer, 1997);
- Site-specific data for engine power settings with respect to operating mode in specific aircraft operations provided by Eagan, McAllister Associates, Inc. (1997);

C Aircraft/engine types provided by Eagan, McAllister Associates, Inc. (1998); and

C Aircraft flight operation data (ATAC, 1997; Bock, 1998).

E.1.1 Aircraft Engine Emissions

Aircraft engines emit pollutants during all phases of operation, whether idling on the ground or in flight. However, only those emissions emitted below the atmospheric mixing layer would have a potential air quality impact on ground-level ambient concentrations. The mixing layer is the air layer between the ground and the height above which the vertical mixing of pollutants decreases significantly. The USEPA recommends that a default mixing layer of 915 meter(m) (3,000 feet(ft)) be used in aircraft emission calculations (USEPA, 1992). Therefore, aircraft emissions released above 915 m (3,000 ft) were not included in this study.

Landing and Takeoff Emissions

Aircraft landing and takeoff (LTO) operations as defined in *Procedures of Emission Inventory Preparation Volume IV: Mobile Sources (Procedures)* (USEPA, 1992) generally exclude in-flight operations. The LTO operating modes that emit pollutants within the mixing layer include: taxi/idle-out, takeoff, climbout, approach, and taxi/idle-in.

Specific pollutant emission rates are associated with each engine operating mode discussed above. Each aircraft operating mode corresponds to a specific engine power setting and emission factors were developed corresponding to each engine power setting. Therefore, the total emissions per aircraft, pollutant and operating cycle were calculated using the following equation recommended by the USEPA (USEPA, 1992):

$$E_{-l} = 3 \ (TIM_{jk}) \text{ x } (FF_{jk}/1000) \text{ x } (EI_{ijk}) \text{ x } (NE_l) \qquad \text{(Eq. E-1)}$$

where:

E_{ijl}	=	total emissions of pollutant i produced by engine type j per aircraft operating cycle (lbs) for aircraft l
TIM_{jk}	=	time-in-mode for operating mode k for engine type j (minutes)
FF_{jk}	=	fuel flow rate for operating mode k for each engine used on engine type j (lbs fuel/minute)
EI_{ijk}	=	emission index (emission factor) for pollutant i in operating mode k for engine type j (lb/10^3 lbs fuel)
NE_l	=	number of engines used on aircraft l

Emission factors and corresponding fuel flow rates were obtained either from USEPA (1992) or from *AESO* (1993) and engine power settings for each operating mode for each aircraft were obtained through an airfield pilot survey (1997). Since emission factors are not available for every specific engine type used in the Patuxent River Complex, emission factors for a similar type of engine were used as a substitute based on recommendations provided by *AESO* (Coffer, 1997). Table E-7 lists the engine models used in the Patuxent River Complex and the substitute engine types used for emission calculations.

Time-in-mode (TIM) data for aircraft operations for all operating modes except for taxi-in, taxi-out and hot refueling were based on the default values provided in *Procedures* for:

- US Navy combat aircraft;
- US Navy trainer-turbine aircraft;
- US Navy transport-turbine aircraft; and
- Military helicopters.

TIM for the taxi-in, taxi-out and hot refueling operating modes was obtained from Eagan, McAllister Associates, Inc. (1997).

In-Flight/Circle Emissions

The aircraft in-flight/circle time (including GCA box circle time, pattern in-flight, etc.) below 915 m (3,000 ft) was derived for each aircraft type based on:

- Flight altitude profiles for each aircraft provided by Wyle Research (1997); and

- Number of operations and total flight hours provided by ATAC (ATAC, 1997) and Eagan, McAllister Associates, Inc. (Bock, 1998).

The flight altitude profile for each aircraft is presented in Table E-8. The altitude profile of the KC-135 was used for the C-135, C-5A and E-6A aircraft types (Wyle Research, 1997). For certain aircraft operations, such as F/A-18 or Lear 24, flight altitudes are identified within a range that includes flight altitudes above and below 915m (3,000 ft). In emission estimates for these operations, it was assumed:

- 50 percent of in-flight would be below 915 m (3,000 ft) mixing height if altitude range is 305 m to 1,524 m (1,000 ft to 5,000 ft); and

- 30 percent of in-flight would be below 915 m (3,000 ft) mixing height if altitude range is 305 m to 3,050 m (1,000 ft to 10,000 ft).

The total flight hours developed in the ATAC and Eagan, McAllister Associates, Inc. reports were based on the time when an aircraft is off the ground, which includes part of LTO cycle time such as the time for takeoff, approach and climbout, and the in-flight time above 915 m (3,000 ft) mixing height. Therefore, the in-flight/circle hours below 915 m (3,000 ft) were determined by:

C Subtracting the total hours for takeoff, approach and climbout from the total flight hours to determine in-flight/circle hours; and then

C Subtracting the total in-flight/circle hours above 915 m (3,000 ft) based on altitude profile for each aircraft (Table E-8) from the in-flight/circle hours described above.

The following equation was used to determine total in-flight/circle time below 915 m (3,000 ft):

$$TIT_j = (TFH_j - 3\ (NO_{jk} \times TIM_{jk}/60)) \times PFH_j \qquad \text{(Eq. E-2)}$$

where:

TIT_j	=	total in-flight/circling time for engine type j (hours)
TFH_j	=	total flight hours for engine type j (hours)
NO_{jk}	=	number of operations associated with time-in-mode k for engine type j
TIM_{jk}	=	time-in-mode k for LTO modes (takeoff, approach, and climbout) for engine type j (minutes)
PFH_j	=	percentage of flight hours below 915 m (3,000 ft) for engine type j

The total emissions for each aircraft in-flight/circle emissions for each pollutant were then calculated using the following equation:

$$E_{ijl} = TIT_j \times FF_j/1000 \times EI_{ij} \times NE_l \qquad \text{(Eq. E-3)}$$

where:

E_{ijl}	=	in-flight/circling emissions for aircraft l, engine type j, and pollutant i (lbs)
TIT_j	=	total in-flight/circling time for engine type j (hours)
FF_j	=	fuel flow rate per engine for engine type j (lb/hr)
EI_{ij}	=	emission index (factor) for pollutant i for engine type j (lb/1000 lb fuel)
NE_l	=	number of engines used for aircraft l

E.1.2 Aircraft Operations

The number and types of operations that were incorporated in the aircraft emission estimates for each alternative were determined based on the operational data developed by ATAC (1997) and Eagan, McAllister Associates, Inc. (1998). In the ATAC report, field operations are characterized in five different categories and each category includes several operating types in addition to in-flight/circle type:

- Departure: taxi-out, takeoff, and climbout;
- Arrival: approach and taxi-in;
- T&G: takeoff, climbout and approach;
- GCA Box: takeoff, climbout, approach and circling; and
- Catapult Launch/Recovery: taxi-out, takeoff, climbout, approach, taxi-in (full LTO).

Each complete operation identified as T&G or GCA or Catapult Launch/Recovery was considered as two operations (departure and arrival) in ATAC and Eagan, McAllister Associates, Inc. reports. Therefore, the total operation numbers (full LTO) used in the air emission analysis for these three types of operations were half of the operations provided by ATAC and Eagan, McAllister Associates, Inc.

For certain types of aircraft, only generic aircraft types (such as H-1, H-2, E-2/C-2, F-14, H-60 and P-3, etc.) are identified in the ATAC report. More specific aircraft types used on the airfield were obtained from Eagan, McAllister Associates, Inc. (1998) and used in the emission estimate. The specific aircraft type within the same generic aircraft type can have different engine types, which results in different air emissions. As an example, F-14 generic operations consist of F-14A and NF-14D specific operations and these two specific aircraft have different types of engines.

Some aircraft periodically require a hot refueling operation after landing. Hot refueling occurs while the engine is idling. The duration of each hot refueling operation and the percentage of hot refueling over the total flight operations were provided by Eagan, McAllister Associates, Inc. (1998).

E.1.3 Sample Aircraft Emission Calculation

Summaries of aircraft emissions are presented in:

- Tables E-9 to E-13 for the total emissions by aircraft type within the entire CTR; and

- Tables E-14 to E-18 for the total emissions by aircraft type within the nonattainment area, Calvert County, Maryland.

The procedures used for calculating emissions for each aircraft type generally included:

- Obtaining emission factors for each aircraft engine type (or for substitute engine type);

- Determining the TIM for each engine power setting that corresponds to the applicable aircraft operating mode;

- Using site-specific TIMs for taxi-in, taxi-out, and hot refueling operations;
- Calculating the emission rates per operating type of an aircraft using equation E-1 (except for in-flight/circle operations);
- Multiplying emission rates by the annual number of operations per aircraft type;
- Calculating emissions from in-flight/circle using equations E-2 and E-3; and
- Determining total annual emissions by combining emissions from all types of operations for each aircraft type.

A sample calculation for A-6E aircraft engine CO emissions under existing conditions is presented as follows:

Straight-in Arrival

Approach: TIM = 1.6 min, FF = 5752 lb fuel/hr, EI = 3.18 lb CO/1000 lb fuel
Taxi in: TIM = 10.0 min., FF = 779 lb/hr, EI = 55.96 lb CO/1000 lb fuel
The number of engines (NE) = 2
The number of arrival operations = 23

Based on equation E-1 and the number of arrival operations, emissions from the approach and taxi in were calculated as follows:

Approach emissions = 1.6 min x 1hr/60min x 5.752 1000 lb fuel/hr x 3.18 lb CO/1000 lb fuel x 1ton/2000lb x 2 engines x 23 opeartions = 0.01 tons
Taxi in emissions = 10.0 min x 1hr/60min x 0.779 1000 lb fuel/hr x 55.96 lb CO/1000 lb fuel x 1ton/2000lb x 2 engines x 23 operations = 0.17 tons
Total Straight-in Arrival emissions
= 0.01 tons + 0.17 tons = 0.18 tons CO

Other Operations

The emissions determined for other types of operations (excluding in-flight/circle operations) were based on the same procedures used for Straight-in Arrival emission calculation described above and these emissions are:

Departure:	0.64 tons
Break type arrival:	0.49 tons
GCA box:	0.02 tons
Touch & Go:	0.17 tons
Subtotal:	1.32 tons

In-Flight/circle Operations

TFH	= 102 hours
$TIM_{approach}$	= 1.6 min
$TIM_{takeoff}$	= 0.4 min
$TIM_{climbout}$	= 0.5 min
$NO_{approach}$	= 23 (straight-in arrival)+63 (break type arrival)+40 (GCA box)+241(T&G) = 367
$NO_{takeoff}$	= 86(departure)+40(GCA box)+241(T&G)= 367
$NO_{climbout}$	= 86(departure)+40(GCA box)+241(T&G)= 367
PFH	= 20%

Total in-flight/circle time was calculated using equation E-2:

TIT = (102 hours-(1.6 min x 367 + 0.4 min x 367 + 0.5 min x 367) x 1hr/60min) x 20%
= 17.34 hours

Total in-flight/circle emissions were then calculated using equation E-3 as follows:

FF = 5,752 lb fuel/hour = 5.752 1000 lb fuel/hour
EI = 3.18 lb CO/1000 lb fuel
NE = 2

then

E = 17.34 hours x 5.752 1000 lb fuel/hour x 3.18 lb CO/1000 lb fuel x 2 x 1ton/2000 lb)
= 0.32 tons

Total CO Emissions

Total CO annual emissions from A-6E flight operations within the CTR (Table E-9) equal to:

Straight-in Arrival emissions + other operation emissions + in-flight/circle emissions
= 0.18 + 1.32 + 0.32 =1.82 tons

The same calculation procedures were employed for the other types of aircraft and the annual total emissions were determined by combining emissions from all aircraft types. Total emissions were then determined for other criteria pollutants and for existing conditions and all alternatives.

Given a total of 53 types of aircraft used in the Patuxent River Complex and five analysis scenarios (existing conditions and four alternatives), a total of 265 calculation worksheets were generated for aircraft emission estimates. Five sample worksheets prepared for calculating F/A-18A emissions are presented in this appendix (Tables E-19 through E-23).

E.2 Other Mobile Sources

Other mobile sources at the Patuxent River Complex would also contribute to air emissions. These include ground support equipment (GSE), auxiliary power unit (APU), and engine maintenance and preflight runups.

E.2.1 GSE and APU

GSE includes various vehicles and equipment used along the flight line to support aircraft operations, such as tow tractors, jet engine start units, and service vehicles.

When large aircraft are on the ground with engines shut down, they need power and preconditioned air to maintain the aircraft's operability. If a ground-based power and air generator is unavailable, an APU, which is part of the aircraft, is operated. These units are essentially small jet engines, which generate electricity and compressed air. They burn jet fuel and generate exhaust emissions like larger engines. In use, APUs essentially run at full throttle.

GSE and APU emissions (Tables E-24 to E-28) were calculated using the average amount of fuel used for each GSE and APU based on a review of equipment and fuel logs provided by Eagan, McAllister Associates, Inc. (1998) and GSE and APU operation information (Bock, 1997). Emission factors for uncontrolled gasoline and diesel engines provided in *Compilation of Air Pollutant Emission Factors (AP-42) (Volume I and Volume IV) (USEPA, 1991)* and *Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO, 1993)* were used to calculate emissions.

E.2.2 Aircraft Maintenance and Preflight Runups

In-aircraft engine testing is performed on a routine basis at Patuxent River Complex in designated areas. These engine tests consists of:

- Maintenance runups that are performed as necessary after engine maintenance events. Each engine is tested at specific power settings that correspond to typical operating modes such as idle, takeoff, climbout and approach for various durations; and

- C Preflight runups that are performed as necessary before aircraft is takeoff. Each engine is tested mostly in idle mode.

The total emission estimates for existing and all alternatives are determined based on the numbers and types of engine maintenance and preflight runups provided by Wyle Research (1998) and presented in Tables E-29 through E-33. Emission rates per runup power setting were calculated by multiplying the time in each power setting by the appropriate fuel flow rate and the emission factors found in *Procedures for Emission Inventory Preparation Volume IV: Mobile Sources (USEPA, 1992)* and the *Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO, 1993)*.

E.3 Stationary Sources

E.3.1 NAS Patuxent River

There are total of 14 source categories identified as stationary emission sources at NAS Patuxent River from the most recent emission inventory report (Johnson, 1997). These sources are described in Table E-34 and their associated emission levels for existing conditions and all alternatives are included in Tables E-1 through E- 5.

The existing emission levels for each identified stationary source were provided in *Criteria and Hazardous Air Pollutant Emissions Inventory, NAS Patuxent River* (Johnson, October 1997). The emission levels for each alternative were determined based on comparison of the operational scale for each alternative at the Patuxent River Complex with the emission assumptions include:

- C No Action Alternative levels would remain the same as the existing conditions;
- C Workload I Alternative levels would remain the same as the No Action Alternative;
- C Workload II Alternative levels would be approximately ten percent more than the No Action Alternative; and
- C Workload III Alternative would be approximately 20 percent more than the No Action Alternative.

E.3.2 Webster Field

The types of stationary emissions sources at Webster Field include: boilers, emergency generators, paint booths, and degreasers. Facility-wide existing criteria pollutants data (Johnson, January 1998) are included in the stationary source emissions summarized in Tables E-1 to E-5. The same assumptions described in E.3.1 are employed for each alternative in emission estimates.

E.4 Clean Air Act Conformity

This analysis was prepared pursuant to the Clean Air Act General Conformity Rule (GCR) with guidance provided by the *Chief of Naval Operations Draft Interim Guidance Document on Compliance with the Clean Air Act General Conformity Rule* (Department of the Navy, April 26, 1994). In order to determine the applicability of general conformity requirements for a proposed project, the GCR requires that the potential emissions generated from the project related construction activity and increased operational activity be determined on an annual basis and compared to the annual *de minimis* levels for those pollutants (or their precursors) for which the area is classified as nonattainment. What this means from a regulatory perspective is that an analysis of project-related construction and operational period emissions is conducted to see if the de minimis emission levels are exceeded. If levels are determined to be below de minimis, no further analyses are necessary and a Record of Non-Applicability (RONA) is prepared. If de minimis levels are exceeded, a more detailed general conformity analysis is required.

Although there would be a change in emissions associated with construction activities and vehicular traffic on and off Patuxent River Complex, these emissions would not occur in nonattainment areas. Therefore, for general conformity determination purposes, only engine emissions attributable to aircraft in-flight/circle operations that would occur below 915 m (3,000 ft) were analyzed.

The nonattainment areas that are located within the CTR include:

- A portion of Sussex County, Delaware, which has been designated as marginal ozone nonattainment area. Part of this county would be within R-4006, however, the flight altitude profile applied to R-4006 is 100 percent above the mixing height of 915 m (3,000 ft). Therefore, aircraft in-flight emissions would have no impact on this area and no emission estimates would be necessary;

- A portion of Calvert County, Maryland, which has been designated as a serious ozone nonattainment area as a part of the Washington DC-MD-VA serious ozone nonattainment region. Part of this county is within R-4007A. The proposed flight operations within this area (R-4007A) would be partially below the 915 m (3,000 ft) mixing height. Therefore, the aircraft flight emission impacts on Calvert County were further evaluated and project general conformity applicability was determined accordingly. For a serious ozone nonattainment area, 45 metric tons per year (tpy) (50 tpy) of NO_x or VOCs is the de minimis criterion.

Calvert County is located approximately 1.6 kilometers (km) (one mile) north of the NAS Patuxent River. For different aircraft and different types of operation, the time would be different for each aircraft to either reach the county or leave the county to land at other Patuxent River Complex fields. The aircraft emissions that could potentially be emitted in this county were conservatively estimated by including all in-flight emissions (takeoff, climbout, approach and in-flight/circle) for each aircraft that would be operated within R-4007A. The net changes in in-flight emissions for each of three proposed alternatives from the No Action Alternative were calculated based on the following procedures:

- Identify aircraft in-flight operational hours within R-4007A for each aircraft type;
- Calculate the area of Calvert County that is located within R-4007A as a percentage of the entire R-4007A area (approximately eight percent was determined);
- Calculate total emission levels for nonattainment pollutants (NO_x and VOC) under existing conditions and for each alternative based on the data described above and associated aircraft emission factors for in-flight operation for each applicable aircraft described in E.1;
- Calculate the net change in total nonattainment pollutants (NO_x and VOC) for each workload alternative from emission levels under the No Action Alternative; and
- Compare these net changes with the de minimis values, as well as the regional emission budget, to make the general conformity applicability determination.

The detailed emission calculation worksheets are presented in Tables E-35 through E-39. The results of this analysis, as summarized in Table E-6, indicate no exceedance of the *de minimis* criteria level of 45 metric tpy (50 tpy) for NO_x or VOC for any alternatives. Furthermore, since the annual total net emission changes do not make up ten percent or more of the available Washington, DC-MD-VA regional target emission levels for NO_x of 211,149 metric tpy (232,543 tpy) and for VOC of 120,272 metric tpy (132,459 tpy), the emission increases resulting from the proposed alternatives at the Patuxent River Complex would not be regionally significant. Therefore, all three workload alternatives would have no significant air quality impact on nonattainment areas within the CTR and thus a formal Conformity Determination is not required.

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Table E-1
Patuxent River Complex Total Emissions Inventory (Existing)

Source Category	Emission Level (tpy)				
	NO_x	VOCs	CO	PM10	SO_2
Mobile Source					
Aircraft Flight Operation	216.4	81.9	407.9	116.8	9.1
-- ozone attainment area	214.0	81.7	405.6	115.7	9.0
-- ozone nonattainment area	2.4	0.2	2.3	1.1	0.1
GSE and APU	5.0	0.4	1.8	0.3	0.3
Maintenance and Pre-flight Runup	49.7	44.6	287.0	27.9	2.1
Mobile Source Subtotal	271.1	126.9	696.7	145.0	11.5
Stationary Source Subtotal[1]	77.5	26.6	20.8	7.8	37.8
Grand Total (tpy)	348.6	153.5	717.5	152.8	49.3
Grand Total (metric tpy)	316.2	139.2	650.9	138.6	44.7

Source: NAS Patuxent River Air Emissions Inventory (Johnson, 1997) and NAWCAD Webster Field Air Emission Data (Johnson, 1998).

Table E-2
Patuxent River Complex Total Emissions Inventory (No Action)

Source Category	Emission Level (tpy)				
	NO_x	VOCs	CO	PM10	SO_2
Mobile Source					
Aircraft Flight Operation	171.6	94.3	481.5	95.9	7.3
-- ozone attainment area	169.9	94.1	479.4	95.2	7.2
-- ozone nonattainment area	1.7	0.2	2.1	0.7	0.1
GSE and APU	5.2	0.4	1.9	0.3	0.4
Maintenance & Preflight Runup	51.9	64.1	308.6	31.9	2.3
Mobile Source Subtotal	228.7	158.8	792.0	128.1	10.0
Stationary Source Subtotal[1]	77.5	26.6	20.8	7.8	37.8
Grand Total (tpy)	306.2	185.4	812.8	135.9	47.8
Grand Total (metric tpy)	277.8	168.2	737.4	123.3	43.4

Source: Stationary source emissions for No Action Alternative are the same as for existing conditions (Johnson, 1997).

Table E-3

Patuxent River Complex Total Emissions Inventory (Workload I)

Source Category	Emission Level (tpy)				
	NO_x	VOCs	CO	PM10	SO_2
Mobile Source					
Aircraft Flight Operation	210.0	109.9	524.7	109.1	8.7
-- ozone attainment area	208.1	109.7	522.5	108.3	8.6
-- ozone nonattainment area	1.9	0.2	2.2	0.8	0.1
GSE and APU	5.3	0.4	1.9	0.3	0.4
Maintenance and Pre-flight Runup	52.0	66.7	314.5	32.7	2.3
Mobile Source Subtotal	267.3	177.0	841.1	142.1	11.4
Stationary Source Subtotal[1]	77.5	26.6	20.8	7.8	37.8
Grand Total (tpy)	344.8	203.6	861.9	149.9	49.2
Grand Total (metric tpy)	312.8	184.7	781.9	136.0	44.6
Total Net Change from No Action Alternative	38.6	18.2	49.1	14.0	1.4
Washington, DC-MD-VA Ozone Nonattainment Area 1999 Target Emissions[2]	232,542	132,459	--	--	--

Note: [1]. Workload I Alternative stationary sources emissions were assumed to be the same as the No Action Alternative (Johnson, 1997).
[2]. Source: Washington, DC-MD-VA Ozone SIP Revision (MWCOG, 1997).

Table E-4

Patuxent River Complex Total Emissions Inventory (Workload II)

Source Category	Emission Level (tpy)				
	NO_x	VOCs	CO	PM10	SO_2
Mobile Source					
Aircraft Flight Operation	232.7	119.4	557.7	118.2	9.6
-- ozone attainment area	230.6	119.2	555.3	117.3	9.5
-- ozone nonattainment area	2.1	0.2	2.4	0.9	0.1
GSE and APU	6.2	0.5	2.3	0.3	0.4
Maintenance and Pre-flight Runup	57.3	74.7	348.3	36.1	2.5
Mobile Source Subtotal	296.2	194.6	908.3	154.6	12.5
Stationary Source Subtotal[1]	85.3	29.3	22.9	8.6	41.6
Grand Total (tpy)	381.5	223.9	931.2	163.2	54.1
Grand Total (metric tpy)	346.1	203.1	844.8	148.1	49.1
Total Net Change from No Action Alternative	75.3	38.5	118.4	27.3	6.3
Washington, DC-MD-VA Ozone Nonattainment Area 1999 Target Emissions[2]	232,542	132,459	--	--	--

Note: [1]. Workload II Alternative stationary sources emissions were assumed to increase 10 % from the No Action Alternative (Johnson, 1997).
[2]. Source: Washington, DC-MD-VA Ozone SIP Revision (MWCOG, 1997).

Table E-5

Patuxent River Complex Total Emissions Inventory (Workload III)

Source Category	Emission Level (tpy)				
	NO_x	VOCs	CO	PM10	SO_2
Mobile Source					
Aircraft Flight Operation	255.3	128.8	590.6	128.1	10.6
-- ozone attainment area	252.9	128.6	588.1	127.1	10.5
-- ozone nonattainment area	2.4	0.2	2.5	1.0	0.1
GSE and APU	7.1	0.5	2.6	0.4	0.5
Maintenance and Pre-flight Runup	62.0	79.9	375.7	38.7	2.7
Mobile Source Subtotal	324.4	209.2	968.9	167.2	13.8
Stationary Source Subtotal[1]	93.0	31.9	25.0	9.4	45.4
Grand Total (tpy)	417.4	241.1	993.9	176.6	59.2
Grand Total (metric tpy)	378.6	218.8	901.6	160.2	53.7
Total Net Change from No Action Alternative	111.2	55.7	181.1	40.7	11.4
Washington, DC-MD-VA Ozone Nonattainment Area 1999 Target Emissions[2]	232,542	132,459	--	--	--

Note: [1]. Workload III Alternative stationary sources emissions were assumed to increased 20% from the No Action Alternative (Johnson, 1997).
[2]. Source: Washington, DC-MD-VA Ozone SIP Revision (MWCOG, 1997).

Table E-6

Total Aircraft Emissions in Calvert County Ozone Nonattainment Area

Scenario	Emission Level (tpy)				
	NO_x	VOCs	CO	PM10	SO_2
Total Emissions					
Existing Level	2.4	0.2	2.3	1.1	0.1
No Action Alternative	1.7	0.2	2.1	0.7	0.1
Workload I Alternative	1.9	0.2	2.2	0.8	0.1
Workload II Alternative	2.1	0.2	2.4	0.9	0.1
Workload III Alternative	2.4	0.2	2.5	1.0	0.1
Net Emission Change from No Action Alternative					
Workload I Alternative	0.2	0.0	0.1	0.1	0.0
Workload II Alternative	0.4	0.0	0.3	0.2	0.0
Workload III Alternative	0.7	0.0	0.4	0.3	0.0
Serious Ozone Nonattainment Area De Minimis Level[1]	50	50	--	--	--
Washington, DC-MD-VA Ozone Nonattainment Area 1999 Target Emissions[2]	232,542	132,459	--	--	--

Source: [1]. 40 CFR 93
[2]. Washington, DC-MD-VA Ozone SIP Revision (MWCOG, 1997)

Table E-7
List of Aircraft and Engines

Generic Aircraft Type(a)	Full Description Aircraft Type (b)	Engine Type (c)	Substitute Engine Type (d)
A-10 (A-10A)	A-10A	TF34-GE-100	
A-6 (A-6E)	A-6E	J52-P-408	
BEECH 99 (Beech C99)	BEECH C99	PT6A-36	PT6A-41
C-12 (UC-12B)	UC-12B	PT6A-41	
C-130 (C-130T/KC-130F)	C-130T	T56-A-16	
	KC-130F	T56-A-16	
C-135	C-135	TF33-P-5	
Cessna 185	Cessna 185	IO-520-D flat six cyl.	TSIO-360
C-5	C-5A	CF6-80C2	
E-2/C-2	E-2C	T56-A-427	T56-A-16
	C-2A	T56-A-425	T56-A-16
E-6	E-6A	CFM56-2A-2	
EA-6	EA-6B	J52-P-409	J52-P-408
F-111	F-111A	TF30-P-100	TF30-P-103 (e)
F-14	F-14A	TF30-P-412A	
	NF-14D	F110-GE-400	F110-GE-400 (e)
F-15	F-15	F100-PW-220	
F-16	F-16N	F110-GE-100	
F/A-18E	F/A-18E	F414-GE-400	
F/A-18F	F/A-18F	F414-GE-400	
H-1	UH-1N	PT6T-3B	T400-CP-400 (f)
	AH-1W	T700-GE-401	
H-2	SH-2F	T58-GE-8F	
	SH-2G	T700-GE-401	
H-3	SH-3H	T58-GE-10	T58-GE-16
	NVH-3A	T58-GE-8F	
H-46	CH-46E	T58-GE-16	
H-53	CH-53E	T64-GE-419	T64-GE-415
H-57	TH-57C	250-C20-J	T63-A-5A
H-58	OH-58A	T63-A-720	T63-A-5A
	OH-58C	T63-A-720	T63-A-5A
H-6	TH-6B	T720	T700-GE-401(e)
H-60	UH-60A	T700-GE-700	T700-GE-401
	SH-60B	T700-GE-401C	T700-GE-401
	SH-60F	T700-GE-401C	T700-GE-401
	HH-60H	T700-GE-401C	T700-GE-401
H-64	AH-64	T700-GE-701	T700-GE-401
LEAR 24	LEAR 24	CJ610-6	J85-GE-2
NU-1B	NU-1B	R-1340 S1H1-G (9cyl.)	R-1820
P-3	P-3C	T56-A-14	T56-A-16
	UP-3A	T56-A-14	T56-A-16
	NP-3D	T56-A-14	T56-A-16
S-3	S-3B	TF34-GE-2	TF34-GE-400 (f)
T-2	T-2C	J85-GE-4	J85-GE-2
T-33	T-33	J33-A-35	

Table E-7 (continued)
List of Aircraft and Engine Types

Generic Aircraft Type(a)	Full Description Aircraft Type (b)	Engine Type (c)	Substitute Engine Type (d)
T-34	T-34C	PT6A-25	PT6A-27
T-38	T-38A	J85-GE-5G/H/J	J85-GE-2
T-39	T-39D	JT12-A-8	J60-P-5B
T-45	T-45A	F405-RR-400L	F405-RR-401(e)
TC-4C	TC-4C	DART-MK529-8X	T58-GE-16
TF-51	TF-51D	V-1650-7/-9/-11	R-3350
UV-18A	UV-18A	PT6A-27	
U-21	U-21F	PT6A-28	PT6A-27
U-6	U-6A	R-985-AN-1/-3/...	R-1820
UH-3	UH-3H	T58-GE-10	T58-GE-16
V-22	NV-22B	T406-AD-400	
F/A -18 A/B/C/D	F/A -18 A/B/C/D	F404-GE-400/-402	F404-GE-400 (e)
UAV	UAV	various small engines	not modeled

Notes:
(a) Generic aircraft types without full description were provided by ATAC (ATAC, 1997).
(b) Full description aircraft types were provided by the EMA (Bock, 1997).
(c) Engine types were provided by EMA (Bock, 1997).
(d) Substitute engines were recommended by AESO (Coffer, 1997) except those with notes.
(e) Substitute with most similar engine types which have emission factor information.
(f) Used Engine types listed in AESO reference (Coffer, 1997).

Table E-8
Typical Altitude Profiles for Restricted Area/Range Utilization by Aircraft Type
(Percent of Time at Various Altitudes)

Aircraft	Feet Above Ground Level								
	100–300	300–500	500–1000	1,000–3000	3,000–5000	1,000–5000	5,000+*	1,000–10000	10,000+**
A-10		5	5			40	50		
A-4				20	25		55		
A-6				20	25		55		
AH-1	30	25	35	10					
AH-64	30	25	35	10					
AV-8				10	40		50		
Beech 99			45	45	10				
C-12			45	45	10				
C-130				25	30		45		
C-185			45	45	10				
E-2				20	20		60		
EA-6							100		
F/A-18 C/D			5					50	45
F/A-18 E/F			5					50	45
F-111							100		
F-14			5					50	45
F-15								50	50
F-16								50	50
H-1	10	25	45	10	10				
H-2	5	20	50	25					
H-3	5	20	50	25					
H-46	35	25	15	25					
H-47	35	25	15	25					
H-53	5	20	50	25					
H-57	5	10	25	30	20		10		
H-58		75	20	5					
H-6	5	20	50	25					
H-60	5	5	10	35	35		10		
KC-135					25		75		
LEAR 24						75	25		
NU-1B			50	25	25				
P-3		10	20	20	25		25		
S-3	5	25	30			40			
T-2								40	60
T-33			45	30	10		15		
T-34		20	25	30	10		15		
T-38								50	50
T-39						75	25		
T-45			25	30	10		35		
TC-4C			5	5	20		70		
TF-51			10	30	20		40		
U-18			50	25	25				
U-21			10	25	25		40		
U-6			50	25	25				
UAV					100				
V-22			50	25	10		15		

* 5,000' to 20,000'; **10,000' to 20,000';
Source: Wyle Laboratories (Wyle Lab, 1997)

Table E-9
Total CO Emissions by Aircraft Type (tons/year)

Aircraft Type	Existing Level	No Action Alternative	Workload I Alternative	Workload II Alternative	Workload III Alternative
A-10 (A-10A)	7.59	6.27	14.91	14.91	14.91
A-6 (A-6E)	1.82	0.00	0.00	0.00	0.00
BEECH 99 (Beech C99)	2.28	4.43	4.43	5.22	6.02
C-12 (UC-12B)	2.69	2.00	2.00	2.36	2.71
C-130 (C-130T, KC-130F)	3.88	11.40	11.40	13.43	15.45
C-135	0.00	0.00	9.66	9.66	9.66
Cessna 185	1.54	1.49	1.49	1.49	1.49
C-5 (C-5A)	0.00	0.00	1.21	1.21	1.21
E-2/C-2 (E-2C, C-2A)	1.75	1.30	1.30	1.52	1.75
E-6 (E-6A)	4.54	3.36	3.36	3.95	4.54
EA-6 (EA-6B)	7.28	5.72	5.75	6.80	7.78
F-111 (F-111A)	0.31	0.23	0.23	0.28	0.31
F-14 (F-14A, NF-14D)	29.85	17.54	22.33	26.27	30.27
F-15	0.00	0.00	0.50	0.50	0.50
F-16 (F-16N)	1.16	1.25	5.39	5.39	5.39
F/A-18E	0.00	84.35	84.35	84.35	84.35
F/A-18F	0.00	89.03	89.03	89.03	89.03
H-1 (UH-1N,AH-1W)	1.63	1.26	1.37	1.61	1.85
H-2 (SH-2F, SH-2G)	1.16	0.87	0.87	1.02	1.18
H-3 (SH-3H, NVH-3A)	3.27	2.45	2.45	2.91	3.35
H-46(CH-46E)	2.01	1.54	1.54	1.79	2.06
H-53(CH-53E)	1.57	1.18	1.18	1.39	1.59
H-57(TH-57C)	0.37	0.28	0.28	0.33	0.38
H-58 (OH-58A, OH-58C)	1.38	1.38	1.38	1.38	1.38
H-6(TH-6B)	2.27	2.30	2.30	2.30	2.30
H-60 (UH-60A, SH-60B, SH-60F, HH-60H)	11.23	8.40	8.40	9.91	11.42
H-64(AH-64)	0.00	0.00	0.24	0.24	0.24
LEAR 24	22.38	17.75	17.75	21.00	24.19
NU-1B	10.22	10.31	10.31	10.31	10.31
P-3 (P-3C,UP-3A, NP-3D)	18.90	14.80	14.80	17.45	20.07
S-3(S-3B)	11.32	6.79	8.43	9.94	11.43
T-2(T-2C)	31.33	31.26	31.26	31.26	31.26
T-33	7.01	7.71	7.71	7.71	7.71
T-34(T-34C)	1.04	0.77	0.77	0.91	1.04
T-38(T-38A)	41.70	41.83	41.83	41.83	41.83
T-39(T-39D)	0.75	0.74	0.74	0.74	0.74
T-45(T-45A)	3.60	0.00	0.00	0.00	0.00
TC-4C	0.38	0.38	0.38	0.38	0.38
TF-51(TF-51D)	6.66	6.66	6.66	6.66	6.66
UV-18A	0.08	0.07	0.07	0.07	0.08
U-21(U-21F)	0.80	0.80	0.80	0.80	0.80
U-6(U-6A)	23.58	23.39	23.39	23.39	23.39
UH-3H	1.92	1.42	1.42	1.67	1.92
V-22(NV-22B)	1.52	1.63	1.63	1.63	1.63
F/A -18A/B/C/D	134.40	62.99	75.26	88.55	101.80
UAV	0.70	4.18	4.18	4.18	4.18
TOTAL	407.88	481.53	524.71	557.74	590.55

Table E-10
Total NOx Emissions by Aircraft Type (tons/year)

Aircraft Type	Existing Level	No Action Alternative	Workload I Alternative	Workload II Alternative	Workload III Alternative
A-10 (A-10A)	0.55	0.49	1.13	1.13	1.13
A-6 (A-6E)	2.06	0.00	0.00	0.00	0.00
BEECH 99 (Beech C99)	0.31	2.39	2.39	2.82	3.25
C-12 (UC-12B)	0.56	0.42	0.42	0.49	0.57
C-130 (C-130T, KC-130F)	3.25	7.43	7.43	8.77	10.11
C-135	0.00	0.00	3.07	3.07	3.07
Cessna 185	0.01	0.01	0.01	0.01	0.01
C-5 (C-5A)	0.00	0.00	2.48	2.48	2.48
E-2/C-2 (E-2C, C-2A)	4.02	2.93	2.93	3.45	3.96
E-6 (E-6A)	12.53	9.26	9.26	10.90	12.53
EA-6 (EA-6B)	3.28	2.49	2.49	2.94	3.38
F-111 (F-111A)	0.17	0.12	0.12	0.15	0.17
F-14 (F-14A, NF-14D)	17.06	9.96	12.67	14.90	17.17
F-15	0.00	0.00	1.82	1.82	1.82
F-16 (F-16N)	5.29	5.36	23.02	23.02	23.02
F/A-18E	0.00	15.89	15.89	15.89	15.89
F/A-18F	0.00	14.74	14.74	14.74	14.74
H-1 (UH-1N,AH-1W)	1.08	0.81	0.88	1.03	1.19
H-2 (SH-2F, SH-2G)	0.41	0.31	0.31	0.37	0.43
H-3 (SH-3H, NVH-3A)	1.61	1.21	1.21	1.45	1.66
H-46(CH-46E)	1.43	1.10	1.10	1.27	1.46
H-53(CH-53E)	3.99	3.07	3.07	3.60	4.12
H-57(TH-57C)	0.10	0.07	0.07	0.08	0.10
H-58 (OH-58A, OH-58C)	0.26	0.26	0.26	0.26	0.26
H-6(TH-6B)	1.53	1.55	1.55	1.55	1.55
H-60 (UH-60A, SH-60B, SH-60F, HH-60H)	6.78	5.06	5.06	5.98	6.89
H-64(AH-64)	0.00	0.00	0.09	0.09	0.09
LEAR 24	3.48	2.82	2.82	3.34	3.84
NU-1B	0.12	0.12	0.12	0.12	0.12
P-3 (P-3C,UP-3A, NP-3D)	16.49	12.71	12.71	15.00	17.27
S-3(S-3B)	3.67	2.12	2.63	3.09	3.55
T-2(T-2C)	3.81	3.80	3.80	3.80	3.80
T-33	0.18	0.19	0.19	0.19	0.19
T-34(T-34C)	0.29	0.21	0.21	0.25	0.29
T-38(T-38A)	5.76	5.79	5.79	5.79	5.79
T-39(T-39D)	0.03	0.03	0.03	0.03	0.03
T-45(T-45A)	3.39	0.00	0.00	0.00	0.00
TC-4C	0.09	0.09	0.09	0.09	0.09
TF-51(TF-51D)	0.08	0.08	0.08	0.08	0.08
UV-18A	0.11	0.11	0.11	0.11	0.11
U-21(U-21F)	0.65	0.65	0.65	0.65	0.65
U-6(U-6A)	0.30	0.29	0.29	0.29	0.29
UH-3H	1.50	1.11	1.11	1.31	1.50
V-22(NV-22B)	8.04	8.46	8.46	8.46	8.46
F/A -18A/B/C/D	102.17	48.10	57.46	67.86	78.21
UAV	0.00	0.00	0.00	0.00	0.00
TOTAL	216.41	171.60	210.01	232.70	255.32

Table E-11
Total VOC Emissions by Aircraft Type (tons/year)

Aircraft Type	Existing Level	No Action Alternative	Workload I Alternative	Workload II Alternative	Workload III Alternative
A-10 (A-10A)	1.93	1.60	3.80	3.80	3.80
A-6 (A-6E)	0.77	0.00	0.00	0.00	0.00
BEECH 99 (Beech C99)	1.81	2.71	2.71	3.19	3.67
C-12 (UC-12B)	1.91	1.43	1.43	1.68	1.93
C-130 (C-130T, KC-130F)	1.84	5.84	5.84	6.87	7.90
C-135	0.00	0.00	7.88	7.88	7.88
Cessna 185	0.02	0.02	0.02	0.02	0.02
C-5 (C-5A)	0.00	0.00	0.25	0.25	0.25
E-2/C-2 (E-2C, C-2A)	1.05	0.78	0.78	0.92	1.05
E-6 (E-6A)	0.19	0.14	0.14	0.17	0.19
EA-6 (EA-6B)	3.56	2.82	2.82	3.33	3.81
F-111 (F-111A)	0.23	0.17	0.17	0.20	0.23
F-14 (F-14A, NF-14D)	4.15	2.41	3.07	3.62	4.16
F-15	0.00	0.00	0.06	0.06	0.06
F-16 (F-16N)	0.08	0.07	0.31	0.31	0.31
F/A-18E	0.00	16.92	16.92	16.92	16.92
F/A-18F	0.00	15.77	15.77	15.77	15.77
H-1 (UH-1N,AH-1W)	0.21	0.17	0.18	0.21	0.24
H-2 (SH-2F, SH-2G)	0.21	0.16	0.16	0.19	0.21
H-3 (SH-3H, NVH-3A)	0.51	0.38	0.38	0.45	0.51
H-46(CH-46E)	0.25	0.19	0.19	0.22	0.25
H-53(CH-53E)	0.33	0.25	0.25	0.29	0.34
H-57(TH-57C)	0.03	0.02	0.02	0.02	0.03
H-58 (OH-58A, OH-58C)	0.09	0.09	0.09	0.09	0.09
H-6(TH-6B)	0.15	0.15	0.15	0.15	0.15
H-60 (UH-60A, SH-60B, SH-60F, HH-60H)	0.71	0.53	0.53	0.63	0.72
H-64(AH-64)	0.00	0.00	0.01	0.01	0.01
LEAR 24	1.11	0.85	0.85	1.00	1.15
NU-1B	0.73	0.73	0.73	0.73	0.73
P-3 (P-3C,UP-3A, NP-3D)	9.53	7.46	7.46	8.78	10.10
S-3(S-3B)	1.33	0.79	0.98	1.15	1.33
T-2(T-2C)	2.09	2.08	2.08	2.08	2.08
T-33	0.63	0.69	0.69	0.69	0.69
T-34(T-34C)	0.35	0.26	0.26	0.30	0.35
T-38(T-38A)	2.51	2.51	2.51	2.51	2.51
T-39(T-39D)	0.09	0.09	0.09	0.09	0.09
T-45(T-45A)	0.59	0.00	0.00	0.00	0.00
TC-4C	0.09	0.09	0.09	0.09	0.09
TF-51(TF-51D)	0.21	0.21	0.21	0.21	0.21
UV-18A	0.05	0.04	0.04	0.04	0.05
U-21(U-21F)	0.55	0.55	0.55	0.55	0.55
U-6(U-6A)	1.44	1.43	1.43	1.43	1.43
UH-3H	0.25	0.19	0.19	0.22	0.25
V-22(NV-22B)	0.72	0.77	0.77	0.77	0.77
F/A -18A/B/C/D	39.20	20.96	25.04	29.47	33.87
UAV	0.35	2.06	2.06	2.06	2.06
TOTAL	81.86	94.34	109.93	119.42	128.83

Table E-12

Total PM10 Emissions by Aircraft Type (tons/year)

Aircraft Type	Existing Level	No Action Alternative	Workload I Alternative	Workload II Alternative	Workload III Alternative
A-10 (A-10A)	1.20	1.00	2.36	2.36	2.36
A-6 (A-6E)	2.09	0.00	0.00	0.00	0.00
BEECH 99 (Beech C99)	0.12	0.73	0.73	0.87	1.00
C-12 (UC-12B)	0.21	0.16	0.16	0.18	0.21
C-130 (C-130T, KC-130F)	0.98	2.26	2.26	2.67	3.08
C-135	0.00	0.00	0.38	0.38	0.38
Cessna 185					
C-5 (C-5A)					
E-2/C-2 (E-2C, C-2A)	0.95	0.69	0.69	0.82	0.94
E-6 (E-6A)					
EA-6 (EA-6B)	4.56	3.54	3.54	4.18	4.79
F-111 (F-111A)					
F-14 (F-14A, NF-14D)	9.98	5.87	7.48	8.79	10.14
F-15	0.00	0.00	0.07	0.07	0.07
F-16 (F-16N)	1.54	1.55	6.65	6.65	6.65
F/A-18E	0.00	7.65	7.65	7.65	7.65
F/A-18F	0.00	5.21	5.21	5.21	5.21
H-1 (UH-1N,AH-1W)	0.23	0.17	0.19	0.22	0.26
H-2 (SH-2F, SH-2G)	0.27	0.20	0.20	0.23	0.27
H-3 (SH-3H, NVH-3A)	0.40	0.30	0.30	0.36	0.41
H-46(CH-46E)					
H-53(CH-53E)	1.02	0.78	0.78	0.91	1.05
H-57(TH-57C)					
H-58 (OH-58A, OH-58C)					
H-6(TH-6B)	0.57	0.58	0.58	0.58	0.58
H-60 (UH-60A, SH-60B, SH-60F, HH-60H)	2.57	1.92	1.92	2.27	2.62
H-64(AH-64)	0.00	0.00	0.04	0.04	0.04
LEAR 24	9.72	7.90	7.90	9.36	10.79
NU-1B					
P-3 (P-3C,UP-3A, NP-3D)	5.12	3.97	3.97	4.69	5.40
S-3(S-3B)	1.76	1.07	1.33	1.57	1.80
T-2(T-2C)	11.25	11.21	11.21	11.21	11.21
T-33	0.04	0.05	0.05	0.05	0.05
T-34(T-34C)	0.09	0.06	0.06	0.08	0.09
T-38(T-38A)	15.82	15.89	15.89	15.89	15.89
T-39(T-39D)	0.00	0.00	0.00	0.00	0.00
T-45(T-45A)					
TC-4C					
TF-51(TF-51D)	0.33	0.33	0.33	0.33	0.33
UV-18A	0.04	0.04	0.04	0.04	0.04
U-21(U-21F)	0.22	0.22	0.22	0.22	0.22
U-6(U-6A)					
UH-3H					
V-22(NV-22B)					
F/A -18A/B/C/D	45.69	22.47	26.84	30.33	34.54
UAV	0.01	0.05	0.05	0.05	0.05
TOTAL	116.79	95.86	109.07	118.24	128.09

Table E-13
Total SO_2 Emissions by Aircraft Type (tons/year)

Aircraft Type	Existing Level	No Action Alternative	Workload I Alternative	Workload II Alternative	Workload III Alternative
A-10 (A-10A)	0.21	0.18	0.42	0.42	0.42
A-6 (A-6E)	0.09	0.00	0.00	0.00	0.00
BEECH 99 (Beech C99)	0.02	0.13	0.13	0.16	0.18
C-12 (UC-12B)	0.04	0.03	0.03	0.03	0.04
C-130 (C-130T, KC-130F)	0.19	0.46	0.46	0.55	0.63
C-135	0.00	0.00	0.14	0.14	0.14
Cessna 185	0.00	0.00	0.00	0.00	0.00
C-5 (C-5A)	0.00	0.00	0.06	0.06	0.06
E-2/C-2 (E-2C, C-2A)	0.17	0.13	0.13	0.15	0.17
E-6 (E-6A)	0.38	0.28	0.28	0.33	0.38
EA-6 (EA-6B)	0.16	0.12	0.12	0.15	0.17
F-111 (F-111A)	0.00	0.00	0.00	0.00	0.00
F-14 (F-14A, NF-14D)	0.73	0.43	0.54	0.64	0.74
F-15	0.00	0.00	0.08	0.08	0.08
F-16 (F-16N)	0.11	0.12	0.50	0.50	0.50
F/A-18E	0.00	0.48	0.48	0.48	0.48
F/A-18F	0.00	0.39	0.39	0.39	0.39
H-1 (UH-1N,AH-1W)	0.08	0.06	0.06	0.07	0.09
H-2 (SH-2F, SH-2G)	0.03	0.02	0.02	0.03	0.03
H-3 (SH-3H, NVH-3A)	0.09	0.07	0.07	0.07	0.09
H-46(CH-46E)	0.06	0.05	0.05	0.05	0.06
H-53(CH-53E)	0.18	0.14	0.14	0.17	0.19
H-57(TH-57C)	0.01	0.01	0.01	0.01	0.01
H-58 (OH-58A, OH-58C)	0.03	0.03	0.03	0.03	0.03
H-6(TH-6B)	0.10	0.10	0.10	0.10	0.10
H-60 (UH-60A, SH-60B, SH-60F, HH-60H)	0.47	0.35	0.35	0.41	0.47
H-64(AH-64)	0.00	0.00	0.01	0.01	0.01
LEAR 24	0.25	0.20	0.20	0.24	0.27
NU-1B	0.01	0.01	0.01	0.01	0.01
P-3 (P-3C,UP-3A, NP-3D)	0.93	0.72	0.72	0.85	0.98
S-3(S-3B)	0.23	0.14	0.17	0.20	0.23
T-2(T-2C)	0.28	0.28	0.28	0.28	0.28
T-33	0.03	0.04	0.04	0.04	0.04
T-34(T-34C)	0.02	0.01	0.01	0.01	0.02
T-38(T-38A)	0.42	0.42	0.42	0.42	0.42
T-39(T-39D)	0.01	0.01	0.01	0.01	0.01
T-45(T-45A)	0.15	0.00	0.00	0.00	0.00
TC-4C	0.00	0.00	0.00	0.00	0.00
TF-51(TF-51D)	0.00	0.00	0.00	0.00	0.00
UV-18A	0.01	0.01	0.01	0.01	0.01
U-21(U-21F)	0.04	0.04	0.04	0.04	0.04
U-6(U-6A)	0.02	0.02	0.02	0.02	0.02
UH-3H	0.06	0.05	0.05	0.05	0.06
V-22(NV-22B)	0.36	0.38	0.38	0.38	0.38
F/A -18A/B/C/D	3.11	1.45	1.74	2.05	2.30
UAV	0.00	0.00	0.00	0.00	0.00
TOTAL	9.07	7.34	8.69	9.63	10.58

Table E-14

Total CO Emissions in Nonattainment Area by Aircraft Type (tons/year)

Aircraft Type	Existing Level	No Action Alternative	Workload I Alternative	Workload II Alternative	Workload III Alternative
A-10 (A-10A)	0.06	0.04	0.10	0.10	0.10
A-6 (A-6E)	0.01	0.00	0.00	0.00	0.00
BEECH 99 (Beech C99)	0.02	0.06	0.06	0.08	0.09
C-12 (UC-12B)	0.04	0.03	0.03	0.03	0.04
C-130 (C-130T, KC-130F)	0.01	0.04	0.04	0.05	0.05
C-135	0.00	0.00	0.00	0.00	0.00
Cessna 185	0.01	0.01	0.01	0.01	0.01
C-5 (C-5A)	0.00	0.00	0.00	0.00	0.00
E-2/C-2 (E-2C, C-2A)	0.00	0.00	0.00	0.00	0.00
E-6 (E-6A)	0.00	0.00	0.00	0.00	0.00
EA-6 (EA-6B)	0.00	0.00	0.00	0.00	0.00
F-111 (F-111A)	0.00	0.00	0.00	0.00	0.00
F-14 (F-14A, NF-14D)	0.03	0.01	0.01	0.02	0.03
F-15	0.00	0.00	0.00	0.00	0.00
F-16 (F-16N)	0.00	0.00	0.00	0.00	0.00
F/A-18E	0.00	0.03	0.03	0.03	0.03
F/A-18F	0.00	0.02	0.02	0.02	0.02
H-1 (UH-1N,AH-1W)	0.03	0.03	0.03	0.03	0.04
H-2 (SH-2F, SH-2G)	0.03	0.02	0.02	0.03	0.03
H-3 (SH-3H, NVH-3A)	0.12	0.08	0.08	0.10	0.11
H-46(CH-46E)	0.04	0.04	0.04	0.04	0.05
H-53(CH-53E)	0.03	0.02	0.02	0.03	0.03
H-57(TH-57C)	0.01	0.01	0.01	0.01	0.01
H-58 (OH-58A, OH-58C)	0.34	0.33	0.33	0.33	0.33
H-6(TH-6B)	0.06	0.06	0.06	0.06	0.06
H-60 (UH-60A, SH-60B, SH-60F, HH-60H)	0.15	0.12	0.12	0.14	0.16
H-64(AH-64)	0.00	0.00	0.01	0.01	0.01
LEAR 24	0.11	0.08	0.08	0.09	0.11
NU-1B	0.11	0.11	0.11	0.11	0.11
P-3 (P-3C,UP-3A, NP-3D)	0.09	0.07	0.07	0.09	0.10
S-3(S-3B)	0.16	0.09	0.11	0.13	0.15
T-2(T-2C)	0.15	0.14	0.14	0.14	0.14
T-33	0.03	0.04	0.04	0.04	0.04
T-34(T-34C)	0.03	0.02	0.02	0.02	0.03
T-38(T-38A)	0.20	0.20	0.20	0.20	0.20
T-39(T-39D)	0.00	0.00	0.00	0.00	0.00
T-45(T-45A)	0.01	0.00	0.00	0.00	0.00
TC-4C	0.00	0.00	0.00	0.00	0.00
TF-51(TF-51D)	0.10	0.10	0.10	0.10	0.10
UV-18A	0.00	0.00	0.00	0.00	0.00
U-21(U-21F)	0.00	0.00	0.00	0.00	0.00
U-6(U-6A)	0.23	0.22	0.22	0.22	0.22
UH-3	0.03	0.02	0.02	0.02	0.03
V-22(NV-22B)	0.00	0.05	0.05	0.05	0.05
F/A -18 A/BC/D	0.09	0.03	0.03	0.04	0.04
TOTAL	2.31	2.13	2.23	2.37	2.52

Table E-15

Total NOx Emissions in Nonattainment Area by Aircraft Type (tons/year)

Aircraft Type	Existing Level	No Action Alternative	Workload I Alternative	Workload II Alternative	Workload III Alternative
A-10 (A-10A)	0.00	0.00	0.00	0.00	0.00
A-6 (A-6E)	0.02	0.00	0.00	0.00	0.00
BEECH 99 (Beech C99)	0.02	0.07	0.07	0.09	0.10
C-12 (UC-12B)	0.04	0.03	0.03	0.04	0.04
C-130 (C-130T, KC-130F)	0.01	0.06	0.06	0.07	0.07
C-135	0.00	0.00	0.00	0.00	0.00
Cessna 185	0.00	0.00	0.00	0.00	0.00
C-5 (C-5A)	0.00	0.00	0.00	0.00	0.00
E-2/C-2 (E-2C, C-2A)	0.02	0.01	0.01	0.01	0.02
E-6 (E-6A)	0.00	0.00	0.00	0.00	0.00
EA-6 (EA-6B)	0.00	0.00	0.00	0.00	0.00
F-111 (F-111A)	0.00	0.00	0.00	0.00	0.00
F-14 (F-14A, NF-14D)	0.22	0.13	0.17	0.19	0.22
F-15	0.00	0.00	0.01	0.01	0.01
F-16 (F-16N)	0.03	0.02	0.10	0.10	0.10
F/A-18E	0.00	0.03	0.03	0.03	0.03
F/A-18F	0.00	0.01	0.01	0.01	0.01
H-1 (UH-1N,AH-1W)	0.03	0.02	0.03	0.03	0.03
H-2 (SH-2F, SH-2G)	0.02	0.00	0.00	0.02	0.02
H-3 (SH-3H, NVH-3A)	0.07	0.04	0.04	0.06	0.07
H-46(CH-46E)	0.04	0.03	0.03	0.04	0.04
H-53(CH-53E)	0.12	0.09	0.09	0.11	0.12
H-57(TH-57C)	0.00	0.00	0.00	0.00	0.00
H-58 (OH-58A, OH-58C)	0.07	0.07	0.07	0.07	0.07
H-6(TH-6B)	0.05	0.05	0.05	0.05	0.05
H-60 (UH-60A, SH-60B, SH-60F, HH-60H)	0.12	0.09	0.09	0.11	0.12
H-64(AH-64)	0.00	0.00	0.01	0.01	0.01
LEAR 24	0.02	0.02	0.02	0.02	0.02
NU-1B	0.00	0.00	0.00	0.00	0.00
P-3 (P-3C,UP-3A, NP-3D)	0.14	0.11	0.11	0.13	0.15
S-3(S-3B)	0.02	0.01	0.01	0.01	0.01
T-2(T-2C)	0.03	0.03	0.03	0.03	0.03
T-33	0.00	0.00	0.00	0.00	0.00
T-34(T-34C)	0.01	0.01	0.01	0.01	0.01
T-38(T-38A)	0.04	0.04	0.04	0.04	0.04
T-39(T-39D)	0.00	0.00	0.00	0.00	0.00
T-45(T-45A)	0.01	0.00	0.00	0.00	0.00
TC-4C	0.00	0.00	0.00	0.00	0.00
TF-51(TF-51D)	0.00	0.00	0.00	0.00	0.00
UV-18A	0.01	0.01	0.01	0.01	0.01
U-21(U-21F)	0.01	0.01	0.01	0.01	0.01
U-6(U-6A)	0.00	0.00	0.00	0.00	0.00
UH-3	0.02	0.02	0.02	0.02	0.02
V-22(NV-22B)	0.02	0.29	0.29	0.29	0.29
F/A -18A/B/C/D	1.17	0.37	0.45	0.53	0.60
TOTAL	2.38	1.69	1.90	2.13	2.36

Table E-16
Total VOC Emissions in Nonattainment Area by Aircraft Type (tons/year)

Aircraft Type	Existing Level	No Action Alternative	Workload I Alternative	Workload II Alternative	Workload III Alternative
A-10 (A-10A)	0.02	0.01	0.03	0.03	0.03
A-6 (A-6E)	0.00	0.00	0.00	0.00	0.00
BEECH 99 (Beech C99)	0.01	0.02	0.02	0.02	0.03
C-12 (UC-12B)	0.01	0.01	0.01	0.01	0.01
C-130 (C-130T, KC-130F)	0.00	0.01	0.01	0.01	0.01
C-135	0.00	0.00	0.00	0.00	0.00
Cessna 185	0.00	0.00	0.00	0.00	0.00
C-5 (C-5A)	0.00	0.00	0.00	0.00	0.00
E-2/C-2 (E-2C, C-2A)	0.00	0.00	0.00	0.00	0.00
E-6 (E-6A)	0.00	0.00	0.00	0.00	0.00
EA-6 (EA-6B)	0.00	0.00	0.00	0.00	0.00
F-111 (F-111A)	0.00	0.00	0.00	0.00	0.00
F-14 (F-14A, NF-14D)	0.01	0.00	0.01	0.01	0.01
F-15	0.00	0.00	0.00	0.00	0.00
F-16 (F-16N)	0.00	0.00	0.00	0.00	0.00
F/A-18E	0.00	0.00	0.00	0.00	0.00
F/A-18F	0.00	0.00	0.00	0.00	0.00
H-1 (UH-1N,AH-1W)	0.00	0.00	0.00	0.00	0.00
H-2 (SH-2F, SH-2G)	0.00	0.00	0.00	0.00	0.00
H-3 (SH-3H, NVH-3A)	0.00	0.00	0.00	0.00	0.00
H-46(CH-46E)	0.00	0.00	0.00	0.00	0.00
H-53(CH-53E)	0.00	0.00	0.00	0.00	0.00
H-57(TH-57C)	0.00	0.00	0.00	0.00	0.00
H-58 (OH-58A, OH-58C)	0.01	0.01	0.01	0.01	0.01
H-6(TH-6B)	0.00	0.00	0.00	0.00	0.00
H-60 (UH-60A, SH-60B, SH-60F, HH-60H)	0.01	0.01	0.01	0.01	0.01
H-64(AH-64)	0.00	0.00	0.00	0.00	0.00
LEAR 24	0.00	0.00	0.00	0.00	0.00
NU-1B	0.00	0.00	0.00	0.00	0.00
P-3 (P-3C,UP-3A, NP-3D)	0.02	0.02	0.02	0.02	0.02
S-3(S-3B)	0.01	0.01	0.01	0.01	0.01
T-2(T-2C)	0.00	0.00	0.00	0.00	0.00
T-33	0.00	0.00	0.00	0.00	0.00
T-34(T-34C)	0.00	0.00	0.00	0.00	0.00
T-38(T-38A)	0.00	0.00	0.00	0.00	0.00
T-39(T-39D)	0.00	0.00	0.00	0.00	0.00
T-45(T-45A)	0.00	0.00	0.00	0.00	0.00
TC-4C	0.00	0.00	0.00	0.00	0.00
TF-51(TF-51D)	0.00	0.00	0.00	0.00	0.00
UV-18A	0.00	0.00	0.00	0.00	0.00
U-21(U-21F)	0.00	0.00	0.00	0.00	0.00
U-6(U-6A)	0.00	0.00	0.00	0.00	0.00
UH-3	0.00	0.00	0.00	0.00	0.00
V-22(NV-22B)	0.00	0.03	0.03	0.03	0.03
F/A -18A/B/C/D	0.03	0.01	0.01	0.01	0.01
TOTAL	0.17	0.17	0.19	0.21	0.23

Table E-17
Total PM10 Emissions in Nonattainment Area by Aircraft Type (tons/year)

Aircraft Type	Existing Level	No Action Alternative	Workload I Alternative	Workload II Alternative	Workload III Alternative
A-10 (A-10A)	0.01	0.01	0.01	0.01	0.01
A-6 (A-6E)	0.02	0.00	0.00	0.00	0.00
BEECH 99 (Beech C99)	0.01	0.02	0.02	0.03	0.03
C-12 (UC-12B)	0.01	0.01	0.01	0.01	0.01
C-130 (C-130T, KC-130F)	0.00	0.01	0.02	0.02	0.03
C-135	0.00	0.00	0.00	0.00	0.00
Cessna 185					
C-5 (C-5A)					
E-2/C-2 (E-2C, C-2A)	0.00	0.00	0.00	0.00	0.00
E-6 (E-6A)					
EA-6 (EA-6B)	0.00	0.00	0.00	0.00	0.00
F-111 (F-111A)					
F-14 (F-14A, NF-14D)	0.09	0.05	0.07	0.08	0.09
F-15	0.00	0.00	0.00	0.00	0.00
F-16 (F-16N)	0.01	0.01	0.03	0.00	0.03
F/A-18E	0.00	0.04	0.04	0.04	0.04
F/A-18F	0.00	0.02	0.02	0.02	0.02
H-1 (UH-1N,AH-1W)	0.01	0.01	0.01	0.01	0.01
H-2 (SH-2F, SH-2G)	0.00	0.00	0.00	0.00	0.01
H-3 (SH-3H, NVH-3A)	0.02	0.01	0.01	0.01	0.02
H-46(CH-46E)					
H-53(CH-53E)	0.04	0.00	0.03	0.03	0.04
H-57(TH-57C)	0.00	0.00	0.00	0.00	0.00
H-58 (OH-58A, OH-58C)	0.00	0.00	0.00	0.00	0.00
H-6(TH-6B)	0.02	0.02	0.02	0.02	0.02
H-60 (UH-60A, SH-60B, SH-60F, HH-60H)	0.04	0.03	0.03	0.04	0.04
H-64(AH-64)	0.00	0.00	0.00	0.00	0.00
LEAR 24	0.06	0.05	0.05	0.05	0.06
NU-1B					
P-3 (P-3C,UP-3A, NP-3D)	0.05	0.04	0.04	0.04	0.05
S-3(S-3B)	0.03	0.02	0.02	0.03	0.03
T-2(T-2C)	0.08	0.08	0.08	0.08	0.08
T-33	0.00	0.00	0.00	0.00	0.00
T-34(T-34C)	0.00	0.00	0.00	0.00	0.00
T-38(T-38A)	0.12	0.12	0.12	0.12	0.12
T-39(T-39D)	0.00	0.00	0.00	0.00	0.00
T-45(T-45A)					
TC-4C					
TF-51(TF-51D)	0.01	0.01	0.01	0.01	0.01
UV-18A	0.00	0.00	0.00	0.00	0.00
U-21(U-21F)	0.00	0.00	0.00	0.00	0.00
U-6(U-6A)					
UH-3					
V-22(NV-22B)					
F/A -18A/B/C/D	0.48	0.15	0.18	0.22	0.25
TOTAL	1.12	0.74	0.83	0.92	1.01

Table E-18
Total SO_2 Emissions in Nonattainment Area by Aircraft Type (tons/year)

Aircraft Type	Existing Level	No Action Alternative	Workload I Alternative	Workload II Alternative	Workload III Alternative
A-10 (A-10A)	0.00	0.00	0.00	0.00	0.00
A-6 (A-6E)	0.00	0.00	0.00	0.00	0.00
BEECH 99 (Beech C99)	0.00	0.00	0.00	0.00	0.01
C-12 (UC-12B)	0.00	0.00	0.00	0.00	0.00
C-130 (C-130T, KC-130F)	0.00	0.00	0.00	0.00	0.00
C-135	0.00	0.00	0.00	0.00	0.00
Cessna 185	0.00	0.00	0.00	0.00	0.00
C-5 (C-5A)	0.00	0.00	0.00	0.00	0.00
E-2/C-2 (E-2C, C-2A)	0.00	0.00	0.00	0.00	0.00
E-6 (E-6A)	0.00	0.00	0.00	0.00	0.00
EA-6 (EA-6B)	0.00	0.00	0.00	0.00	0.00
F-111 (F-111A)	0.00	0.00	0.00	0.00	0.00
F-14 (F-14A, NF-14D)	0.00	0.00	0.00	0.00	0.00
F-15	0.00	0.00	0.00	0.00	0.00
F-16 (F-16N)	0.00	0.00	0.00	0.00	0.00
F/A-18E	0.00	0.00	0.00	0.00	0.00
F/A-18F	0.00	0.00	0.00	0.00	0.00
H-1 (UH-1N,AH-1W)	0.00	0.00	0.00	0.00	0.00
H-2 (SH-2F, SH-2G)	0.00	0.00	0.00	0.00	0.00
H-3 (SH-3H, NVH-3A)	0.00	0.00	0.00	0.00	0.00
H-46(CH-46E)	0.00	0.00	0.00	0.00	0.00
H-53(CH-53E)	0.01	0.00	0.00	0.01	0.01
H-57(TH-57C)	0.00	0.00	0.00	0.00	0.00
H-58 (OH-58A, OH-58C)	0.01	0.01	0.01	0.01	0.01
H-6(TH-6B)	0.00	0.00	0.00	0.00	0.00
H-60 (UH-60A, SH-60B, SH-60F, HH-60H)	0.01	0.01	0.01	0.01	0.01
H-64(AH-64)	0.00	0.00	0.00	0.00	0.00
LEAR 24	0.00	0.00	0.00	0.00	0.00
NU-1B	0.00	0.00	0.00	0.00	0.00
P-3 (P-3C,UP-3A, NP-3D)	0.01	0.01	0.01	0.01	0.01
S-3(S-3B)	0.00	0.00	0.00	0.00	0.00
T-2(T-2C)	0.00	0.00	0.00	0.00	0.00
T-33	0.00	0.00	0.00	0.00	0.00
T-34(T-34C)	0.00	0.00	0.00	0.00	0.00
T-38(T-38A)	0.00	0.00	0.00	0.00	0.00
T-39(T-39D)	0.00	0.00	0.00	0.00	0.00
T-45(T-45A)	0.00	0.00	0.00	0.00	0.00
TC-4C	0.00	0.00	0.00	0.00	0.00
TF-51(TF-51D)	0.00	0.00	0.00	0.00	0.00
UV-18A	0.00	0.00	0.00	0.00	0.00
U-21(U-21F)	0.00	0.00	0.00	0.00	0.00
U-6(U-6A)	0.00	0.00	0.00	0.00	0.00
UH-3	0.00	0.00	0.00	0.00	0.00
V-22(NV-22B)	0.00	0.01	0.01	0.01	0.01
F/A -18A/B/C/D	0.03	0.01	0.01	0.01	0.02
TOTAL	0.10	0.08	0.09	0.10	0.11

Table E-19
Patuxent River Complex F/A-18A Emissions Calculation (Existing)

Engine Type: F404-GE-400

Engine type Modeled: F404-GE-400

Type of Operation	Operating Mode	Power Setting[1]	TIM[2] (min.)	Fuel flow rate(lb/hr)[3]	No. of Operations per Year[4]	Emission Factors (lb/1000lb fuel)[3] CO	NOx	VOC	PM10	SO2	No. of Engines	Emission (tons/year) CO	NOx	VOC	PM10	SO2
Departure	Taxi out	Ground Idle	10.0	623.9	741	137.34	1.16	58.18	12.38	0.40	2	10.59	0.09	4.48	0.95	0.03
	Takeoff	AB Max	0.4	28396.5	741	23.12	9.22	0.13	2.81	0.40	2	3.24	1.29	0.02	0.39	0.06
	Climbout	94%	0.5	8082.6	741	1.22	21.38	0.32	6.10	0.40	2	0.06	1.07	0.02	0.30	0.02
Straight in	Approach	76%	1.6	6541.3	220	1.09	14.80	0.35	6.10	0.40	2	0.04	0.57	0.01	0.23	0.02
Arrival	Taxi in	Idle	10.0	623.9	220	137.34	1.16	58.18	12.38	0.40	2	3.15	0.03	1.33	0.28	0.01
Break type	Approach	Max. Cont.	1.6	7495.1	521	1.17	18.71	0.33	6.10	0.40	2	0.12	1.95	0.03	0.64	0.04
Arrival	Taxi in	Ground Idle	10.0	623.9	521	137.34	1.16	58.18	12.38	0.40	2	7.44	0.06	3.15	0.67	0.02
GCA Box	Takeoff	AB Max	0.4	28396.5	178	23.12	9.22	0.13	2.81	0.40	2	0.78	0.31	0.00	0.09	0.01
	Climbout	94%	0.5	8082.6	178	1.22	21.38	0.32	6.10	0.40	2	0.01	0.26	0.00	0.07	0.00
	Approach	76%	1.6	6541.3	178	1.09	14.80	0.35	6.10	0.40	2	0.03	0.46	0.01	0.19	0.01
Catapult	Taxi out	Ground Idle	10.0	623.9	16	137.34	1.16	58.18	12.38	0.40	2	0.23	0.00	0.10	0.02	0.00
Launch	Takeoff	AB Max	0.4	28396.5	16	23.12	9.22	0.13	2.81	0.40	2	0.07	0.03	0.00	0.01	0.00
and	Climbout	AB Max	0.5	28396.5	16	23.12	9.22	0.13	2.81	0.40	2	0.09	0.03	0.00	0.01	0.00
Recovery	Approach	Max. Cont.	1.6	7495.1	16	1.17	18.71	0.33	6.10	0.40	2	0.00	0.06	0.00	0.02	0.00
	Taxi in	Ground Idle	10.0	623.9	16	137.34	1.16	58.18	12.38	0.40	2	0.23	0.00	0.10	0.02	0.00
Touch	Approach	76%	1.6	6541.3	1808	1.09	14.80	0.35	6.10	0.40	2	0.34	4.67	0.11	1.92	0.13
& Go	Takeoff	AB Max	0.4	28396.5	1808	23.12	9.22	0.13	2.81	0.40	2	7.91	3.16	0.04	0.96	0.14
	Climbout	94%	0.5	8082.6	1808	1.22	21.38	0.32	6.10	0.40	2	0.15	2.60	0.04	0.74	0.05
Hot Refueling	Idling	Ground Idle	20.0	623.9	151	137.34	1.16	58.18	12.38	0.40	2	4.33	0.04	1.83	0.39	0.01
Inflight/Circle	Inflight/Circle	76%	8,427.4	6541.3	1	1.09	14.80	0.35	6.10	0.40	2	1.00	13.60	0.32	5.60	0.37
								Emissions Subtotal (tons/year):				**39.82**	**30.27**	**11.61**	**13.54**	**0.92**

Note:

1. Used typical engine settings provided by Coffer (1997), and Bock (1997).
2. Used default Time-in-Mode (TIM) of US Navy combat aircraft. Taxi TIM was provided by Bock (1997), Inflight/Circle TIM was calculated using equation E-2 of Appendix E.
3. Fuel flow rates and emission factors are from Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO, 1993).
4. Number of circling operations is one since all circling time has been already counted in TIM.

Table E-20
Patuxent River Complex F/A-18A Emissions Calculation (No Action)

Engine Type: F404-GE-400

Engine type Modeled: F404-GE-400

Type of Operation	Operating Mode	Power Setting[1]	TIM[2] (min.)	Fuel flow rate(lb/hr)[3]	No. of Operations per Year[4]	Emission Factors (lb/1000lb fuel)[3] CO	NOx	VOC	PM10	SO2	No. of Engines	Emission (tons/year) CO	NOx	VOC	PM10	SO2
Departure	Taxi out	Ground Idle	10.0	623.9	405	137.34	1.16	58.18	12.38	0.40	2	5.78	0.05	2.45	0.52	0.02
	Takeoff	AB Max	0.4	28396.5	405	23.12	9.22	0.13	2.81	0.40	2	1.77	0.71	0.01	0.22	0.03
	Climbout	94%	0.5	8082.6	405	1.22	21.38	0.32	6.10	0.40	2	0.03	0.58	0.01	0.17	0.01
Straight in	Approach	76%	1.6	6541.3	83	1.09	14.80	0.35	6.10	0.40	2	0.02	0.21	0.01	0.09	0.01
Arrival	Taxi in	Idle	10.0	623.9	83	137.34	1.16	58.18	12.38	0.40	2	1.19	0.01	0.50	0.11	0.00
Break type	Approach	Max. Cont.	1.6	7495.1	321	1.17	18.71	0.33	6.10	0.40	2	0.08	1.20	0.02	0.39	0.03
Arrival	Taxi in	Ground Idle	10.0	623.9	321	137.34	1.16	58.18	12.38	0.40	2	4.59	0.04	1.94	0.41	0.01
GCA Box	Takeoff	AB Max	0.4	28396.5	44	23.12	9.22	0.13	2.81	0.40	2	0.19	0.08	0.00	0.02	0.00
	Climbout	94%	0.5	8082.6	44	1.22	21.38	0.32	6.10	0.40	2	0.00	0.06	0.00	0.02	0.00
	Approach	76%	1.6	6541.3	44	1.09	14.80	0.35	6.10	0.40	2	0.01	0.11	0.00	0.05	0.00
Catapult	Taxi out	Ground Idle	10.0	623.9	2	137.34	1.16	58.18	12.38	0.40	2	0.03	0.00	0.01	0.00	0.00
Launch	Takeoff	AB Max	0.4	28396.5	2	23.12	9.22	0.13	2.81	0.40	2	0.01	0.00	0.00	0.00	0.00
and	Climbout	AB Max	0.5	28396.5	2	23.12	9.22	0.13	2.81	0.40	2	0.01	0.00	0.00	0.00	0.00
Recovery	Approach	Max. Cont.	1.6	7495.1	2	1.17	18.71	0.33	6.10	0.40	2	0.00	0.01	0.00	0.00	0.00
	Taxi in	Ground Idle	10.0	623.9	2	137.34	1.16	58.18	12.38	0.40	2	0.03	0.00	0.01	0.00	0.00
Touch	Approach	76%	1.6	6541.3	419	1.09	14.80	0.35	6.10	0.40	2	0.08	1.08	0.03	0.45	0.03
& Go	Takeoff	AB Max	0.4	28396.5	419	23.12	9.22	0.13	2.81	0.40	2	1.83	0.73	0.01	0.22	0.03
	Climbout	94%	0.5	8082.6	419	1.22	21.38	0.32	6.10	0.40	2	0.03	0.60	0.01	0.17	0.01
Hot Refueling	Idling	Ground Idle	20.0	623.9	81	137.34	1.16	58.18	12.38	0.40	2	2.32	0.02	0.98	0.21	0.01
Inflight/Circle	Inflight/Circle	76%	9,364.1	6541.3	1	1.09	14.80	0.35	6.10	0.40	2	1.11	15.11	0.36	6.23	0.41
								Emissions Subtotal (tons/year):				**19.13**	**20.62**	**6.36**	**9.28**	**0.60**

Note:

1. Used typical engine settings provided by Coffer (1997), and Bock (1997).
2. Used default Time-in-Mode (TIM) of US Navy combat aircraft. Taxi TIM was provided by Bock (1997), Inflight/Circle TIM was calculated using equation E-2 of Appendix E.
3. Fuel flow rates and emission factors are from Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO, 1993).
4. Number of circling operations is one since all circling time has been already counted in TIM.

Table E-21
Patuxent River Complex F/A-18B Emissions Calculation (Workload I)

Engine Type: F404-GE-400

Engine type Modeled: F404-GE-400

Type of Operation	Operating Mode	Power Setting[1]	TIM[2] (min.)	Fuel flow rate(lb/hr)[3]	No. of Operations per Year[4]	Emission Factors (lb/1000lb fuel)[3] CO	NOx	VOC	PM10	SO2	No. of Engines	Emission (tons/year) CO	NOx	VOC	PM10	SO2
Departure	Taxi out	Ground Idle	10.0	623.9	665	137.34	1.16	58.18	12.38	0.40	2	9.50	0.08	4.02	0.86	0.03
	Takeoff	AB Max	0.4	28396.5	665	23.12	9.22	0.13	2.81	0.40	2	2.91	1.16	0.02	0.35	0.05
	Climbout	94%	0.5	8082.6	665	1.22	21.38	0.32	6.10	0.40	2	0.05	0.96	0.01	0.27	0.02
Straight in	Approach	76%	1.6	6541.3	136	1.09	14.80	0.35	6.10	0.40	2	0.03	0.35	0.01	0.15	0.01
Arrival	Taxi in	Idle	10.0	623.9	136	137.34	1.16	58.18	12.38	0.40	2	1.95	0.02	0.83	0.18	0.01
Break type	Approach	Max. Cont.	1.6	7495.1	528	1.17	18.71	0.33	6.10	0.40	2	0.12	1.98	0.03	0.64	0.04
Arrival	Taxi in	Ground Idle	10.0	623.9	528	137.34	1.16	58.18	12.38	0.40	2	7.55	0.06	3.20	0.68	0.02
GCA Box	Takeoff	AB Max	0.4	28396.5	73	23.12	9.22	0.13	2.81	0.40	2	0.32	0.13	0.00	0.04	0.01
	Climbout	94%	0.5	8082.6	73	1.22	21.38	0.32	6.10	0.40	2	0.01	0.11	0.00	0.03	0.00
	Approach	76%	1.6	6541.3	73	1.09	14.80	0.35	6.10	0.40	2	0.01	0.19	0.00	0.08	0.01
Catapult	Taxi out	Ground Idle	10.0	623.9	4	137.34	1.16	58.18	12.38	0.40	2	0.05	0.00	0.02	0.00	0.00
Launch	Takeoff	AB Max	0.4	28396.5	4	23.12	9.22	0.13	2.81	0.40	2	0.02	0.01	0.00	0.00	0.00
and	Climbout	AB Max	0.5	28396.5	4	23.12	9.22	0.13	2.81	0.40	2	0.02	0.01	0.00	0.00	0.00
Recovery	Approach	Max. Cont.	1.6	7495.1	4	1.17	18.71	0.33	6.10	0.40	2	0.00	0.01	0.00	0.00	0.00
	Taxi in	Ground Idle	10.0	623.9	4	137.34	1.16	58.18	12.38	0.40	2	0.05	0.00	0.02	0.00	0.00
Touch	Approach	76%	1.6	6541.3	688	1.09	14.80	0.35	6.10	0.40	2	0.13	1.78	0.04	0.73	0.05
& Go	Takeoff	AB Max	0.4	28396.5	688	23.12	9.22	0.13	2.81	0.40	2	3.01	1.20	0.02	0.37	0.05
	Climbout	94%	0.5	8082.6	688	1.22	21.38	0.32	6.10	0.40	2	0.06	0.99	0.01	0.28	0.02
Hot Refueling	Idling	Ground Idle	20.0	623.9	134	137.34	1.16	58.18	12.38	0.40	2	3.82	0.03	1.62	0.34	0.01
Inflight/Circle	Inflight/Circle	76%	9,084.4	6541.3	1	1.09	14.80	0.35	6.10	0.40	2	1.08	14.66	0.35	6.04	0.40
								Emissions Subtotal (tons/year):				**30.68**	**23.71**	**10.21**	**11.06**	**0.72**

Note:

1. Used typical engine settings provided by Coffer (1997), and Bock (1997).
2. Used default Time-in-Mode (TIM) of US Navy combat aircraft. Taxi TIM was provided by Bock (1997), Inflight/Circle TIM was calculated using equation E-2 of Appendix E.
3. Fuel flow rates and emission factors are from Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO, 1993).
4. Number of circling operations is one since all circling time has been already counted in TIM.

Table E-22
Patuxent River Complex F/A-18C Emissions Calculation (Workload II)

Engine Type: F404-GE-400

Engine type Modeled: F404-GE-400

Type of Operation	Operating Mode	Power Setting[1]	TIM[2] (min.)	Fuel flow rate(lb/hr)[3]	No. of Operations per Year[4]	Emission Factors (lb/1000lb fuel)[3] CO	NOx	VOC	PM10	SO2	No. of Engines	Emission (tons/year) CO	NOx	VOC	PM10	SO2
Departure	Taxi out	Ground Idle	10.0	623.9	356	137.34	1.16	58.18	12.38	0.40	2	5.08	0.04	2.15	0.46	0.01
	Takeoff	AB Max	0.4	28396.5	356	23.12	9.22	0.13	2.81	0.40	2	1.56	0.62	0.01	0.19	0.03
	Climbout	94%	0.5	8082.6	356	1.22	21.38	0.32	2.81	0.40	2	0.03	0.51	0.01	0.07	0.01
Straight in	Approach	76%	1.6	6541.3	73	1.09	14.80	0.35	6.10	0.40	2	0.01	0.19	0.00	0.08	0.01
Arrival	Taxi in	Idle	10.0	623.9	73	137.34	1.16	58.18	12.38	0.40	2	1.04	0.01	0.44	0.09	0.00
Break type	Approach	Max. Cont.	1.6	7495.1	282	1.17	18.71	0.33	2.81	0.40	2	0.07	1.06	0.02	0.16	0.02
Arrival	Taxi in	Ground Idle	10.0	623.9	282	137.34	1.16	58.18	12.38	0.40	2	4.03	0.03	1.71	0.36	0.01
GCA Box	Takeoff	AB Max	0.4	28396.5	39	23.12	9.22	0.13	2.81	0.40	2	0.17	0.07	0.00	0.02	0.00
	Climbout	94%	0.5	8082.6	39	1.22	21.38	0.32	2.81	0.40	2	0.00	0.06	0.00	0.01	0.00
	Approach	76%	1.6	6541.3	39	1.09	14.80	0.35	6.10	0.40	2	0.01	0.10	0.00	0.04	0.00
Catapult	Taxi out	Ground Idle	10.0	623.9	2	137.34	1.16	58.18	12.38	0.40	2	0.03	0.00	0.01	0.00	0.00
Launch	Takeoff	AB Max	0.4	28396.5	2	23.12	9.22	0.13	2.81	0.40	2	0.01	0.00	0.00	0.00	0.00
and	Climbout	AB Max	0.5	28396.5	2	23.12	9.22	0.13	2.81	0.40	2	0.01	0.00	0.00	0.00	0.00
Recovery	Approach	Max. Cont.	1.6	7495.1	2	1.17	18.71	0.33	2.81	0.40	2	0.00	0.01	0.00	0.00	0.00
	Taxi in	Ground Idle	10.0	623.9	2	137.34	1.16	58.18	12.38	0.40	2	0.03	0.00	0.01	0.00	0.00
Touch	Approach	76%	1.6	6541.3	368	1.09	14.80	0.35	6.10	0.40	2	0.07	0.95	0.02	0.39	0.03
& Go	Takeoff	AB Max	0.4	28396.5	368	23.12	9.22	0.13	2.81	0.40	2	1.61	0.64	0.01	0.20	0.03
	Climbout	94%	0.5	8082.6	368	1.22	21.38	0.32	2.81	0.40	2	0.03	0.53	0.01	0.07	0.01
Hot Refueling	Idling	Ground Idle	20.0	623.9	72	137.34	1.16	58.18	12.38	0.40	2	2.04	0.02	0.87	0.18	0.01
Inflight/Circle	Inflight/Circle	76%	9,416.9	6541.3	1	1.09	14.80	0.35	6.10	0.40	2	1.12	15.19	0.36	6.26	0.41
								Emissions Subtotal (tons/year):				**16.95**	**20.04**	**5.63**	**8.59**	**0.58**

Note:

1. Used typical engine settings provided by Coffer (1997), and Bock (1997).
2. Used default Time-in-Mode (TIM) of US Navy combat aircraft. Taxi TIM was provided by Bock (1997), Inflight/Circle TIM was calculated using equation E-2 of Appendix E.
3. Fuel flow rates and emission factors are from Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO, 1993).
4. Number of circling operations is one since all circling time has been already counted in TIM.

Table E-23
Patuxent River Complex F/A-18D Emissions Calculation (Workload III)

Engine Type: **F404-GE-400**

Engine type Modeled: **F404-GE-400**

Type of Operation	Operating Mode	Power Setting[1]	TIM[2] (min.)	Fuel flow rate(lb/hr)[3]	No. of Operations per Year[4]	Emission Factors (lb/1000lb fuel)[3] CO	NOx	VOC	PM10	SO2	No. of Engines	Emission (tons/year) CO	NOx	VOC	PM10	SO2
Departure	Taxi out	Ground Idle	10.0	623.9	245	137.34	1.16	58.18	12.38	0.40	2	3.50	0.03	1.48	0.32	0.01
	Takeoff	AB Max	0.4	28396.5	245	23.12	9.22	0.13	2.81	0.40	2	1.07	0.43	0.01	0.13	0.02
	Climbout	94%	0.5	8082.6	245	1.22	21.38	0.32	6.10	0.40	2	0.02	0.35	0.01	0.10	0.01
Straight in	Approach	76%	1.6	6541.3	50	1.09	14.80	0.35	6.10	0.40	2	0.01	0.13	0.00	0.05	0.00
Arrival	Taxi in	Idle	10.0	623.9	50	137.34	1.16	58.18	12.38	0.40	2	0.72	0.01	0.31	0.06	0.00
Break type	Approach	Max. Cont.	1.6	7495.1	195	1.17	18.71	0.33	6.10	0.40	2	0.05	0.73	0.01	0.24	0.02
Arrival	Taxi in	Ground Idle	10.0	623.9	195	137.34	1.16	58.18	12.38	0.40	2	2.78	0.02	1.18	0.25	0.01
GCA Box	Takeoff	AB Max	0.4	28396.5	27	23.12	9.22	0.13	2.81	0.40	2	0.12	0.05	0.00	0.01	0.00
	Climbout	94%	0.5	8082.6	27	1.22	21.38	0.32	6.10	0.40	2	0.00	0.04	0.00	0.01	0.00
	Approach	76%	1.6	6541.3	27	1.09	14.80	0.35	6.10	0.40	2	0.01	0.07	0.00	0.03	0.00
Catapult	Taxi out	Ground Idle	10.0	623.9	1	137.34	1.16	58.18	12.38	0.40	2	0.02	0.00	0.01	0.00	0.00
Launch	Takeoff	AB Max	0.4	28396.5	1	23.12	9.22	0.13	2.81	0.40	2	0.01	0.00	0.00	0.00	0.00
and	Climbout	AB Max	0.5	28396.5	1	23.12	9.22	0.13	2.81	0.40	2	0.01	0.00	0.00	0.00	0.00
Recovery	Approach	Max. Cont.	1.6	7495.1	1	1.17	18.71	0.33	6.10	0.40	2	0.00	0.00	0.00	0.00	0.00
	Taxi in	Ground Idle	10.0	623.9	1	137.34	1.16	58.18	12.38	0.40	2	0.02	0.00	0.01	0.00	0.00
Touch	Approach	76%	1.6	6541.3	254	1.09	14.80	0.35	6.10	0.40	2	0.05	0.65	0.02	0.27	0.02
& Go	Takeoff	AB Max	0.4	28396.5	254	23.12	9.22	0.13	2.81	0.40	2	1.11	0.44	0.01	0.13	0.02
	Climbout	94%	0.5	8082.6	254	1.22	21.38	0.32	6.10	0.40	2	0.02	0.37	0.01	0.10	0.01
Hot Refueling	Idling	Ground Idle	20.0	623.9	49	137.34	1.16	58.18	12.38	0.40	2	1.41	0.01	0.60	0.13	0.00
Inflight/Circle	Inflight/Circle	76%	9,535.6	6541.3	1	1.09	14.80	0.35	6.10	0.40	2	1.13	15.39	0.36	6.34	0.42
								Emissions Subtotal (tons/year):				**12.05**	**18.73**	**4.00**	**8.19**	**0.53**

Note:

1. Used typical engine settings provided by Coffer (1997), and Bock (1997).
2. Used default Time-in-Mode (TIM) of US Navy combat aircraft. Taxi TIM was provided by Bock (1997), Inflight/Circle TIM was calculated using equation E-2 of Appendix E.
3. Fuel flow rates and emission factors are from Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO, 1993).
4. Number of circling operations is one since all circling time has been already counted in TIM.

Table E-24

Patuxent River Complex GSE Emissions Calculation (Existing)

Aircraft Type	GSE TYPE	Preflight Time (hrs) (1)	No. of Operations (2)	GSE Preflight use %	GSE Total Preflight (1) (hrs)	GSE Fuel flow (1) rate(gal/hr)	GSE Emission Factors (lb/1000gal) (3) CO	NOx	VOC	PM10	SO2	GSE Emission (tons/year) CO	NOx	VOC	PM10	SO2
P-3	NC-10/NC-8	2.5	1079	50%	1349	5	130.15	604.17	49.23	42.47	39.73	0.439	2.037	0.166	0.143	0.134
C-13OT	NC-10/NC-8	2	133	75%	200	5	130.15	604.17	49.23	42.47	39.73	0.065	0.302	0.025	0.021	0.020
E-2	NC-10/NC-8	2	194	100%	389	5	130.15	604.17	49.23	42.47	39.73	0.126	0.587	0.048	0.041	0.039
C-2	NC-10/NC-8	0.5	65	1%	0	5	130.15	604.17	49.23	42.47	39.73	0.000	0.000	0.000	0.000	0.000
S-3	NC-10	1	400	67%	268	5	130.15	604.17	49.23	42.47	39.73	0.087	0.405	0.033	0.028	0.027
EA-6B	NC-8	0.083	401	100%	33	5	130.15	604.17	49.23	42.47	39.73	0.011	0.050	0.004	0.004	0.003
C-130F	NC-10/NC-8	2	66	75%	99	5	130.15	604.17	49.23	42.47	39.73	0.032	0.149	0.012	0.010	0.010
TH-57C	NC-10/NC-8	-	-	-	150	5	130.15	604.17	49.23	42.47	39.73	0.049	0.227	0.018	0.016	0.015
									Total GSE Emissions:			**0.81**	**3.76**	**0.31**	**0.26**	**0.25**

Patuxent River Complex GSE Emissions Calculation (Existing)

Aircraft Type	APU TYPE	Preflight Time (hrs) (1)	No. of Operations (2)	APU Preflight use %	APU Total Preflight (1) (hrs)	APU Fuel flow(4) rate(lb/hr)(1)	APU Emission Factors (lb/1000lb) (4) CO	NOx	VOC	PM10	SO2	APU Emission (tons/year) CO	NOx	VOC	PM10	SO2
P-3	GTCP 95-3	2.5	1079	50%	1349	300	3.20	5.65	0.36		0.40	0.647	1.143	0.073		0.081
C-13OT	GTCP- 95	2	133	25%	67	300	3.20	5.65	0.36		0.40	0.032	0.056	0.004		0.004
C-2	PTU-9	0.5	65	99%	32	200	14.83	3.88	0.13		0.40	0.048	0.012	0.000		0.001
S-3	GTCP 36-201	1	400	33%	132	200	14.83	3.88	0.13		0.40	0.196	0.051	0.002		0.005
C-130F	GTCP-85-55	2	66	25%	33	300	14.83	3.88	0.13		0.40	0.073	0.019	0.001		0.002
									Total APU Emissions:			**1.00**	**1.28**	**0.08**		**0.09**

	CO	NOx	VOC	PM10	SO2
Total GSE and APU Emissions:	**1.81**	**5.04**	**0.39**	**0.26**	**0.34**

Note:
(1) Information provided by Bock (1997)
(2) Information provided by ATAC (1997).
(3) GSE emission factors from AP-42 Volume I for uncontrolled gasoline and diesel industrial engines SCC 20200102, 20300101, and 2300301.
(4) APU emission factors from AESO Report 6-93 (AESO, 1993).

Table E-25

Patuxent River Complex GSE Emissions Calculation (No Action)

Aircraft Type	GSE TYPE	Preflight Time (hrs) (1)	No. of Operations (2)	GSE Preflight use %	GSE Total Preflight (1) (hrs)	GSE Fuel flow (1) rate(gal/hr)	GSE Emission Factors (lb/1000gal) (3)					GSE Emission (tons/year)				
							CO	NOx	VOC	PM10	SO2	CO	NOx	VOC	PM10	SO2
P-3	NC-10/NC-8	2.5	843	50%	1054	5	130.15	604.17	49.23	42.47	39.73	0.343	1.592	0.130	0.112	0.105
C-13OT	NC-10/NC-8	2	448	75%	671	5	130.15	604.17	49.23	42.47	39.73	0.218	1.014	0.083	0.071	0.067
E-2	NC-10/NC-8	2	144	100%	288	5	130.15	604.17	49.23	42.47	39.73	0.094	0.435	0.035	0.031	0.029
C-2	NC-10/NC-8	0.5	48	1%	0	5	130.15	604.17	49.23	42.47	39.73	0.000	0.000	0.000	0.000	0.000
S-3	NC-10	1	230	67%	154	5	130.15	604.17	49.23	42.47	39.73	0.050	0.233	0.019	0.016	0.015
EA-6B	NC-8	0.083	318	100%	26	5	130.15	604.17	49.23	42.47	39.73	0.009	0.040	0.003	0.003	0.003
C-130F	NC-10/NC-8	2	220	75%	331	5	130.15	604.17	49.23	42.47	39.73	0.108	0.499	0.041	0.035	0.033
TH-57C	NC-10/NC-8	-	-	-	150	5	130.15	604.17	49.23	42.47	39.73	0.049	0.227	0.018	0.016	0.015
									Total GSE Emissions:			**0.87**	**4.04**	**0.33**	**0.28**	**0.27**

Patuxent River Complex GSE Emissions Calculation (No Action)

Aircraft Type	APU TYPE	Preflight Time (hrs) (1)	No. of Operations (2)	APU Preflight use %	APU Total Preflight (1) (hrs)	APU Fuel flow(4) rate(lb/hr)(1)	APU Emission Factors (lb/1000lb) (4)					APU Emission (tons/year)				
							CO	NOx	VOC	PM10	SO2	CO	NOx	VOC	PM10	SO2
P-3	GTCP 95-3	2.5	843	50%	1054	300	3.20	5.65	0.36		0.40	0.506	0.893	0.057		0.063
C-13OT	GTCP- 95	2	448	25%	224	300	3.20	5.65	0.36		0.40	0.107	0.190	0.012		0.013
C-2	PTU-9	0.5	48	99%	24	200	14.83	3.88	0.13		0.40	0.035	0.009	0.000		0.001
S-3	GTCP 36-201	1	230	33%	76	200	14.83	3.88	0.13		0.40	0.113	0.029	0.001		0.003
C-130F	GTCP-85-55	2	220	25%	110	300	14.83	3.88	0.13		0.40	0.245	0.064	0.002		0.007
									Total APU Emissions:			**1.01**	**1.19**	**0.07**		**0.09**

Total GSE and APU Emissions: 1.88 5.23 0.40 0.28 0.35

Note:
(1) Information provided by Bock (1997)
(2) Information provided by ATAC (1997).
(3) GSE emission factors from AP-42 Volume I for uncontrolled gasoline and diesel industrial engines SCC 20200102, 20300101, and 2300301.
(4) APU emission factors from AESO Report 6-93 (AESO, 1993).

Table E-26

Patuxent River Complex GSE Emissions Calculation (Workload I)

Aircraft Type	GSE TYPE	Preflight Time (hrs) (1)	No. of Operations (2)	GSE Preflight use %	GSE Total Preflight (1) (hrs)	GSE Fuel flow (1) rate(gal/hr)	GSE Emission Factors (lb/1000gal) (3) CO	NOx	VOC	PM10	SO2	GSE Emission (tons/year) CO	NOx	VOC	PM10	SO2
P-3	NC-10/NC-8	2.5	843	50%	1054	5	130.15	604.17	49.23	42.47	39.73	0.343	1.592	0.130	0.112	0.10
C-13OT	NC-10/NC-8	2	448	75%	671	5	130.15	604.17	49.23	42.47	39.73	0.218	1.014	0.083	0.071	0.07
E-2	NC-10/NC-8	2	144	100%	288	5	130.15	604.17	49.23	42.47	39.73	0.094	0.435	0.035	0.031	0.03
C-2	NC-10/NC-8	0.5	48	1%	0	5	130.15	604.17	49.23	42.47	39.73	0.000	0.000	0.000	0.000	0.00
S-3	NC-10	1	286	67%	192	5	130.15	604.17	49.23	42.47	39.73	0.062	0.289	0.024	0.020	0.02
EA-6B	NC-8	0.083	318	100%	26	5	130.15	604.17	49.23	42.47	39.73	0.009	0.040	0.003	0.003	0.00
C-130F	NC-10/NC-8	2	220	75%	331	5	130.15	604.17	49.23	42.47	39.73	0.108	0.499	0.041	0.035	0.03
TH-57C	NC-10/NC-8	-	-	-	150	5	130.15	604.17	49.23	42.47	39.73	0.049	0.227	0.018	0.016	0.01
									Total GSE Emissions:			**0.88**	**4.10**	**0.33**	**0.29**	**0.27**

Patuxent River Complex GSE Emissions Calculation (Workload I)

Aircraft Type	APU TYPE	Preflight Time (hrs) (1)	No. of Operations (2)	APU Preflight use %	APU Total Preflight (1) (hrs)	APU Fuel flow(4) rate(lb/hr)(1)	APU Emission Factors (lb/1000lb) (4) CO	NOx	VOC	PM10	SO2	APU Emission (tons/year) CO	NOx	VOC	PM10	SO2
P-3	GTCP 95-3	2.5	843	50%	1054	300	3.20	5.65	0.36		0.40	0.506	0.893	0.057		0.063
C-13OT	GTCP- 95	2	448	25%	224	300	3.20	5.65	0.36		0.40	0.107	0.190	0.012		0.013
C-2	PTU-9	0.5	48	99%	24	200	14.83	3.88	0.13		0.40	0.035	0.009	0.000		0.001
S-3	GTCP 36-201	1	286	33%	94	200	14.83	3.88	0.13		0.40	0.140	0.037	0.001		0.004
C-130F	GTCP-85-55	2	220	25%	110	300	14.83	3.88	0.13		0.40	0.245	0.064	0.002		0.007
								Total APU Emissions:				**1.03**	**1.19**	**0.07**		**0.09**

	CO	NOx	VOC	PM10	SO2
Total GSE and APU Emissions:	**1.92**	**5.29**	**0.41**	**0.29**	**0.36**

Note: (1) Information provided by Bock (1997)
(2) Information provided by ATAC (1997).
(3) GSE emission factors from AP-42 Volume I for uncontrolled gasoline and diesel industrial engines SCC 20200102, 20300101, and 2300301.
(4) APU emission factors from AESO Report 6-93 (AESO, 1993).

Table E-27

Patuxent River Complex GSE Emissions Calculation (Workload II)

Aircraft Type	GSE TYPE	Preflight Time (hrs) (1)	No. of Operations (2)	GSE Preflight use %	GSE Total Preflight (1) (hrs)	GSE Fuel flow (1) rate(gal/hr)	GSE Emission Factors (lb/1000gal) (3) CO	NOx	VOC	PM10	SO2	GSE Emission (tons/year) CO	NOx	VOC	PM10	SO2
P-3	NC-10/NC-8	2.5	993	50%	1241	5	130.15	604.17	49.23	42.47	39.73	0.404	1.875	0.153	0.132	0.123
C-13OT	NC-10/NC-8	2	527	75%	790	5	130.15	604.17	49.23	42.47	39.73	0.257	1.193	0.097	0.084	0.078
E-2	NC-10/NC-8	2	170	100%	339	5	130.15	604.17	49.23	42.47	39.73	0.110	0.512	0.042	0.036	0.034
C-2	NC-10/NC-8	0.5	57	1%	0	5	130.15	604.17	49.23	42.47	39.73	0.000	0.000	0.000	0.000	0.000
S-3	NC-10	1	335	67%	224	5	130.15	604.17	49.23	42.47	39.73	0.073	0.339	0.028	0.024	0.022
EA-6B	NC-8	0.083	375	100%	31	5	130.15	604.17	49.23	42.47	39.73	0.010	0.047	0.004	0.003	0.003
C-130F	NC-10/NC-8	2	259	75%	389	5	130.15	604.17	49.23	42.47	39.73	0.127	0.588	0.048	0.041	0.039
TH-57C	NC-10/NC-8	-	-	-	150	5	130.15	604.17	49.23	42.47	39.73	0.049	0.227	0.018	0.016	0.015
									Total GSE Emissions:			**1.03**	**4.78**	**0.39**	**0.34**	**0.31**

Patuxent River Complex GSE Emissions Calculation (Workload II)

Aircraft Type	APU TYPE	Preflight Time (hrs) (1)	No. of Operations (2)	APU Preflight use %	APU Total Preflight (1) (hrs)	APU Fuel flow(4) rate(lb/hr)(1)	APU Emission Factors (lb/1000lb) (4) CO	NOx	VOC	PM10	SO2	APU Emission (tons/year) CO	NOx	VOC	PM10	SO2
CP-3	GTCP 95-3	2.5	993	50%	1241	300	3.20	5.65	0.36		0.40	0.596	1.052	0.067		0.074
C-13OT	GTCP- 95	2	527	25%	263	300	3.20	5.65	0.36		0.40	0.126	0.223	0.014		0.016
C-2	PTU-9	0.5	57	99%	28	200	14.83	3.88	0.13		0.40	0.041	0.011	0.000		0.001
S-3	GTCP 36-201	1	335	33%	111	200	14.83	3.88	0.13		0.40	0.164	0.043	0.001		0.004
C-130F	GTCP-85-55	2	259	25%	130	300	14.83	3.88	0.13		0.40	0.288	0.075	0.003		0.008
								Total APU Emissions:				**1.22**	**1.40**	**0.09**		**0.10**

Total GSE and APU Emissions:	**2.25**	**6.18**	**0.48**	**0.34**	**0.42**

Note:
(1) Information provided by Bock (1997)
(2) Information provided by ATAC (1997).
(3) GSE emission factors from AP-42 Volume I for uncontrolled gasoline and diesel industrial engines SCC 20200102, 20300101, and 2300301.
(4) APU emission factors from AESO Report 6-93 (AESO, 1993).

Table E-28

Patuxent River Complex GSE Emissions Calculation (Workload III)

Aircraft Type	GSE TYPE	Preflight Time (hrs) (1)	No. of Operations (2)	GSE Preflight use %	GSE Total Preflight (1) (hrs)	GSE Fuel flow (1) rate(gal/hr)	GSE Emission Factors (lb/1000gal) (3) CO	NOx	VOC	PM10	SO2	GSE Emission (tons/year) CO	NOx	VOC	PM10	SO2
P-3	NC-10/NC-8	2.5	1141	50%	1426	5	130.15	604.17	49.23	42.47	39.73	0.464	2.154	0.176	0.151	0.142
C-13OT	NC-10/NC-8	2	605	75%	908	5	130.15	604.17	49.23	42.47	39.73	0.295	1.371	0.112	0.096	0.090
E-2	NC-10/NC-8	2	194	100%	389	5	130.15	604.17	49.23	42.47	39.73	0.126	0.587	0.048	0.041	0.039
C-2	NC-10/NC-8	0.5	65	1%	0	5	130.15	604.17	49.23	42.47	39.73	0.000	0.000	0.000	0.000	0.000
S-3	NC-10	1	385	67%	258	5	130.15	604.17	49.23	42.47	39.73	0.084	0.390	0.032	0.027	0.026
EA-6B	NC-8	0.083	430	100%	36	5	130.15	604.17	49.23	42.47	39.73	0.012	0.054	0.004	0.004	0.004
C-130F	NC-10/NC-8	2	298	75%	447	5	130.15	604.17	49.23	42.47	39.73	0.145	0.675	0.055	0.047	0.044
TH-57C	NC-10/NC-8	-	-	-	150	5	130.15	604.17	49.23	42.47	39.73	0.049	0.227	0.018	0.016	0.015
									Total GSE Emissions:			**1.18**	**5.46**	**0.44**	**0.38**	**0.36**

Patuxent River Complex GSE Emissions Calculation (Workload III)

Aircraft Type	APU TYPE	Preflight Time (hrs) (1)	No. of Operations (2)	APU Preflight use %	APU Total Preflight (1) (hrs)	APU Fuel flow(4) rate(lb/hr)(1)	APU Emission Factors (lb/1000lb) (4) CO	NOx	VOC	PM10	SO2	APU Emission (tons/year) CO	NOx	VOC	PM10	SO2
P-3	GTCP 95-3	2.5	1141	50%	1426	300	3.20	5.65	0.36		0.40	0.685	1.209	0.077		0.086
C-13OT	GTCP- 95	2	605	25%	303	300	3.20	5.65	0.36		0.40	0.145	0.256	0.016		0.018
C-2	PTU-9	0.5	65	99%	32	200	14.83	3.88	0.13		0.40	0.048	0.012	0.000		0.001
S-3	GTCP 36-201	1	385	33%	127	200	14.83	3.88	0.13		0.40	0.188	0.049	0.002		0.005
C-130F	GTCP-85-55	2	298	25%	149	300	14.83	3.88	0.13		0.40	0.331	0.087	0.003		0.009
									Total APU Emissions:			**1.40**	**1.61**	**0.10**		**0.12**

Total GSE and APU Emissions: **2.57** **7.07** **0.54** **0.38** **0.48**

Note:
(1) Information provided by Bock (1997)
(2) Information provided by ATAC (1997).
(3) GSE emission factors from AP-42 Volume I for uncontrolled gasoline and diesel industrial engines SCC 20200102, 20300101, and 2300301.
(4) APU emission factors from AESO Report 6-93 (AESO, 1993).

Table E-29
Emissions from Maintenance & Preflight Runup Operations at NAS Patuxent River (Existing)

Maintenance Runups																			
				No./yr(1)	Power Setting	Power Setting	Duration(1)	Number	Fuel flow	Emission Factor (lb/1000lb) (3)					Emission (tons/year) (4)				
Unit (1)	Site(1)	Aircraft(1)	Engine Type(2)	(1 engine)	Reported(1)	Modeled	(minutes)	of Engines(1)	Rate (lb/hr) (3)	CO	NOx	VOC	PM-103	SO2	CO	NOx	VOC	PM-10	SO2
ATEF	HH	F/A-18 E/F	F414-GE-400	105	idle	ground idle	20	1	749.12	88.85	3.29	54.20	12.75	0.40	1.16	0.04	0.71	0.17	0.01
				105	mil	IRP	25	1	10986.28	0.69	34.94	0.12	1.66	0.40	0.17	8.40	0.03	0.40	0.10
				105	A/B	Max A/B	15	1	35603.33	262.12	9.47	4.72	0.00	0.40	122.49	4.43	2.21	0.00	0.19
ATEF	HH	F/A-18 C/D	F404-GE-400	201	idle	ground idle	20	1	623.90	137.34	1.16	58.18	12.38	0.40	2.87	0.02	1.22	0.26	0.01
				201	mil	IRP	25	1	8586.90	1.05	25.16	0.31	2.81	0.40	0.38	9.05	0.11	1.01	0.14
				201	A/B	A/B max	15	1	28396.50	23.12	9.22	0.13	2.81	0.40	16.50	6.58	0.09	2.00	0.29
ATEF	HH	F-14A	TF30-P-412A	55	idle	idle	10	1	920.00	55.51	3.22	31.42	8.96	0.40	0.23	0.01	0.13	0.04	0.00
				55	mil	military	20	1	7050.00	1.38	19.60	0.77	2.98	0.40	0.09	1.27	0.05	0.19	0.03
				55	A/B	A/B Z5	30	1	47800.00	10.77	4.79	0.20	2.98	0.40	7.08	3.15	0.13	1.96	0.26
ATEF	HH	F-14D	F110-GE-400	37	idle	idle	10	1	1171.20	16.60	2.77	3.65	12.38	0.40	0.06	0.01	0.01	0.04	0.00
				37	mil	IRP	20	1	11719.30	0.84	28.63	0.40	2.81	0.40	0.06	2.07	0.03	0.20	0.03
				37	A/B	A/B max	30	1	56702.80	23.12	9.22	0.13	2.81	0.40	12.13	4.84	0.07	1.47	0.21
ATEF	HH	EA-6	J52-P-408	46	idle	idle	10	1	779.00	55.96	2.38	28.33	19.94	0.40	0.17	0.01	0.08	0.06	0.00
				46	mil	military	50	1	9479.00	1.47	12.32	0.57	7.75	0.40	0.27	2.24	0.10	1.41	0.07
ATEF	HH	T-2	J85-GE-2	105	idle	ground idle	20	1	560.00	111.86	3.68	11.86	22.00	0.40	1.10	0.04	0.12	0.22	0.00
				105	mil	military	40	1	2890.00	21.56	6.40	0.45	9.40	0.40	2.18	0.65	0.05	0.95	0.04
ATEF	HH	T-38	J85-GE-2	136	idle	ground idle	15	1	560.00	111.86	3.68	11.86	22.00	0.40	1.06	0.04	0.11	0.21	0.00
				136	mil	military	35	1	2890.00	21.56	6.40	0.45	9.40	0.40	2.47	0.73	0.05	1.08	0.05
				136	A/B	A/B	10	1	2890.00	21.56	6.40	0.45	0.00	0.40	0.71	0.21	0.01	0.00	0.01
ATEF	HH	T-45	F405-RR-401	21	idle	7% thrust	15	1	519.50	143.00	0.31	30.50		0.40	0.20	0.00	0.04		0.00
				21	mil	00% thrust(max	45	1	4873.80	3.05	11.00	0.09		0.40	0.12	0.42	0.00		0.02
ATEF	HH	S-3	TF34-GE-400	54	idle	idle	15	1	458.00	90.98	1.69	14.99	3.26	0.40	0.28	0.01	0.05	0.01	0.00
				54	mil	military	45	1	3800.00	5.95	7.51	0.39	2.11	0.40	0.46	0.58	0.03	0.16	0.03
TPS	TPS3/2	F/A-18B	F404-GE-400	140	idle	ground idle	15	1	623.90	137.34	1.16	58.18	12.38	0.40	1.50	0.01	0.64	0.14	0.00
TPS	TPS3/2	T-2C	J85-GE-2	335	idle	ground idle	15	1	560.00	111.86	3.68	11.86	22.00	0.40	2.62	0.09	0.28	0.52	0.01
TPS	TPS3/2	T-38A	J85-GE-2	430	idle	ground idle	10	1	560.00	111.86	3.68	11.86	22.00	0.40	2.24	0.07	0.24	0.44	0.01
Strike	STK1/2	F/A-18A/B/C/I	F404-GE-400	950	idle	ground idle	22	1	623.90	137.34	1.16	58.18	12.38	0.40	14.92	0.13	6.32	1.35	0.04
Strike	STK1/2	T-45A	F405-RR-401	50	idle	7% thrust	5	1	519.50	143.00	0.31	30.50		0.40	0.15	0.00	0.03		0.00
Strike	STK3	F-14A	TF30-P-412A	225	idle	idle	35	1	920.00	55.51	3.22	31.42	8.96	0.40	3.35	0.19	1.90	0.54	0.02
Strike	STK3	F-14D	F110-GE-400	225	idle	idle	35	1	1171.20	16.60	2.77	3.65	12.38	0.40	1.28	0.21	0.28	0.95	0.03
Strike	STK1/2	EA-6B	J52-P-408	30	idle	idle	10	1	779.00	55.96	2.38	28.33	19.44	0.40	0.11	0.00	0.06	0.04	0.00
Strike	STK1/2	F/A-18 E/F	F414-GE-400	0	idle	ground idle	37	1	749.12	88.85	3.29	54.20	12.75	0.40	0.00	0.00	0.00	0.00	0.00
Force	FRC2	E-2/C-2	T56-A-16	1	idle	H/S ground idle	660	1	756.00	5.65	6.35	1.22	2.21	0.40	0.02	0.03	0.01	0.01	0.00
Force	FRC2	P-3	T-56-A16	1	idle	H/S ground idle	84	1	756.00	5.65	6.35	1.22	2.21	0.40	0.00	0.00	0.00	0.00	0.00
Force	FRC2	S-3	TF34-GE-400	1	idle	idle	228	1	458.00	90.98	1.69	14.99	3.26	0.40	0.08	0.00	0.01	0.00	0.00

Table E-29 (continued)
Emissions from Maintenance & Preflight Runup Operations at NAS Patuxent River (Existing)

Preflight Runups																			
				Number per	Power Setting	Power Setting	Duration(1)	Number	Fuel flow	Emission Factor (lb/1000lb) (3)					Emission (tons/year) (4)				
Unit (1)	Site(1)	Aircraft(1)	Engine Type(2)	Year (1)	Reported(1)	Modeled	(minutes)	of Engines(1)	Rate (lb/hr) (3)	CO	NOx	VOC	PM-103	SO2	CO	NOx	VOC	PM-10	SO2
TPS	TPS3/2	F/A-18B	F404-GE-400	300	idle	ground idle	15	2	623.90	137.34	1.16	58.18	12.38	0.40	6.43	0.05	2.72	0.58	0.02
TPS	TPS3/2	T-2C	J85-GE-2	716	idle	ground idle	15	2	560.00	111.86	3.68	11.86	22.00	0.40	11.21	0.37	1.19	2.21	0.04
TPS	TPS3/2	T-38A	J85-GE-2	908	idle	ground idle	10	2	560.00	111.86	3.68	11.86	22.00	0.40	9.48	0.31	1.01	1.86	0.03
TPS	TPS2	TH-6	T700-GE-401	642	idle	idle	10	1	164.00	29.00	3.80	1.45	2.21	0.40	0.25	0.03	0.01	0.02	0.00
TPS	TPS1	H-60	T700-GE-401	508	idle	idle	20	2	164.00	29.00	3.80	1.45	2.21	0.40	0.81	0.11	0.04	0.06	0.01
TPS	TPS4	NU-1B	R1820	72	idle	idle	5	1	89.00	474.16	0.00	150.56		0.40	0.13	0.00	0.04		0.00
TPS	TPS4	U-6A	R1820	162	idle	idle	5	1	89.00	474.16	0.00	150.56		0.40	0.28	0.00	0.09		0.00
TPS	TPS2	OH-58	T63-A-5A	459	idle	ground idle	10	1	61.20	79.15	1.42	20.30	2.21	0.40	0.19	0.00	0.05	0.01	0.00
TPS	TPS4	U-21F	PT6A-27	283	idle	idle	15	2	115.20	64.00	2.43	50.17	2.21	0.40	0.52	0.02	0.41	0.02	0.00
Strike	STK1/2	F/A-18A/B/C/I	F404-GE-400	2202	idle	ground idle	12	2	623.90	137.34	1.16	58.18	12.38	0.40	37.74	0.32	15.99	3.40	0.11
Strike	STK1/2	T-45A	F405-RR-401	181	idle	7% thrust	22	1	519.50	143.00	0.31	30.50		0.40	2.47	0.01	0.53		0.01
Strike	STK3	F-14A	TF30-P-412A	217	idle	idle	25	2	920.00	55.51	3.22	31.42	8.96	0.40	4.62	0.27	2.61	0.75	0.03
Strike	STK3	F-14D	F110-GE-400	217	idle	idle	25	2	1171.20	16.60	2.77	3.65	12.38	0.40	1.76	0.29	0.39	1.31	0.04
Strike	STK1/2	EA-6B	J52-P-408	167	idle	idle	25	2	779.00	55.96	2.38	28.33	19.94	0.40	3.03	0.13	1.54	1.08	0.02
Strike	STK1/2	F/A-18 E/F	F414-GE-400	0	idle	idle	28	2	749.12	88.85	3.29	54.20	12.75	0.40	0.00	0.00	0.00	0.00	0.00
Rotary \	V22	V-22	T406-AD-400	102	60%	70% IRP	20	2	1709.00	1.70	9.00	0.80		0.40	0.10	0.52	0.05		0.02
Rotary \	RTW2	HH-60	T700-GE-401	683	idle	idle	25	2	164.00	29.00	3.80	1.45	2.21	0.40	1.35	0.18	0.07	0.10	0.02
Rotary \	RTW2	UH-1	T400-CP-400	406	idle	ground idle	22	1	138.00	29.78	3.05	8.98		0.40	0.31	0.03	0.09		0.00
Rotary \	RTW2	H-3	T58-GE-16	101	idle	ground idle	27	2	150.00	139.73	3.03	40.91	2.21	0.40	0.95	0.02	0.28	0.02	0.00
Rotary \	RTW2	H-46	T58-GE-16	150	idle	ground idle	27	2	150.00	139.73	3.03	40.91	2.21	0.40	1.41	0.03	0.41	0.02	0.00
Rotary \	RTW2	H-53	T64-GE-415	152	idle	idle	30	3	269.00	74.33	2.12	24.35	2.21	0.40	2.28	0.07	0.75	0.07	0.01
Rotary \	RTW1	TH-57C	T63-A-5A	186	idle	ground idle	17	1	61.20	79.15	1.42	20.30	2.21	0.40	0.13	0.00	0.03	0.00	0.00
Force	RC1/2/A	P-3	T56-A-16	550	idle	H/S ground idle	10	4	756.00	5.65	6.35	1.22	2.21	0.40	0.78	0.88	0.17	0.31	0.06
Force	FRC2	E-2/C-2	T56-A-16	259	idle	H/S ground idle	10	4	756.00	5.65	6.35	1.22	2.21	0.40	0.37	0.41	0.08	0.14	0.03
Force	FRC2/A	C-130	T56-A-15	199	idle	7% thrust	10	4	493.80	17.69	2.50	14.96	1.32	0.40	0.58	0.08	0.49	0.04	0.01
Force	FRC2	S-3	TF34-GE-400	168	idle	idle	10	2	458.00	90.98	1.69	14.99	3.26	0.40	1.17	0.02	0.19	0.04	0.01
Force	FRC2	T-34	PT6A-27	295	idle	idle	10	1	115.20	64.00	2.43	50.17	2.21	0.40	0.18	0.01	0.14	0.01	0.00
												Total Emissions (tons/year):			**287.02**	**49.68**	**44.55**	**27.87**	**2.10**

Note:

1. Provided by Wyle Laboratories (Wyle Lab, 1997).
2. Engine types modeled are the same as listed in Table E-7.
3. Emission factors and fuel flow rates are the same as the data used in total emissions calculation.
4. Annual emissions = number of engine test per year * test time duration *number of engines * fuel flow rate * emission factor * unit conversion factor (1/60/1000/2000)

Table E-30
Emissions from Maintenance & Preflight Runup Operations at NAS Patuxent River (No Action)

Maintenance Runups																			
				No./yr(1)	Power Setting	Power Setting	Duration(1)	Number	Fuel flow	Emission Factor (lb/1000lb) (3)					Emission (tons/year) (4)				
Unit (1)	Site(1)	Aircraft(1)	Engine Type(2)	(1 engine)	Reported(1)	Modeled	(minutes)	of Engines(1)	Rate (lb/hr) (3)	CO	NOx	VOC	PM-103	SO2	CO	NOx	VOC	PM-10	SO2
ATEF	HH	F/A-18 E/F	F414-GE-400	105	idle	ground idle	20	1	749.12	88.85	3.29	54.20	12.75	0.40	1.16	0.04	0.71	0.17	0.01
				105	mil	IRP	25	1	10986.28	0.69	34.94	0.12	1.66	0.40	0.17	8.40	0.03	0.40	0.10
				105	A/B	Max A/B	15	1	35603.33	262.12	9.47	4.72	0.00	0.40	122.49	4.43	2.21	0.00	0.19
ATEF	HH	F/A-18 C/D	F404-GE-400	201	idle	ground idle	20	1	623.90	137.34	1.16	58.18	12.38	0.40	2.87	0.02	1.22	0.26	0.01
				201	mil	IRP	25	1	8586.90	1.05	25.16	0.31	2.81	0.40	0.38	9.05	0.11	1.01	0.14
				201	A/B	A/B max	15	1	28396.50	23.12	9.22	0.13	2.81	0.40	16.50	6.58	0.09	2.00	0.29
ATEF	HH	F-14A	TF30-P-412A	55	idle	idle	10	1	920.00	55.51	3.22	31.42	8.96	0.40	0.23	0.01	0.13	0.04	0.00
				55	mil	military	20	1	7050.00	1.38	19.60	0.77	2.98	0.40	0.09	1.27	0.05	0.19	0.03
				55	A/B	A/B Z5	30	1	47800.00	10.77	4.79	0.20	2.98	0.40	7.08	3.15	0.13	1.96	0.26
ATEF	HH	F-14D	F110-GE-400	37	idle	idle	10	1	1171.20	16.60	2.77	3.65	12.38	0.40	0.06	0.01	0.01	0.04	0.00
				37	mil	IRP	20	1	11719.30	0.84	28.63	0.40	2.81	0.40	0.06	2.07	0.03	0.20	0.03
				37	A/B	A/B max	30	1	56702.80	23.12	9.22	0.13	2.81	0.40	12.13	4.84	0.07	1.47	0.21
ATEF	HH	EA-6	J52-P-408	46	idle	idle	10	1	779.00	55.96	2.38	28.33	19.94	0.40	0.17	0.01	0.08	0.06	0.00
				46	mil	military	50	1	9479.00	1.47	12.32	0.57	7.75	0.40	0.27	2.24	0.10	1.41	0.07
ATEF	HH	T-2	J85-GE-2	105	idle	ground idle	20	1	560.00	111.86	3.68	11.86	22.00	0.40	1.10	0.04	0.12	0.22	0.00
				105	mil	military	40	1	2890.00	21.56	6.40	0.45	9.40	0.40	2.18	0.65	0.05	0.95	0.04
ATEF	HH	T-38	J85-GE-2	136	idle	ground idle	15	1	560.00	111.86	3.68	11.86	22.00	0.40	1.06	0.04	0.11	0.21	0.00
				136	mil	military	35	1	2890.00	21.56	6.40	0.45	9.40	0.40	2.47	0.73	0.05	1.08	0.05
				136	A/B	A/B	10	1	2890.00	21.56	6.40	0.45	0.00	0.40	0.71	0.21	0.01	0.00	0.01
ATEF	HH	T-45	F405-RR-401	21	idle	7% thrust	15	1	519.50	143.00	0.31	30.50		0.40	0.20	0.00	0.04		0.00
				21	mil	100% thrust(max	45	1	4873.80	3.05	11.00	0.09		0.40	0.12	0.42	0.00		0.02
ATEF	HH	S-3	TF34-GE-400	54	idle	idle	15	1	458.00	90.98	1.69	14.99	3.26	0.40	0.28	0.01	0.05	0.01	0.00
				54	mil	military	45	1	3800.00	5.95	7.51	0.39	2.11	0.40	0.46	0.58	0.03	0.16	0.03
TPS	TPS3/2	F/A-18B	F404-GE-400	140	idle	ground idle	15	1	623.90	137.34	1.16	58.18	12.38	0.40	1.50	0.01	0.64	0.14	0.00
TPS	TPS3/2	T-2C	J85-GE-2	335	idle	ground idle	15	1	560.00	111.86	3.68	11.86	22.00	0.40	2.62	0.09	0.28	0.52	0.01
TPS	TPS3/2	T-38A	J85-GE-2	430	idle	ground idle	10	1	560.00	111.86	3.68	11.86	22.00	0.40	2.24	0.07	0.24	0.44	0.01
Strike	STK1/2	/A-18A/B/C/	F404-GE-400	950	idle	ground idle	22	1	623.90	137.34	1.16	58.18	12.38	0.40	14.92	0.13	6.32	1.35	0.04
Strike	STK1/2	T-45A	F405-RR-401	50	idle	7% thrust	5	1	519.50	143.00	0.31	30.50		0.40	0.15	0.00	0.03		0.00
Strike	STK3	F-14A	TF30-P-412A	225	idle	idle	35	1	920.00	55.51	3.22	31.42	8.96	0.40	3.35	0.19	1.90	0.54	0.02
Strike	STK3	F-14D	F110-GE-400	225	idle	idle	35	1	1171.20	16.60	2.77	3.65	12.38	0.40	1.28	0.21	0.28	0.95	0.03
Strike	STK1/2	EA-6B	J52-P-408	30	idle	idle	10	1	779.00	55.96	2.38	28.33	19.44	0.40	0.11	0.00	0.06	0.04	0.00
Strike	STK1/2	F/A-18 E/F	F414-GE-400	0	idle	ground idle	37	1	749.12	88.85	3.29	54.20	12.75	0.40	0.00	0.00	0.00	0.00	0.00
Force	FRC2	E-2/C-2	T56-A-16	1	idle	H/S ground idle	660	1	756.00	5.65	6.35	1.22	2.21	0.40	0.02	0.03	0.01	0.01	0.00
Force	FRC2	P-3	T-56-A16	1	idle	H/S ground idle	84	1	756.00	5.65	6.35	1.22	2.21	0.40	0.00	0.00	0.00	0.00	0.00
Force	FRC2	S-3	TF34-GE-400	1	idle	idle	228	1	458.00	90.98	1.69	14.99	3.26	0.40	0.08	0.00	0.01	0.00	0.00

Table E-30 (continued)
Emissions from Maintenance & Preflight Runup Operations at NAS Patuxent River (No Action)

Preflight Runups																			
				Number per	Power Setting	Power Setting	Duration(1)	Number	Fuel flow	Emission Factor (lb/1000lb) (3)					Emission (tons/year) (4)				
Unit (1)	Site(1)	Aircraft(1)	Engine Type(2)	Year (1)	Reported(1)	Modeled	(minutes)	of Engines(1)	Rate (lb/hr) (3)	CO	NOx	VOC	PM-103	SO2	CO	NOx	VOC	PM-10	SO2
TPS	TPS3/2	F/A-18B	F404-GE-400	164	idle	ground idle	15	2	623.90	137.34	1.16	58.18	12.38	0.40	3.51	0.03	1.49	0.32	0.01
TPS	TPS3/2	T-2C	J85-GE-2	716	idle	ground idle	15	2	560.00	111.86	3.68	11.86	22.00	0.40	11.21	0.37	1.19	2.21	0.04
TPS	TPS3/2	T-38A	J85-GE-2	907	idle	ground idle	10	2	560.00	111.86	3.68	11.86	22.00	0.40	9.47	0.31	1.00	1.86	0.03
TPS	TPS2	TH-6	T700-GE-401	641	idle	idle	10	1	164.00	29.00	3.80	1.45	2.21	0.40	0.25	0.03	0.01	0.02	0.00
TPS	TPS1	H-60	T700-GE-401	375	idle	idle	20	2	164.00	29.00	3.80	1.45	2.21	0.40	0.59	0.08	0.03	0.05	0.01
TPS	TPS4	NU-1B	R1820	72	idle	idle	5	1	89.00	474.16	0.00	150.56		0.40	0.13	0.00	0.04		0.00
TPS	TPS4	U-6A	R1820	160	idle	idle	5	1	89.00	474.16	0.00	150.56		0.40	0.28	0.00	0.09		0.00
TPS	TPS2	OH-58	T63-A-5A	460	idle	ground idle	10	1	61.20	79.15	1.42	20.30	2.21	0.40	0.19	0.00	0.05	0.01	0.00
TPS	TPS4	U-21F	PT6A-27	283	idle	idle	15	2	115.20	64.00	2.43	50.17	2.21	0.40	0.52	0.02	0.41	0.02	0.00
Strike	STK1/2	!/A-18A/B/C/I	F404-GE-400	1202	idle	ground idle	12	2	623.90	137.34	1.16	58.18	12.38	0.40	20.60	0.17	8.73	1.86	0.06
Strike	STK1/2	T-45A	F405-RR-401	0	idle	7% thrust	22	1	519.50	143.00	0.31	30.50		0.40	0.00	0.00	0.00		0.00
Strike	STK3	F-14A	TF30-P-412A	131	idle	idle	25	2	920.00	55.51	3.22	31.42	8.96	0.40	2.78	0.16	1.57	0.45	0.02
Strike	STK3	F-14D	F110-GE-400	131	idle	idle	25	2	1171.20	16.60	2.77	3.65	12.38	0.40	1.06	0.18	0.23	0.79	0.03
Strike	STK1/2	EA-6B	J52-P-408	140	idle	idle	25	2	779.00	55.96	2.38	28.33	19.94	0.40	2.54	0.11	1.29	0.91	0.02
Strike	STK1/2	F/A-18 E/F	F414-GE-400	1551	idle	idle	28	2	749.12	88.85	3.29	54.20	12.75	0.40	48.18	1.78	29.39	6.91	0.22
Rotary V	V22	V-22	T406-AD-400	303	60%	70% IRP	20	2	1709.00	1.70	9.00	0.80		0.40	0.29	1.55	0.14		0.07
Rotary V	RTW2	HH-60	T700-GE-401	505	idle	idle	25	2	164.00	29.00	3.80	1.45	2.21	0.40	1.00	0.13	0.05	0.08	0.01
Rotary V	RTW2	UH-1	T400-CP-400	360	idle	ground idle	22	1	138.00	29.78	3.05	8.98		0.40	0.27	0.03	0.08		0.00
Rotary V	RTW2	H-3	T58-GE-16	74	idle	ground idle	27	2	150.00	139.73	3.03	40.91	2.21	0.40	0.70	0.02	0.20	0.01	0.00
Rotary V	RTW2	H-46	T58-GE-16	111	idle	ground idle	27	2	150.00	139.73	3.03	40.91	2.21	0.40	1.05	0.02	0.31	0.02	0.00
Rotary V	RTW2	H-53	T64-GE-415	113	idle	idle	30	3	269.00	74.33	2.12	24.35	2.21	0.40	1.69	0.05	0.56	0.05	0.01
Rotary V	RTW1	TH-57C	T63-A-5A	140	idle	ground idle	17	1	61.20	79.15	1.42	20.30	2.21	0.40	0.10	0.00	0.02	0.00	0.00
Force	FRC1/2/	P-3	T56-A-16	430	idle	H/S ground idle	10	4	756.00	5.65	6.35	1.22	2.21	0.40	0.61	0.69	0.13	0.24	0.04
Force	FRC2	E-2/C-2	T56-A-16	192	idle	H/S ground idle	10	4	756.00	5.65	6.35	1.22	2.21	0.40	0.27	0.31	0.06	0.11	0.02
Force	FRC2/A	C-130	T56-A-15	668	idle	7% thrust	10	4	493.80	17.69	2.50	14.96	1.32	0.40	1.95	0.27	1.64	0.15	0.04
Force	FRC2	S-3	TF34-GE-400	97	idle	idle	10	2	458.00	90.98	1.69	14.99	3.26	0.40	0.67	0.01	0.11	0.02	0.00
Force	FRC2	T-34	PT6A-27	220	idle	idle	10	1	115.20	64.00	2.43	50.17	2.21	0.40	0.14	0.01	0.11	0.00	0.00
												Total Emissions (tons/year):			**308.55**	**51.85**	**64.13**	**31.89**	**2.26**

Note:

1. Provided by Wyle Laboratories (Wyle Lab, 1997).
2. Engine types modeled are the same as listed in Table E-7.
3. Emission factors and fuel flow rates are the same as the data used in total emissions calculation.
4. Annual emissions = number of engine test per year * test time duration *number of engines * fuel flow rate * emission factor * unit conversion factor (1/60/1000/2000)

Table E-31

Emissions from Maintenance & Preflight Runup Operations at NAS Patuxent River (Workload I)

Maintenance Runups																			
				No./yr(1)	Power Setting	Power Setting	Duration(1)	Number	Fuel flow	Emission Factor (lb/1000lb) (3)					Emission (tons/year) (4)				
Unit (1)	Site(1)	Aircraft(1)	Engine Type(2)	(1 engine)	Reported(1)	Modeled	(minutes)	of Engines(1)	Rate (lb/hr) (3)	CO	NOx	VOC	PM-103	SO2	CO	NOx	VOC	PM-10	SO2
ATEF	HH	F/A-18 E/F	F414-GE-400	105	idle	ground idle	20	1	749.12	88.85	3.29	54.20	12.75	0.40	1.16	0.04	0.71	0.17	0.01
				105	mil	IRP	25	1	10986.28	0.69	34.94	0.12	1.66	0.40	0.17	8.40	0.03	0.40	0.10
				105	A/B	Max A/B	15	1	35603.33	262.12	9.47	4.72	0.00	0.40	122.49	4.43	2.21	0.00	0.19
ATEF	HH	F/A-18 C/D	F404-GE-400	201	idle	ground idle	20	1	623.90	137.34	1.16	58.18	12.38	0.40	2.87	0.02	1.22	0.26	0.01
				201	mil	IRP	25	1	8586.90	1.05	25.16	0.31	2.81	0.40	0.38	9.05	0.11	1.01	0.14
				201	A/B	A/B max	15	1	28396.50	23.12	9.22	0.13	2.81	0.40	16.50	6.58	0.09	2.00	0.29
ATEF	HH	F-14A	TF30-P-412A	55	idle	idle	10	1	920.00	55.51	3.22	31.42	8.96	0.40	0.23	0.01	0.13	0.04	0.00
				55	mil	military	20	1	7050.00	1.38	19.60	0.77	2.98	0.40	0.09	1.27	0.05	0.19	0.03
				55	A/B	A/B Z5	30	1	47800.00	10.77	4.79	0.20	2.98	0.40	7.08	3.15	0.13	1.96	0.26
ATEF	HH	F-14D	F110-GE-400	37	idle	idle	10	1	1171.20	16.60	2.77	3.65	12.38	0.40	0.06	0.01	0.01	0.04	0.00
				37	mil	IRP	20	1	11719.30	0.84	28.63	0.40	2.81	0.40	0.06	2.07	0.03	0.20	0.03
				37	A/B	A/B max	30	1	56702.80	23.12	9.22	0.13	2.81	0.40	12.13	4.84	0.07	1.47	0.21
ATEF	HH	EA-6	J52-P-408	46	idle	idle	10	1	779.00	55.96	2.38	28.33	19.94	0.40	0.17	0.01	0.08	0.06	0.00
				46	mil	military	50	1	9479.00	1.47	12.32	0.57	7.75	0.40	0.27	2.24	0.10	1.41	0.07
ATEF	HH	T-2	J85-GE-2	105	idle	ground idle	20	1	560.00	111.86	3.68	11.86	22.00	0.40	1.10	0.04	0.12	0.22	0.00
				105	mil	military	40	1	2890.00	21.56	6.40	0.45	9.40	0.40	2.18	0.65	0.05	0.95	0.04
ATEF	HH	T-38	J85-GE-2	136	idle	ground idle	15	1	560.00	111.86	3.68	11.86	22.00	0.40	1.06	0.04	0.11	0.21	0.00
				136	mil	military	35	1	2890.00	21.56	6.40	0.45	9.40	0.40	2.47	0.73	0.05	1.08	0.05
				136	A/B	A/B	10	1	2890.00	21.56	6.40	0.45	0.00	0.40	0.71	0.21	0.01	0.00	0.01
ATEF	HH	T-45	F405-RR-401	21	idle	7% thrust	15	1	519.50	143.00	0.31	30.50		0.40	0.20	0.00	0.04		0.00
				21	mil	100% thrust(max)	45	1	4873.80	3.05	11.00	0.09		0.40	0.12	0.42	0.00		0.02
ATEF	HH	S-3	TF34-GE-400	54	idle	idle	15	1	458.00	90.98	1.69	14.99	3.26	0.40	0.28	0.01	0.05	0.01	0.00
				54	mil	military	45	1	3800.00	5.95	7.51	0.39	2.11	0.40	0.46	0.58	0.03	0.16	0.03
TPS	TPS3/2	F/A-18B	F404-GE-400	140	idle	ground idle	15	1	623.90	137.34	1.16	58.18	12.38	0.40	1.50	0.01	0.64	0.14	0.00
TPS	TPS3/2	T-2C	J85-GE-2	335	idle	ground idle	15	1	560.00	111.86	3.68	11.86	22.00	0.40	2.62	0.09	0.28	0.52	0.01
TPS	TPS3/2	T-38A	J85-GE-2	430	idle	ground idle	10	1	560.00	111.86	3.68	11.86	22.00	0.40	2.24	0.07	0.24	0.44	0.01
Strike	STK1/2	F/A-18A/B/C/D	F404-GE-400	950	idle	ground idle	22	1	623.90	137.34	1.16	58.18	12.38	0.40	14.92	0.13	6.32	1.35	0.04
Strike	STK1/2	T-45A	F405-RR-401	50	idle	7% thrust	5	1	519.50	143.00	0.31	30.50		0.40	0.15	0.00	0.03		0.00
Strkie	STK3	F-14A	TF30-P-412A	225	idle	idle	35	1	920.00	55.51	3.22	31.42	8.96	0.40	3.35	0.19	1.90	0.54	0.02
Strike	STK3	F-14D	F110-GE-400	225	idle	idle	35	1	1171.20	16.60	2.77	3.65	12.38	0.40	1.28	0.21	0.28	0.95	0.03
Strike	STK1/2	EA-6B	J52-P-408	30	idle	idle	10	1	779.00	55.96	2.38	28.33	19.44	0.40	0.11	0.00	0.06	0.04	0.00
Strike	STK1/2	F/A-18 E/F	F414-GE-400	0	idle	ground idle	37	1	749.12	88.85	3.29	54.20	12.75	0.40	0.00	0.00	0.00	0.00	0.00
Force	FRC2	E-2/C-2	T56-A-16	1	idle	H/S ground idle	660	1	756.00	5.65	6.35	1.22	2.21	0.40	0.02	0.03	0.01	0.01	0.00
Force	FRC2	P-3	T-56-A16	1	idle	H/S ground idle	84	1	756.00	5.65	6.35	1.22	2.21	0.40	0.00	0.00	0.00	0.00	0.00
Force	FRC2	S-3	TF34-GE-400	1	idle	idle	228	1	458.00	90.98	1.69	14.99	3.26	0.40	0.08	0.00	0.01	0.00	0.00

Table E-31 (continued)
Emissions from Maintenance & Preflight Runup Operations at NAS Patuxent River (Workload I)

Preflight Runups																			
				Number per	Power Setting	Power Setting	Duration(1)	Number	Fuel flow	Emission Factor (lb/1000lb) (3)					Emission (tons/year) (4)				
Unit (1)	Site(1)	Aircraft(1)	Engine Type(2)	Year (1)	Reported(1)	Modeled	(minutes)	of Engines(1)	Rate (lb/hr) (3)	CO	NOx	VOC	PM-103	SO2	CO	NOx	VOC	PM-10	SO2
TPS	TPS3/2	F/A-18B	F404-GE-400	196	idle	ground idle	15	2	623.90	137.34	1.16	58.18	12.38	0.40	4.20	0.04	1.78	0.38	0.01
TPS	TPS3/2	T-2C	J85-GE-2	716	idle	ground idle	15	2	560.00	111.86	3.68	11.86	22.00	0.40	11.21	0.37	1.19	2.21	0.04
TPS	TPS3/2	T-38A	J85-GE-2	907	idle	ground idle	10	2	560.00	111.86	3.68	11.86	22.00	0.40	9.47	0.31	1.00	1.86	0.03
TPS	TPS2	TH-6	T700-GE-401	641	idle	idle	10	1	164.00	29.00	3.80	1.45	2.21	0.40	0.25	0.03	0.01	0.02	0.00
TPS	TPS1	H-60	T700-GE-401	375	idle	idle	20	2	164.00	29.00	3.80	1.45	2.21	0.40	0.59	0.08	0.03	0.05	0.01
TPS	TPS4	NU-1B	R1820	72	idle	idle	5	1	89.00	474.16	0.00	150.56		0.40	0.13	0.00	0.04		0.00
TPS	TPS4	U-6A	R1820	160	idle	idle	5	1	89.00	474.16	0.00	150.56		0.40	0.28	0.00	0.09		0.00
TPS	TPS2	OH-58	T63-A-5A	460	idle	ground idle	10	1	61.20	79.15	1.42	20.30	2.21	0.40	0.19	0.00	0.05	0.01	0.00
TPS	TPS4	U-21F	PT6A-27	283	idle	idle	15	2	115.20	64.00	2.43	50.17	2.21	0.40	0.52	0.02	0.41	0.02	0.00
Strike	STK1/2	F/A-18A/B/C/D	F404-GE-400	1436	idle	ground idle	12	2	623.90	137.34	1.16	58.18	12.38	0.40	24.61	0.21	10.42	2.22	0.07
Strike	STK1/2	T-45A	F405-RR-401	0	idle	7% thrust	22	1	519.50	143.00	0.31	30.50		0.40	0.00	0.00	0.00		0.00
Strike	STK3	F-14A	TF30-P-412A	167	idle	idle	25	2	920.00	55.51	3.22	31.42	8.96	0.40	3.54	0.21	2.01	0.57	0.03
Strike	STK3	F-14D	F110-GE-400	167	idle	idle	25	2	1171.20	16.60	2.77	3.65	12.38	0.40	1.35	0.23	0.30	1.01	0.03
Strike	STK1/2	EA-6B	J52-P-408	140	idle	idle	25	2	779.00	55.96	2.38	28.33	19.94	0.40	2.54	0.11	1.29	0.91	0.02
Strike	STK1/2	F/A-18 E/F	F414-GE-400	1551	idle	idle	28	2	749.12	88.85	3.29	54.20	12.75	0.40	48.18	1.78	29.39	6.91	0.22
Rotary W	V22	V-22	T406-AD-400	303	60%	70% IRP	20	2	1709.00	1.70	9.00	0.80		0.40	0.29	1.55	0.14		0.07
Rotary W	RTW2	HH-60	T700-GE-401	505	idle	idle	25	2	164.00	29.00	3.80	1.45	2.21	0.40	1.00	0.13	0.05	0.08	0.01
Rotary W	RTW2	UH-1	T400-CP-400	391	idle	ground idle	22	1	138.00	29.78	3.05	8.98		0.40	0.29	0.03	0.09		0.00
Rotary W	RTW2	H-3	T58-GE-16	74	idle	ground idle	27	2	150.00	139.73	3.03	40.91	2.21	0.40	0.70	0.02	0.20	0.01	0.00
Rotary W	RTW2	H-46	T58-GE-16	111	idle	ground idle	27	2	150.00	139.73	3.03	40.91	2.21	0.40	1.05	0.02	0.31	0.02	0.00
Rotary W	RTW2	H-53	T64-GE-415	113	idle	idle	30	3	269.00	74.33	2.12	24.35	2.21	0.40	1.69	0.05	0.56	0.05	0.01
Rotary W	RTW1	TH-57C	T63-A-5A	140	idle	ground idle	17	1	61.20	79.15	1.42	20.30	2.21	0.40	0.10	0.00	0.02	0.00	0.00
Force	FRC1/2/A	P-3	T56-A-16	430	idle	H/S ground idle	10	4	756.00	5.65	6.35	1.22	2.21	0.40	0.61	0.69	0.13	0.24	0.04
Force	FRC2	E-2/C-2	T56-A-16	192	idle	H/S ground idle	10	4	756.00	5.65	6.35	1.22	2.21	0.40	0.27	0.31	0.06	0.11	0.02
Force	FRC2/A	C-130	T56-A-15	668	idle	7% thrust	10	4	493.80	17.69	2.50	14.96	1.32	0.40	1.95	0.27	1.64	0.15	0.04
Force	FRC2	S-3	TF34-GE-400	120	idle	idle	10	2	458.00	90.98	1.69	14.99	3.26	0.40	0.83	0.02	0.14	0.03	0.00
Force	FRC2	T-34	PT6A-27	220	idle	idle	10	1	115.20	64.00	2.43	50.17	2.21	0.40	0.14	0.01	0.11	0.00	0.00
												Total Emissions (tons/year):			**314.49**	**51.99**	**66.65**	**32.66**	**2.29**

Note:

1. Provided by Wyle Laboratories (Wyle Lab, 1997).
2. Engine types modeled are the same as listed in Table E-7.
3. Emission factors and fuel flow rates are the same as the data used in total emissions calculation.
4. Annual emissions = number of engine test per year * test time duration *number of engines * fuel flow rate * emission factor * unit conversion factor (1/60/1000/2000)

Table E-32

Emissions from Maintenance & Preflight Runup Operations at NAS Patuxent River (Workload II)

Maintenance Runups																			
Unit (1)	Site(1)	Aircraft(1)	Engine Type(2)	Number per Year (1)	Power Setting Reported(1)	Power Setting Modeled	Duration(1) (minutes)	Number of Engines(1)	Fuel flow Rate (lb/hr) (3)	Emission Factor (lb/1000lb) (3) CO	NOx	VOC	PM-10^3	SO2	Emission (tons/year) (4) CO	NOx	VOC	PM-10	SO2
ATEF	HH	F/A-18 E/F	F414-GE-400	116	idle	ground idle	20	1	749.12	88.85	3.29	54.20	12.75	0.40	1.29	0.05	0.78	0.18	0.01
				116	mil	IRP	25	1	10986.28	0.69	34.94	0.12	1.66	0.40	0.18	9.28	0.03	0.44	0.11
				116	A/B	Max A/B	15	1	35603.33	262.12	9.47	4.72	0.00	0.40	135.32	4.89	2.44	0.00	0.21
ATEF	HH	F/A-18 C/D	F404-GE-400	221	idle	ground idle	20	1	623.90	137.34	1.16	58.18	12.38	0.40	3.16	0.03	1.34	0.28	0.01
				221	mil	IRP	25	1	8586.90	1.05	25.16	0.31	2.81	0.40	0.42	9.95	0.12	1.11	0.16
				221	A/B	A/B max	15	1	28396.50	23.12	9.22	0.13	2.81	0.40	18.14	7.23	0.10	2.20	0.31
ATEF	HH	F-14A	TF30-P-412A	61	idle	idle	10	1	920.00	55.51	3.22	31.42	8.96	0.40	0.26	0.02	0.15	0.04	0.00
				61	mil	military	20	1	7050.00	1.38	19.60	0.77	2.98	0.40	0.10	1.40	0.06	0.21	0.03
				61	A/B	A/B Z5	30	1	47800.00	10.77	4.79	0.20	2.98	0.40	7.85	3.49	0.15	2.17	0.29
ATEF	HH	F-14D	F110-GE-400	41	idle	idle	10	1	1171.20	16.60	2.77	3.65	12.38	0.40	0.07	0.01	0.01	0.05	0.00
				41	mil	IRP	20	1	11719.30	0.84	28.63	0.40	2.81	0.40	0.07	2.29	0.03	0.23	0.03
				41	A/B	A/B max	30	1	56702.80	23.12	9.22	0.13	2.81	0.40	13.44	5.36	0.08	1.63	0.23
ATEF	HH	EA-6	J52-P-408	51	idle	idle	10	1	779.00	55.96	2.38	28.33	19.94	0.40	0.19	0.01	0.09	0.07	0.00
				51	mil	military	50	1	9479.00	1.47	12.32	0.57	7.75	0.40	0.30	2.48	0.11	1.56	0.08
ATEF	HH	T-2	J85-GE-2	116	idle	ground idle	20	1	560.00	111.86	3.68	11.86	22.00	0.40	1.21	0.04	0.13	0.24	0.00
				116	mil	military	40	1	2890.00	21.56	6.40	0.45	9.40	0.40	2.41	0.72	0.05	1.05	0.04
ATEF	HH	T-38	J85-GE-2	150	idle	ground idle	15	1	560.00	111.86	3.68	11.86	22.00	0.40	1.17	0.04	0.12	0.23	0.00
				150	mil	military	35	1	2890.00	21.56	6.40	0.45	9.40	0.40	2.73	0.81	0.06	1.19	0.05
				150	A/B	A/B	10	1	2890.00	21.56	6.40	0.45	0.00	0.40	0.78	0.23	0.02	0.00	0.01
ATEF	HH	T-45	F405-RR-401	23	idle	7% thrust	15	1	519.50	143.00	0.31	30.50		0.40	0.21	0.00	0.05		0.00
				23	mil	100% thrust(max	45	1	4873.80	3.05	11.00	0.09		0.40	0.13	0.46	0.00		0.02
ATEF	HH	S-3	TF34-GE-400	59	idle	idle	15	1	458.00	90.98	1.69	14.99	3.26	0.40	0.31	0.01	0.05	0.01	0.00
				59	mil	military	45	1	3800.00	5.95	7.51	0.39	2.11	0.40	0.50	0.63	0.03	0.18	0.03
TPS	TPS3/2	F/A-18B	F404-GE-400	154	idle	ground idle	15	1	623.90	137.34	1.16	58.18	12.38	0.40	1.65	0.01	0.70	0.15	0.00
TPS	TPS3/2	T-2C	J85-GE-2	369	idle	ground idle	15	1	560.00	111.86	3.68	11.86	22.00	0.40	2.89	0.10	0.31	0.57	0.01
TPS	TPS3/2	T-38A	J85-GE-2	473	idle	ground idle	10	1	560.00	111.86	3.68	11.86	22.00	0.40	2.47	0.08	0.26	0.49	0.01
Strike	STK1/2	F/A-18A/B/C/D	F404-GE-400	1045	idle	ground idle	22	1	623.90	137.34	1.16	58.18	12.38	0.40	16.42	0.14	6.95	1.48	0.05
Strike	STK1/2	T-45A	F405-RR-401	55	idle	7% thrust	5	1	519.50	143.00	0.31	30.50		0.40	0.17	0.00	0.04		0.00
Strike	STK3	F-14A	TF30-P-412A	248	idle	idle	35	1	920.00	55.51	3.22	31.42	8.96	0.40	3.69	0.21	2.09	0.60	0.03
Strike	STK3	F-14D	F110-GE-400	248	idle	idle	35	1	1171.20	16.60	2.77	3.65	12.38	0.40	1.40	0.23	0.31	1.05	0.03
Strike	STK1/2	EA-6B	J52-P-408	33	idle	idle	10	1	779.00	55.96	2.38	28.33	19.44	0.40	0.12	0.01	0.06	0.04	0.00
Strike	STK1/2	F/A-18 E/F	F414-GE-400	250	idle	ground idle	37	1	749.12	88.85	3.29	54.20	12.75	0.40	5.13	0.19	3.13	0.74	0.02
Force	FRC2	E-2/C-2	T56-A-16	1	idle	H/S ground idle	660	1	756.00	5.65	6.35	1.22	2.21	0.40	0.02	0.03	0.01	0.01	0.00
Force	FRC2	P-3	T-56-A16	1	idle	H/S ground idle	84	1	756.00	5.65	6.35	1.22	2.21	0.40	0.00	0.00	0.00	0.00	0.00
Force	FRC2	S-3	TF34-GE-400	1	idle	idle	228	1	458.00	90.98	1.69	14.99	3.26	0.40	0.08	0.00	0.01	0.00	0.00

Table E-32 (continued)
Emissions from Maintenance & Preflight Runup Operations at NAS Patuxent River (Workload II)

Preflight Runups

Unit[1]	Site[1]	Aircraft[1]	Engine Type[2]	Number per Year[1]	Power Setting Reported[1]	Power Setting Modeled	Duration[1] (minutes)	Number of Engines[1]	Fuel flow Rate[3] (lb/hr)	Emission Factor[3] (lb/1000lb) CO	NOx	VOC	PM-10[3]	SO2	Emission (tons/year)[4] CO	NOx	VOC	PM-10	SO2
TPS	TPS3/2	F/A-18B	F404-GE-400	230	idle	ground idle	15	2	623.90	137.34	1.16	58.18	12.38	0.40	4.93	0.04	2.09	0.44	0.01
TPS	TPS3/2	T-2C	J85-GE-2	716	idle	ground idle	15	2	560.00	111.86	3.68	11.86	22.00	0.40	11.21	0.37	1.19	2.21	0.04
TPS	TPS3/2	T-38A	J85-GE-2	907	idle	ground idle	10	2	560.00	111.86	3.68	11.86	22.00	0.40	9.47	0.31	1.00	1.86	0.03
TPS	TPS2	TH-6	T700-GE-401	641	idle	idle	10	1	164.00	29.00	3.80	1.45	2.21	0.40	0.25	0.03	0.01	0.02	0.00
TPS	TPS1	H-60	T700-GE-401	441	idle	idle	20	2	164.00	29.00	3.80	1.45	2.21	0.40	0.70	0.09	0.03	0.05	0.01
TPS	TPS4	NU-1B	R1820	72	idle	idle	5	1	89.00	474.16	0.00	150.56		0.40	0.13	0.00	0.04		0.00
TPS	TPS4	U-6A	R1820	160	idle	idle	5	1	89.00	474.16	0.00	150.56		0.40	0.28	0.00	0.09		0.00
TPS	TPS2	OH-58	T63-A-5A	460	idle	ground idle	10	1	61.20	79.15	1.42	20.30	2.21	0.40	0.19	0.00	0.05	0.01	0.00
TPS	TPS4	U-21F	PT6A-27	283	idle	idle	15	2	115.20	64.00	2.43	50.17	2.21	0.40	0.52	0.02	0.41	0.02	0.00
Strike	STK1/2	F/A-18A/B/C/D	F404-GE-400	1690	idle	ground idle	12	2	623.90	137.34	1.16	58.18	12.38	0.40	28.96	0.24	12.27	2.61	0.08
Strike	STK1/2	T-45A	F405-RR-401	0	idle	7% thrust	22	1	519.50	143.00	0.31	30.50		0.40	0.00	0.00	0.00		0.00
Strike	STK3	F-14A	TF30-P-412A	196	idle	idle	25	2	920.00	55.51	3.22	31.42	8.96	0.40	4.16	0.24	2.35	0.67	0.03
Strike	STK3	F-14D	F110-GE-400	196	idle	idle	25	2	1171.20	16.60	2.77	3.65	12.38	0.40	1.58	0.26	0.35	1.18	0.04
Strike	STK1/2	EA-6B	J52-P-408	166	idle	idle	25	2	779.00	55.96	2.38	28.33	19.94	0.40	3.02	0.13	1.53	1.07	0.02
Strike	STK1/2	F/A-18 E/F	F414-GE-400	1551	idle	idle	28	2	749.12	88.85	3.29	54.20	12.75	0.40	48.18	1.78	29.39	6.91	0.22
Rotary W	V22	V-22	T406-AD-400	303	60%	70% IRP	20	2	1709.00	1.70	9.00	0.80		0.40	0.29	1.55	0.14		0.07
Rotary W	RTW2	HH-60	T700-GE-401	594	idle	idle	25	2	164.00	29.00	3.80	1.45	2.21	0.40	1.18	0.15	0.06	0.09	0.02
Rotary W	RTW2	UH-1	T400-CP-400	458	idle	ground idle	22	1	138.00	29.78	3.05	8.98		0.40	0.35	0.04	0.10		0.00
Rotary W	RTW2	H-3	T58-GE-16	88	idle	ground idle	27	2	150.00	139.73	3.03	40.91	2.21	0.40	0.83	0.02	0.24	0.01	0.00
Rotary W	RTW2	H-46	T58-GE-16	131	idle	ground idle	27	2	150.00	139.73	3.03	40.91	2.21	0.40	1.24	0.03	0.36	0.02	0.00
Rotary W	RTW2	H-53	T64-GE-415	133	idle	idle	30	3	269.00	74.33	2.12	24.35	2.21	0.40	1.99	0.06	0.65	0.06	0.01
Rotary W	RTW1	TH-57C	T63-A-5A	164	idle	ground idle	17	1	61.20	79.15	1.42	20.30	2.21	0.40	0.11	0.00	0.03	0.00	0.00
Force	RC1/2/A	P-3	T56-A-16	506	idle	H/S ground idle	10	4	756.00	5.65	6.35	1.22	2.21	0.40	0.72	0.81	0.16	0.28	0.05
Force	FRC2	E-2/C-2	T56-A-16	226	idle	H/S ground idle	10	4	756.00	5.65	6.35	1.22	2.21	0.40	0.32	0.36	0.07	0.13	0.02
Force	FRC2/A	C-130	T56-A-15	786	idle	7% thrust	10	4	493.80	17.69	2.50	14.96	1.32	0.40	2.29	0.32	1.94	0.17	0.05
Force	FRC2	S-3	TF34-GE-400	141	idle	idle	10	2	458.00	90.98	1.69	14.99	3.26	0.40	0.98	0.02	0.16	0.04	0.00
Force	FRC2	T-34	PT6A-27	258	idle	idle	10	1	115.20	64.00	2.43	50.17	2.21	0.40	0.16	0.01	0.12	0.01	0.00
												Total Emissions (tons/year):			**348.28**	**57.32**	**74.70**	**36.06**	**2.53**

Note:

1. Provided by Wyle Laboratories (Wyle Lab, 1997).

2. Engine types modeled are the same as listed in Table E-7.

3. Emission factors and fuel flow rates are the same as the data used in total emissions calculation.

4. Annual emissions = number of engine test per year * test time duration *number of engines * fuel flow rate * emission factor * unit conversion factor (1/60/1000/2000)

Table E-33

Emissions from Maintenance & Preflight Runup Operations at NAS Patuxent River (Workload III)

Maintenance Runups																			
Unit (1)	Site(1)	Aircraft(1)	Engine Type(2)	Number per Year (1)	Power Setting Reported(1)	Power Setting Modeled	Duration(1) (minutes)	Number of Engines(1)	Fuel flow Rate (lb/hr) (3)	Emission Factor (lb/1000lb) (3)					Emission (tons/year) (4)				
										CO	NOx	VOC	PM-10[3]	SO2	CO	NOx	VOC	PM-10	SO2
ATEF	HH	F/A-18 E/F	F414-GE-400	126	idle	ground idle	20	1	749.12	88.85	3.29	54.20	12.75	0.40	1.40	0.05	0.85	0.20	0.01
				126	mil	IRP	25	1	10986.28	0.69	34.94	0.12	1.66	0.40	0.20	10.08	0.03	0.48	0.12
				126	A/B	Max A/B	15	1	35603.33	262.12	9.47	4.72	0.00	0.40	146.98	5.31	2.65	0.00	0.22
ATEF	HH	F/A-18 C/D	F404-GE-400	241	idle	ground idle	20	1	623.90	137.34	1.16	58.18	12.38	0.40	3.44	0.03	1.46	0.31	0.01
				241	mil	IRP	25	1	8586.90	1.05	25.16	0.31	2.81	0.40	0.45	10.85	0.13	1.21	0.17
				241	A/B	A/B max	15	1	28396.50	23.12	9.22	0.13	2.81	0.40	19.78	7.89	0.11	2.40	0.34
ATEF	HH	F-14A	TF30-P-412A	66	idle	idle	10	1	920.00	55.51	3.22	31.42	8.96	0.40	0.28	0.02	0.16	0.05	0.00
				66	mil	military	20	1	7050.00	1.38	19.60	0.77	2.98	0.40	0.11	1.52	0.06	0.23	0.03
				66	A/B	A/B Z5	30	1	47800.00	10.77	4.79	0.20	2.98	0.40	8.49	3.78	0.16	2.35	0.32
ATEF	HH	F-14D	F110-GE-400	44	idle	idle	10	1	1171.20	16.60	2.77	3.65	12.38	0.40	0.07	0.01	0.02	0.05	0.00
				44	mil	IRP	20	1	11719.30	0.84	28.63	0.40	2.81	0.40	0.07	2.46	0.03	0.24	0.03
				44	A/B	A/B max	30	1	56702.80	23.12	9.22	0.13	2.81	0.40	14.42	5.75	0.08	1.75	0.25
ATEF	HH	EA-6	J52-P-408	55	idle	idle	10	1	779.00	55.96	2.38	28.33	19.94	0.40	0.20	0.01	0.10	0.07	0.00
				55	mil	military	50	1	9479.00	1.47	12.32	0.57	7.75	0.40	0.32	2.68	0.12	1.68	0.09
ATEF	HH	T-2	J85-GE-2	126	idle	ground idle	20	1	560.00	111.86	3.68	11.86	22.00	0.40	1.32	0.04	0.14	0.26	0.00
				126	mil	military	40	1	2890.00	21.56	6.40	0.45	9.40	0.40	2.62	0.78	0.05	1.14	0.05
ATEF	HH	T-38	J85-GE-2	163	idle	ground idle	15	1	560.00	111.86	3.68	11.86	22.00	0.40	1.28	0.04	0.14	0.25	0.00
				163	mil	military	35	1	2890.00	21.56	6.40	0.45	9.40	0.40	2.96	0.88	0.06	1.29	0.05
				163	A/B	A/B	10	1	2890.00	21.56	6.40	0.45	0.00	0.40	0.85	0.25	0.02	0.00	0.02
ATEF	HH	T-45	F405-RR-401	25	idle	7% thrust	15	1	519.50	143.00	0.31	30.50		0.40	0.23	0.00	0.05		0.00
				25	mil	100% thrust(max)	45	1	4873.80	3.05	11.00	0.09		0.40	0.14	0.50	0.00		0.02
ATEF	HH	S-3	TF34-GE-400	65	idle	idle	15	1	458.00	90.98	1.69	14.99	3.26	0.40	0.34	0.01	0.06	0.01	0.00
				65	mil	military	45	1	3800.00	5.95	7.51	0.39	2.11	0.40	0.55	0.70	0.04	0.20	0.04
TPS	TPS3/2	F/A-18B	F404-GE-400	168	idle	ground idle	15	1	623.90	137.34	1.16	58.18	12.38	0.40	1.80	0.02	0.76	0.16	0.01
TPS	TPS3/2	T-2C	J85-GE-2	402	idle	ground idle	15	1	560.00	111.86	3.68	11.86	22.00	0.40	3.15	0.10	0.33	0.62	0.01
TPS	TPS3/2	T-38A	J85-GE-2	516	idle	ground idle	10	1	560.00	111.86	3.68	11.86	22.00	0.40	2.69	0.09	0.29	0.53	0.01
Strike	STK1/2	F/A-18A/B/C/D	F404-GE-400	1140	idle	ground idle	22	1	623.90	137.34	1.16	58.18	12.38	0.40	17.91	0.15	7.59	1.61	0.05
Strike	STK1/2	T-45A	F405-RR-401	60	idle	7% thrust	5	1	519.50	143.00	0.31	30.50		0.40	0.19	0.00	0.04		0.00
Strike	STK3	F14A	TF30-P-412A	270	idle	idle	35	1	920.00	55.51	3.22	31.42	8.96	0.40	4.02	0.23	2.28	0.65	0.03
Strike	STK3	F-14D	F110-GE-400	270	idle	idle	35	1	1171.20	16.60	2.77	3.65	12.38	0.40	1.53	0.26	0.34	1.14	0.04
Strike	STK1/2	EA-6B	J52-P-408	36	idle	idle	10	1	779.00	55.96	2.38	28.33	19.44	0.40	0.13	0.01	0.07	0.05	0.00
Strike	STK1/2	F/A-18 E/F	F414-GE-400	275	idle	ground idle	37	1	749.12	88.85	3.29	54.20	12.75	0.40	5.64	0.21	3.44	0.81	0.03
Force	FRC2	E-2/C-2	T56-A-16	1	idle	H/S ground idle	660	1	756.00	5.65	6.35	1.22	2.21	0.40	0.02	0.03	0.01	0.01	0.00
Force	FRC2	P-3	T-56-A16	1	idle	H/S ground idle	84	1	756.00	5.65	6.35	1.22	2.21	0.40	0.00	0.00	0.00	0.00	0.00
Force	FRC2	S-3	TF34-GE-400	1	idle	idle	228	1	458.00	90.98	1.69	14.99	3.26	0.40	0.08	0.00	0.01	0.00	0.00

Table E-33 (continued)
Emissions from Maintenance & Preflight Runup Operations at NAS Patuxent River (Workload III)

Preflight Runups																			
Unit[1]	Site[1]	Aircraft[1]	Engine Type[2]	Number per Year[1]	Power Setting Reported[1]	Power Setting Modeled	Duration[1] (minutes)	Number of Engines[1]	Fuel flow Rate[3] (lb/hr)	Emission Factor[3] (lb/1000lb) CO	NOx	VOC	PM-10[3]	SO2	Emission (tons/year)[4] CO	NOx	VOC	PM-10	SO2
TPS	TPS3/2	F/A-18B	F404-GE-400	265	idle	ground idle	15	2	623.90	137.34	1.16	58.18	12.38	0.40	5.68	0.05	2.40	0.51	0.02
TPS	TPS3/2	T-2C	J85-GE-2	716	idle	ground idle	15	2	560.00	111.86	3.68	11.86	22.00	0.40	11.21	0.37	1.19	2.21	0.04
TPS	TPS3/2	T-38A	J85-GE-2	907	idle	ground idle	10	2	560.00	111.86	3.68	11.86	22.00	0.40	9.47	0.31	1.00	1.86	0.03
TPS	TPS2	TH-6	T700-GE-401	641	idle	idle	10	1	164.00	29.00	3.80	1.45	2.21	0.40	0.25	0.03	0.01	0.02	0.00
TPS	TPS1	H-60	T700-GE-401	509	idle	idle	20	2	164.00	29.00	3.80	1.45	2.21	0.40	0.81	0.11	0.04	0.06	0.01
TPS	TPS4	NU-1B	R1820	72	idle	idle	5	1	89.00	474.16	0.00	150.56		0.40	0.13	0.00	0.04		0.00
TPS	TPS4	U-6A	R1820	160	idle	idle	5	1	89.00	474.16	0.00	150.56		0.40	0.28	0.00	0.09		0.00
TPS	TPS2	OH-58	T63-A-5A	460	idle	ground idle	10	1	61.20	79.15	1.42	20.30	2.21	0.40	0.19	0.00	0.05	0.01	0.00
TPS	TPS4	U-21F	PT6A-27	283	idle	idle	15	2	115.20	64.00	2.43	50.17	2.21	0.40	0.52	0.02	0.41	0.02	0.00
Strike	STK1/2	F/A-18A/B/C/D	F404-GE-400	1942	idle	ground idle	12	2	623.90	137.34	1.16	58.18	12.38	0.40	33.28	0.28	14.10	3.00	0.10
Strike	STK1/2	T-45A	F405-RR-401	0	idle	7% thrust	22	1	519.50	143.00	0.31	30.50		0.40	0.00	0.00	0.00	0.00	0.00
Strike	STK3	F-14A	TF30-P-412A	225	idle	idle	25	2	920.00	55.51	3.22	31.42	8.96	0.40	4.79	0.28	2.71	0.77	0.03
Strike	STK3	F-14D	F110-GE-400	225	idle	idle	25	2	1171.20	16.60	2.77	3.65	12.38	0.40	1.82	0.30	0.40	1.36	0.04
Strike	STK1/2	EA-6B	J52-P-408	190	idle	idle	25	2	779.00	55.96	2.38	28.33	19.94	0.40	3.45	0.15	1.75	1.23	0.02
Strike	STK1/2	F/A-18 E/F	F414-GE-400	1551	idle	idle	28	2	749.12	88.85	3.29	54.20	12.75	0.40	48.18	1.78	29.39	6.91	0.22
Rotary W	V22	V-22	T406-AD-400	303	60%	70% IRP	20	2	1709.00	1.70	9.00	0.80		0.40	0.29	1.55	0.14		0.07
Rotary W	RTW2	HH-60	T700-GE-401	683	idle	idle	25	2	164.00	29.00	3.80	1.45	2.21	0.40	1.35	0.18	0.07	0.10	0.02
Rotary W	RTW2	UH-1	T400-CP-400	527	idle	ground idle	22	1	138.00	29.78	3.05	8.98		0.40	0.40	0.04	0.12		0.01
Rotary W	RTW2	H-3	T58-GE-16	101	idle	ground idle	27	2	150.00	139.73	3.03	40.91	2.21	0.40	0.95	0.02	0.28	0.02	0.00
Rotary W	RTW2	H-46	T58-GE-16	150	idle	ground idle	27	2	150.00	139.73	3.03	40.91	2.21	0.40	1.41	0.03	0.41	0.02	0.00
Rotary W	RTW2	H-53	T64-GE-415	152	idle	idle	30	3	269.00	74.33	2.12	24.35	2.21	0.40	2.28	0.07	0.75	0.07	0.01
Rotary W	RTW1	TH-57C	T63-A-5A	188	idle	ground idle	17	1	61.20	79.15	1.42	20.30	2.21	0.40	0.13	0.00	0.03	0.00	0.00
Force	FRC1/2	P-3	T56-A-16	582	idle	H/S ground idle	10	4	756.00	5.65	6.35	1.22	2.21	0.40	0.83	0.93	0.18	0.32	0.06
Force	FRC2	E-2/C-2	T56-A-16	259	idle	H/S ground idle	10	4	756.00	5.65	6.35	1.22	2.21	0.40	0.37	0.41	0.08	0.14	0.03
Force	FRC2/A	C-130	T56-A-15	903	idle	7% thrust	10	4	493.80	17.69	2.50	14.96	1.32	0.40	2.63	0.37	2.22	0.20	0.06
Force	FRC2	S-3	TF34-GE-400	162	idle	idle	10	2	458.00	90.98	1.69	14.99	3.26	0.40	1.13	0.02	0.19	0.04	0.00
Force	FRC2	T-34	PT6A-27	297	idle	idle	10	1	115.20	64.00	2.43	50.17	2.21	0.40	0.18	0.01	0.14	0.01	0.00
												Total Emissions (tons/year):			**375.67**	**62.03**	**79.86**	**38.65**	**2.74**

Note:

1. Provided by Wyle Laboratories (Wyle Lab, 1997).
2. Engine types modeled are the same as listed in Table E-7.
3. Emission factors and fuel flow rates are the same as the data used in total emissions calculation.
4. Annual emissions = number of engine test per year * test time duration *number of engines * fuel flow rate * emission factor * unit conversion factor (1/60/1000/2000)

Table E-34

Summary of NAS Patuxent River Stationary Emission Sources

Emission Source	Description
Fuel Burning Equipment	The facility has a total of 84 boilers, 12 furnaces and 4 water heaters. Seventy of the boilers have heat input ratings of at least 1,000,000 BTU/hour and are permitted or registered.
Stationary Internal Combustion Engines	There are a total of 74 stationary combustion engines. All of them use diesel fuel only. Only one engine has greater than 1,000 bhp and is registered.
Spray Coating Operation	There are 11 paint spray booths, each operating eight hours per day.
Jet Engine Test Cells	There are a total of 13 operational jet engine test cells used to test a variety of helicopter and jet engines (excludes the Bldg 2360 test cell still under construction).
Degreasers	There are 33 degreasers used to clean equipment coated with grease and oil. Only one degreaser has a greater than 60 gallon capacity and is registered/permitted.
Underground Storage Tanks	There are underground storage tanks in use that store various petroleum products including No. 2 fuel oil, diesel fuel, unleaded gasoline, and JP-4/5 jet fuels.
Aboveground Storage Tanks	Dual-walled aboveground storage tanks in use.
Paper Shredder	One large paper shredder is used to destroy classified documents. The resulting particulate emissions are controlled by a cyclone and baghouse.
Groundwater Remediation System	A remediation system is used to treat groundwater contaminated with aviation fuel leakage from former underground storage tank releases. The remediation consists of two processes: a controlled biological system and air stripping. The vapors produced released during the biological system are treated through carbon adsorption.
Air Stripper	An air stripper is used to treat approximately 16 million gallons of contaminated groundwater annually. The VOCs stripped from the groundwater are controlled by a carbon absorption unit.
Paint Stripper	A dry paint stripper is operated approximately 2 hours per day for 250 days annually. Since the dry paint is removed by abrasive action, only particulate matter is emitted from paint stripper.
Candle Flare	A utility candle flare is operated on an inactive municipal solid waste landfill to destroy landfill gas. Due to its size and annual non-methane emissions, the landfill is not subject to guideline for municipal solid waste landfills (40 CFR Part 60, Subpart Cc).
Lead Smelter	A smelter is used to process lead to cast ballast weights for aircraft. Since the smelter uses electric heat, lead is the only criteria pollutant emitted.
Stationary Welder	A stationary welder is operated for miscellaneous parts welding.

Note: 1. A number of underground storage tanks are in the process of being removed.
Source: *Criteria and Hazardous Air Pollutant Emissions Inventory, NAS Patuxent River* (October 1997).

Table E-35
Nonattainment Area Emissions (Existing)

Aircraft Type	Engine Type Modeled	Operating Mode	Power Setting[1]	Time (hour)	Fuel flow rate(lb/hr)[3]	Emission Factors (lb/1000lb)[3] CO	NOx	VOC	PM_{10}	SO2	No. of Engines	Emissions (tons/year) CO	NOx	VOC	PM10	SO2
A-10(A-10A)	TF34-GE-100	Inflight/Circle	Intermediate	1.73	2460	14.59	0.49	3.80	2.11	0.40	2	0.06	0.00	0.02	0.01	0.00
A-6(A-6E)	J52-P-408	Inflight/Circle	Intermediate 2	0.46	5752	3.18	8.38	0.67	7.75	0.40	2	0.01	0.02	0.00	0.02	0.00
Beech C99	PT6A-41	Inflight/Circle	90% Thrust	6.26	473	6.49	7.57	2.03	2.21	0.40	2	0.02	0.02	0.01	0.01	0.00
C-12(UC-12B)	PT6A-41	Inflight/Circle	90%	11.59	473	6.49	7.57	2.03	2.21	0.40	2	0.04	0.04	0.01	0.01	0.00
C-130(C-130T, KC-130F)	T56-A-16	Inflight/Circle	Flight Idle	1.18	836	4.54	6.52	0.95	2.21	0.40	4	0.01	0.01	0.00	0.00	0.00
C-135	TF-33-P-5	Inflight/Circle	Intermediate	0.00	8960	1.70	10.70	0.50	0.90	0.40	4	0.00	0.00	0.00	0.00	0.00
Cessna 185	TSIO-360	Inflight/Circle	85%	0.29	99.6	960.80	4.32	9.55		0.40	1	0.01	0.00	0.00		0.00
C-5(C-5A)	CF6-80-C2B6	Inflight/Circle	85%	0.00	16516.2	0.52	22.94	0.08		0.40	4	0.00	0.00	0.00		0.00
E-2/C-2(E-2C/C-2A)	T56-A-16	Inflight/Circle	Flight Idle	1.87	836	0.42	9.93	0.17	2.21	0.40	2	0.00	0.02	0.00	0.00	0.00
E-6(E-6A)	CFM56-2A-2	Inflight/Circle	85%	0.00	7357	1.00	17.18	0.04		0.40	4	0.00	0.00	0.00		0.00
EA-6(EA-6B)	J52-P-408	Inflight/Circle	Intermediate 2	0.00	5752	3.18	8.38	0.67	7.75	0.40	2	0.00	0.00	0.00	0.00	0.00
F-111(F-111A)	TF-30-P103	Inflight/Circle	100%	0.00	5541	2.09	20.03	0.09		0.40	2	0.00	0.00	0.00		0.00
F-14(F-14A)	TF30-P-412A	Inflight/Circle	75% Thrust	1.11	4300	3.43	10.74	1.48	7.98	0.40	2	0.02	0.05	0.01	0.04	0.00
F-14(F-14D)	F110-GE-400	Inflight/Circle	75% IRP	1.11	7982	0.76	19.61	0.26	6.10	0.40	2	0.01	0.17	0.00	0.05	0.00
F-15	F100-PW-220	Inflight/Circle	Intermediate	0.00	5110	1.60	9.80	0.10	0.47	0.40	2	0.00	0.00	0.00	0.00	0.00
F-16(F-16N)	F110-GE-400	Inflight/Circle	75% IRP	0.35	7982	0.76	19.61	0.26	6.10	0.40	1	0.00	0.03	0.00	0.01	0.00
F/A-18E	F414-GE-400	Inflight/Circle	80% RPM	0.00	2109	7.79	6.52	0.60	8.47	0.40	2	0.00	0.00	0.00	0.00	0.00
F/A-18F	F414-GE-400	Inflight/Circle	80% RPM	0.00	2109	7.79	6.52	0.60	8.47	0.40	2	0.00	0.00	0.00	0.00	0.00
H-1(UH-1N)	T400-CP-400	Inflight/Circle	Cruise	8.90	283	2.64	4.90	0.15		0.40	2	0.01	0.01	0.00		0.00
H-1(AH-1W)	T700-GE-401	Inflight/Circle	60% MC	5.93	523	7.75	6.05	0.55	2.21	0.40	2	0.02	0.02	0.00	0.01	0.00
H-2(SH-2F)	T58-GE-8F	Inflight/Circle	Cruise	1.84	627	14.13	4.68	0.80	4.20	0.40	2	0.02	0.01	0.00	0.00	0.00
H-2(SH-2G)	T700-GE-401	Inflight/Circle	60% MC	1.84	523	7.75	6.05	0.55	2.21	0.40	2	0.01	0.01	0.00	0.00	0.00
H-3(SH-3H)	T58-GE-16	Inflight/Circle	75% Normal	6.64	779	10.89	9.47	0.63		0.40	2	0.06	0.05	0.00		0.00
H-3(NVU-3A)	T58-GE-8F	Inflight/Circle	Cruise	6.64	627	14.13	4.68	0.80	4.20	0.40	2	0.06	0.02	0.00	0.02	0.00
H-46(CH-46E)	T58-GE-16	Inflight/Circle	75% Normal	5.20	779	10.89	9.47	0.63		0.40	2	0.04	0.04	0.00		0.00
H-53(CH-53E)	T64-GE-415	Inflight/Circle	75%	6.80	1493	2.10	8.09	0.13	2.33	0.40	3	0.03	0.12	0.00	0.04	0.01
H-57(TH-57C)	T63-A-5A	Inflight/Circle	60%	6.94	157	20.79	4.11	0.68		0.40	1	0.01	0.00	0.00	0.00	0.00
H-58(OH-58A/C)	T63-A-5A	Inflight/Circle	60%	32.56	1000	20.79	4.11	0.68		0.40	1	0.34	0.07	0.01	0.00	0.01
H-6(TH-6B)	T700-GE-401	Inflight/Circle	60% MC	29.52	523	7.75	6.05	0.55	2.21	0.40	1	0.06	0.05	0.00	0.02	0.00
H-60(UH-60A,SH-60B,SH-60F,HH-60)	T700-GE-401	Inflight/Circle	60% MC	36.96	523	7.75	6.05	0.55	2.21	0.40	2	0.15	0.12	0.01	0.04	0.01
H-64(AH-64)	T700-GE-401	Inflight/Circle	60% MC	0.00	523	7.75	6.05	0.55	2.21	0.40	2	0.00	0.00	0.00	0.00	0.00
LEAR-24	J85-GE-2	Inflight/Circle	75% normal	1.77	2155	28.38	5.67	0.64	16.60	0.40	2	0.11	0.02	0.00	0.06	0.00

Table E-35 (continued)
Nonattainment Area Emissions (Existing)

Aircraft	Engine Type	Operating	Power	Time	Fuel flow	Emission Factors (lb/1000lb)[3]					No. of	Emissions (tons/year)				
Type	Modeled	Mode	Setting[1]	(hour)	rate(lb/hr)[3]	CO	NOx	VOC	PM_{10}	SO2	Engines	CO	NOx	VOC	PM10	SO2
P-3 (NP3-D, P-3C,UP-3A)	T56-A-16	Inflight/Circle	Flight Idle	12.44	836	4.54	6.52	0.95	2.21	0.40	4	0.09	0.14	0.02	0.05	0.01
NU-1B	R-1820	Inflight/Circle	75% M/C	1.80	323	384.83	6.50	5.57		0.40	1	0.11	0.00	0.00		0.00
S-3(S-3B)	TF34-GE-400	Inflight/Circle	75% rpm	10.05	460	33.57	3.42	2.63	6.86	0.40	2	0.16	0.02	0.01	0.03	0.00
T-2(T-2C)	J85-GE-2	Inflight/Circle	75% normal	2.37	2155	28.38	5.67	0.64	16.60	0.40	2	0.15	0.03	0.00	0.08	0.00
T-33	J33-A-35	Inflight/Circle	Approach	1.26	1000	49.10	2.70	1.30	0.02	0.40	1	0.03	0.00	0.00	0.00	0.00
T-34(T-34C)	PT6A-27	Inflight/Circle	90%	6.18	400	23.02	8.37	2.19	2.21	0.40	1	0.03	0.01	0.00	0.00	0.00
T-38(T-38A)	J85-GE-2	Inflight/Circle	75% normal	3.28	2155	28.38	5.67	0.64	16.60	0.40	2	0.20	0.04	0.00	0.12	0.00
T-39(T-39D)	J60-P-5B	Inflight/Circle	Intermediate	0.12	1426	5.80	4.00	0.20	0.23	0.40	2	0.00	0.00	0.00	0.00	0.00
T-45(T-45A)	F405-RR-401	Inflight/Circle	71% Thrust	3.96	1000	4.72	6.13	0.29		0.40	1	0.01	0.01	0.00		0.00
TC-4C	T58-GE-16	Inflight/Circle	75% Normal	0.07	779	10.89	9.47	0.63		0.40	2	0.00	0.00	0.00		0.00
TF-51(TF-51D)	R-3350	Inflight/Circle	Intermediate	0.48	610	692.00	9.40	9.50	40.00	0.40	1	0.10	0.00	0.00	0.01	0.00
UV-18A	PT6A-27	Inflight/Circle	90%	2.40	400	1.20	7.00	0.00	2.21	0.40	2	0.00	0.01	0.00	0.00	0.00
U-21(U-21F)	PT6A-27	Inflight/Circle	90%	3.98	400	1.20	7.00	0.00	2.21	0.40	2	0.00	0.01	0.00	0.00	0.00
U-6(U-6A)	R-1820	Inflight/Circle	75% M/C	3.66	323	384.83	6.50	5.57		0.40	1	0.23	0.00	0.00		0.00
UH-3(UH-3H)	T58-GE-16	Inflight/Circle	75% Normal	3.12	779	10.89	9.47	0.63		0.40	2	0.03	0.02	0.00		0.00
V-22(NV-22B)	T406-AD-400	Inflight/Circle	70% IRP	1.08	1709	1.70	9.00	0.80		0.40	2	0.00	0.02	0.00		0.00
F/A-18 A/BC/D	F404-GE-400	Inflight/Circle	76%	12.08	6541.3	1.09	14.80	0.35	6.11	0.40	2	0.09	1.17	0.03	0.48	0.03
								Total Emissions (tons/year):				**2.31**	**2.38**	**0.17**	**1.12**	**0.10**

Note:

1. Used average inflight/circle engine power setting provided by the Complex (Bock, 1997) except Load Factor of UAV,which is derived from Nonroad Engine and Vehicle Emission Study - Report (EPA, 1991)
2. Inflight/circle time were calculated using equation E-2 in the text of this Appendix.
3. Used same inflight/circle fuel flow rates and emission factors as in the calculation of total emissions.

Table E-36
Nonattainment Area Emissions (No Action)

Aircraft Type	Engine Type Modeled	Operating Mode	Power Setting[1]	Time (hour)	Fuel flow rate(lb/hr)[3]	Emission Factors (lb/1000lb)[3] CO	NOx	VOC	PM_{10}	SO2	No. of Engines	Emissions (tons/year) CO	NOx	VOC	PM10	SO2
A-10(A-10A)	TF34-GE-100	Inflight/Circle	Intermediate	1.22	2460	14.59	0.49	3.80	2.11	0.40	2	0.04	0.00	0.01	0.01	0.00
A-6(A-6E)	J52-P-408	Inflight/Circle	Intermediate 2	0.00	5752	3.18	8.38	0.67	7.75	0.40	2	0.00	0.00	0.00	0.00	0.00
Beech C99	PT6A-41	Inflight/Circle	90% Thrust	20.81	473	6.49	7.57	2.03	2.21	0.40	2	0.06	0.07	0.02	0.02	0.00
C-12(UC-12B)	PT6A-41	Inflight/Circle	90%	8.57	473	6.49	7.57	2.03	2.21	0.40	2	0.03	0.03	0.01	0.01	0.00
C-130(C-130T, KC-130F)	T56-A-16	Inflight/Circle	Flight Idle	5.09	836	4.54	6.52	0.95	2.21	0.40	4	0.04	0.06	0.01	0.02	0.00
C-135	TF-33-P-5	Inflight/Circle	Intermediate	0.00	8960	1.70	10.70	0.50	0.90	0.40	4	0.00	0.00	0.00	0.00	0.00
Cessna 185	TSIO-360	Inflight/Circle	85%	0.29	99.6	960.80	4.32	9.55		0.40	1	0.01	0.00	0.00		0.00
C-5(C-5A)	CF6-80-C2B6	Inflight/Circle	85%	0.00	16516.2	0.52	22.94	0.08		0.40	4	0.00	0.00	0.00		0.00
E-2/C-2(E-2C/C-2A)	T56-A-16	Inflight/Circle	Flight Idle	1.36	836	0.42	9.93	0.17	2.21	0.40	2	0.00	0.01	0.00	0.00	0.00
E-6(E-6A)	CFM56-2A-2	Inflight/Circle	85%	0.00	7357	1.00	17.18	0.04		0.40	4	0.00	0.00	0.00		0.00
EA-6(EA-6B)	J52-P-408	Inflight/Circle	Intermediate 2	0.00	5752	3.18	8.38	0.67	7.75	0.40	2	0.00	0.00	0.00	0.00	0.00
F-111(F-111A)	TF-30-P103	Inflight/Circle	100%	0.00	5541	2.09	20.03	0.09		0.40	2	0.00	0.00	0.00		0.00
F-14(F-14A)	TF30-P-412A	Inflight/Circle	75% Thrust	0.64	4300	3.43	10.74	1.48	7.98	0.40	2	0.01	0.03	0.00	0.02	0.00
F-14(F-14D)	F110-GE-400	Inflight/Circle	75% IRP	0.64	7982	0.76	19.61	0.26	6.10	0.40	2	0.00	0.10	0.00	0.03	0.00
F-15	F100-PW-220	Inflight/Circle	Intermediate	0.00	5110	1.60	9.80	0.10	0.47	0.40	2	0.00	0.00	0.00	0.00	0.00
F-16(F-16N)	F110-GE-400	Inflight/Circle	75% IRP	0.30	7982	0.76	19.61	0.26	6.10	0.40	1	0.00	0.02	0.00	0.01	0.00
F/A-18E	F414-GE-400	Inflight/Circle	80% RPM	2.08	2109	7.79	6.52	0.60	8.47	0.40	2	0.03	0.03	0.00	0.04	0.00
F/A-18F	F414-GE-400	Inflight/Circle	80% RPM	1.04	2109	7.79	6.52	0.60	8.47	0.40	2	0.02	0.01	0.00	0.02	0.00
H-1(UH-1N)	T400-CP-400	Inflight/Circle	Cruise	7.04	283	2.64	4.90	0.15		0.40	2	0.01	0.01	0.00		0.00
H-1(AH-1W)	T700-GE-401	Inflight/Circle	60% MC	4.69	523	7.75	6.05	0.55	2.21	0.40	2	0.02	0.01	0.00	0.01	0.00
H-2(SH-2F)	T58-GE-8F	Inflight/Circle	Cruise	1.48	627	14.13	4.68	0.80	4.20	0.40	2	0.01	0.00	0.00	0.00	0.00
H-2(SH-2G)	T700-GE-401	Inflight/Circle	60% MC	1.48	523	7.75	6.05	0.55	2.21	0.40	2	0.01	0.00	0.00	0.00	0.00
H-3(SH-3H)	T58-GE-16	Inflight/Circle	75% Normal	4.72	779	10.89	9.47	0.63		0.40	2	0.04	0.03	0.00		0.00
H-3(NVU-3A)	T58-GE-8F	Inflight/Circle	Cruise	4.72	627	14.13	4.68	0.80	4.20	0.40	2	0.04	0.01	0.00	0.01	0.00
H-46(CH-46E)	T58-GE-16	Inflight/Circle	75% Normal	4.40	779	10.89	9.47	0.63		0.40	2	0.04	0.03	0.00		0.00
H-53(CH-53E)	T64-GE-415	Inflight/Circle	75%	5.12	1493	2.10	8.09	0.13	2.33	0.40	3	0.02	0.09	0.00	0.03	0.00
H-57(TH-57C)	T63-A-5A	Inflight/Circle	60%	5.54	157	20.79	4.11	0.68		0.40	1	0.01	0.00	0.00	0.00	0.00
H-58(OH-58A/C)	T63-A-5A	Inflight/Circle	60%	32.00	1000	20.79	4.11	0.68		0.40	1	0.33	0.07	0.01	0.00	0.01
H-6(TH-6B)	T700-GE-401	Inflight/Circle	60% MC	29.36	523	7.75	6.05	0.55	2.21	0.40	1	0.06	0.05	0.00	0.02	0.00
H-60(UH-60A,SH-60B,SH-60F,HH-60)	T700-GE-401	Inflight/Circle	60% MC	28.73	523	7.75	6.05	0.55	2.21	0.40	2	0.12	0.09	0.01	0.03	0.01
H-64(AH-64)	T700-GE-401	Inflight/Circle	60% MC	0.00	523	7.75	6.05	0.55	2.21	0.40	2	0.00	0.00	0.00	0.00	0.00
LEAR-24	J85-GE-2	Inflight/Circle	75% normal	1.29	2155	28.38	5.67	0.64	16.60	0.40	2	0.08	0.02	0.00	0.05	0.00

Table E-36 (continued)
Nonattainment Area Emissions (No Action)

Aircraft Type	Engine Type Modeled	Operating Mode	Power Setting[1]	Time (hour)	Fuel flow rate(lb/hr)[3]	Emission Factors (lb/1000lb)[3]					No. of Engines	Emissions (tons/year)				
						CO	NOx	VOC	PM_{10}	SO2		CO	NOx	VOC	PM10	SO2
P-3 (NP3-D, P-3C,UP-3A)	T56-A-16	Inflight/Circle	Flight Idle	9.84	836	4.54	6.52	0.95	2.21	0.40	4	0.07	0.11	0.02	0.04	0.01
NU-1B	R-1820	Inflight/Circle	75% M/C	1.80	323	384.83	6.50	5.57		0.40	1	0.11	0.00	0.00		0.00
S-3(S-3B)	TF34-GE-400	Inflight/Circle	75% rpm	5.57	460	33.57	3.42	2.63	6.86	0.40	2	0.09	0.01	0.01	0.02	0.00
T-2(T-2C)	J85-GE-2	Inflight/Circle	75% normal	2.29	2155	28.38	5.67	0.64	16.60	0.40	2	0.14	0.03	0.00	0.08	0.00
T-33	J33-A-35	Inflight/Circle	Approach	1.44	1000	49.10	2.70	1.30	0.02	0.40	1	0.04	0.00	0.00	0.00	0.00
T-34(T-34C)	PT6A-27	Inflight/Circle	90%	4.56	400	23.02	8.37	2.19	2.21	0.40	1	0.02	0.01	0.00	0.00	0.00
T-38(T-38A)	J85-GE-2	Inflight/Circle	75% normal	3.26	2155	28.38	5.67	0.64	16.60	0.40	2	0.20	0.04	0.00	0.12	0.00
T-39(T-39D)	J60-P-5B	Inflight/Circle	Intermediate	0.12	1426	5.80	4.00	0.20	0.23	0.40	2	0.00	0.00	0.00	0.00	0.00
T-45(T-45A)	F405-RR-401	Inflight/Circle	71% Thrust	0.00	1000	4.72	6.13	0.29		0.40	1	0.00	0.00	0.00		0.00
TC-4C	T58-GE-16	Inflight/Circle	75% Normal	0.07	779	10.89	9.47	0.63		0.40	2	0.00	0.00	0.00		0.00
TF-51(TF-51D)	R-3350	Inflight/Circle	Intermediate	0.48	610	692.00	9.40	9.50	40.00	0.40	1	0.10	0.00	0.00	0.01	0.00
UV-18A	PT6A-27	Inflight/Circle	90%	2.16	400	1.20	7.00	0.00	2.21	0.40	2	0.00	0.01	0.00	0.00	0.00
U-21(U-21F)	PT6A-27	Inflight/Circle	90%	4.12	400	1.20	7.00	0.00	2.21	0.40	2	0.00	0.01	0.00	0.00	0.00
U-6(U-6A)	R-1820	Inflight/Circle	75% M/C	3.48	323	384.83	6.50	5.57		0.40	1	0.22	0.00	0.00		0.00
UH-3(UH-3H)	T58-GE-16	Inflight/Circle	75% Normal	2.32	779	10.89	9.47	0.63		0.40	2	0.02	0.02	0.00		0.00
V-22(NV-22B)	T406-AD-400	Inflight/Circle	70% IRP	18.66	1709	1.70	9.00	0.80		0.40	2	0.05	0.29	0.03		0.01
F/A-18 A/B/C/D	F404-GE-400	Inflight/Circle	76%	3.86	6541.3	1.09	14.80	0.35	6.11	0.40	2	0.03	0.37	0.01	0.15	0.01
								Total Emissions (tons/year):				**2.13**	**1.69**	**0.17**	**0.74**	**0.08**

Note:

1. Used average inflight/circle engine power setting provided by the Complex (Bock, 1997) except Load Factor of UAV,which is derived from Nonroad Engine and Vehicle Emission Study - Report (EPA, 1991)
2. Inflight/circle time were calculated using equation E-2 in the text of this Appendix.
3. Used same inflight/circle fuel flow rates and emission factors as in the calculation of total emissions.

Table E-37
Nonattainment Area Emissions (Workload I)

Aircraft	Engine Type	Operating	Power	Time	Fuel flow	Emission Factors (lb/1000lb)[3]					No. of	Emissions (tons/year)				
Type	Modeled	Mode	Setting[1]	(hour)	rate(lb/hr)[3]	CO	NOx	VOC	PM_{10}	SO2	Engines	CO	NOx	VOC	PM10	SO2
A-10(A-10A)	TF34-GE-100	Inflight/Circle	Intermediate	2.76	2460	14.59	0.49	3.80	2.11	0.40	2	0.10	0.00	0.03	0.01	0.00
A-6(A-6E)	J52-P-408	Inflight/Circle	Intermediate 2	0.00	5752	3.18	8.38	0.67	7.75	0.40	2	0.00	0.00	0.00	0.00	0.00
Beech C99	PT6A-41	Inflight/Circle	90% Thrust	20.81	473	6.49	7.57	2.03	2.21	0.40	2	0.06	0.07	0.02	0.02	0.00
C-12(UC-12B)	PT6A-41	Inflight/Circle	90%	8.57	473	6.49	7.57	2.03	2.21	0.40	2	0.03	0.03	0.01	0.01	0.00
C-130(C-130T, KC-130F)	T56-A-16	Inflight/Circle	Flight Idle	5.09	836	4.54	6.52	0.95	2.21	0.40	4	0.04	0.06	0.01	0.02	0.00
C-135	TF-33-P-5	Inflight/Circle	Intermediate	0.00	8960	1.70	10.70	0.50	0.90	0.40	4	0.00	0.00	0.00	0.00	0.00
Cessna 185	TSIO-360	Inflight/Circle	85%	0.29	99.6	960.80	4.32	9.55		0.40	1	0.01	0.00	0.00		0.00
C-5(C-5A)	CF6-80-C2B6	Inflight/Circle	85%	0.00	16516.2	0.52	22.94	0.08		0.40	4	0.00	0.00	0.00		0.00
E-2/C-2(E-2C/C-2A)	T56-A-16	Inflight/Circle	Flight Idle	1.36	836	0.42	9.93	0.17	2.21	0.40	2	0.00	0.01	0.00	0.00	0.00
E-6(E-6A)	CFM56-2A-2	Inflight/Circle	85%	0.00	7357	1.00	17.18	0.04		0.40	4	0.00	0.00	0.00		0.00
EA-6(EA-6B)	J52-P-408	Inflight/Circle	Intermediate 2	0.00	5752	3.18	8.38	0.67	7.75	0.40	2	0.00	0.00	0.00	0.00	0.00
F-111(F-111A)	TF-30-P103	Inflight/Circle	100%	0.00	5541	2.09	20.03	0.09		0.40	2	0.00	0.00	0.00		0.00
F-14(F-14A)	TF30-P-412A	Inflight/Circle	75% Thrust	0.82	4300	3.43	10.74	1.48	7.98	0.40	2	0.01	0.04	0.01	0.03	0.00
F-14(F-14D)	F110-GE-400	Inflight/Circle	75% IRP	0.82	7982	0.76	19.61	0.26	6.10	0.40	2	0.00	0.13	0.00	0.04	0.00
F-15	F100-PW-220	Inflight/Circle	Intermediate	0.17	5110	1.60	9.80	0.10	0.47	0.40	2	0.00	0.01	0.00	0.00	0.00
F-16(F-16N)	F110-GE-400	Inflight/Circle	75% IRP	1.30	7982	0.76	19.61	0.26	6.10	0.40	1	0.00	0.10	0.00	0.03	0.00
F/A-18E	F414-GE-400	Inflight/Circle	80% RPM	2.08	2109	7.79	6.52	0.60	8.47	0.40	2	0.03	0.03	0.00	0.04	0.00
F/A-18F	F414-GE-400	Inflight/Circle	80% RPM	1.04	2109	7.79	6.52	0.60	8.47	0.40	2	0.02	0.01	0.00	0.02	0.00
H-1(UH-1N)	T400-CP-400	Inflight/Circle	Cruise	7.60	283	2.64	4.90	0.15		0.40	2	0.01	0.01	0.00		0.00
H-1(AH-1W)	T700-GE-401	Inflight/Circle	60% MC	5.07	523	7.75	6.05	0.55	2.21	0.40	2	0.02	0.02	0.00	0.01	0.00
H-2(SH-2F)	T58-GE-8F	Inflight/Circle	Cruise	1.48	627	14.13	4.68	0.80	4.20	0.40	2	0.01	0.00	0.00	0.00	0.00
H-2(SH-2G)	T700-GE-401	Inflight/Circle	60% MC	1.48	523	7.75	6.05	0.55	2.21	0.40	2	0.01	0.00	0.00	0.00	0.00
H-3(SH-3H)	T58-GE-16	Inflight/Circle	75% Normal	4.72	779	10.89	9.47	0.63		0.40	2	0.04	0.03	0.00		0.00
H-3(NVU-3A)	T58-GE-8F	Inflight/Circle	Cruise	4.72	627	14.13	4.68	0.80	4.20	0.40	2	0.04	0.01	0.00	0.01	0.00
H-46(CH-46E)	T58-GE-16	Inflight/Circle	75% Normal	4.40	779	10.89	9.47	0.63		0.40	2	0.04	0.03	0.00		0.00
H-53(CH-53E)	T64-GE-415	Inflight/Circle	75%	5.12	1493	2.10	8.09	0.13	2.33	0.40	3	0.02	0.09	0.00	0.03	0.00
H-57(TH-57C)	T63-A-5A	Inflight/Circle	60%	5.54	157	20.79	4.11	0.68		0.40	1	0.01	0.00	0.00	0.00	0.00
H-58(OH-58A/C)	T63-A-5A	Inflight/Circle	60%	32.00	1000	20.79	4.11	0.68		0.40	1	0.33	0.07	0.01	0.00	0.01
H-6(TH-6B)	T700-GE-401	Inflight/Circle	60% MC	29.36	523	7.75	6.05	0.55	2.21	0.40	1	0.06	0.05	0.00	0.02	0.00
H-60(UH-60A,SH-60B,SH-60F,HH-60)	T700-GE-401	Inflight/Circle	60% MC	28.73	523	7.75	6.05	0.55	2.21	0.40	2	0.12	0.09	0.01	0.03	0.01
H-64(AH-64)	T700-GE-401	Inflight/Circle	60% MC	2.00	523	7.75	6.05	0.55	2.21	0.40	2	0.01	0.01	0.00	0.00	0.00
LEAR-24	J85-GE-2	Inflight/Circle	75% normal	1.29	2155	28.38	5.67	0.64	16.60	0.40	2	0.08	0.02	0.00	0.05	0.00

Table E-37 (continued)
Nonattainment Area Emissions (Workload I)

Aircraft Type	Engine Type Modeled	Operating Mode	Power Setting[1]	Time (hour)	Fuel flow rate(lb/hr)[3]	Emission Factors (lb/1000lb)[3] CO	NOx	VOC	PM_{10}	SO2	No. of Engines	Emissions (tons/year) CO	NOx	VOC	PM10	SO2
P-3(NP3-D, P-3C,UP-3A)	T56-A-16	Inflight/Circle	Flight Idle	9.84	836	4.54	6.52	0.95	2.21	0.40	4	0.07	0.11	0.02	0.04	0.01
NU-1B	R-1820	Inflight/Circle	75% M/C	1.80	323	384.83	6.50	5.57		0.40	1	0.11	0.00	0.00		0.00
S-3(S-3B)	TF34-GE-400	Inflight/Circle	75% rpm	6.91	460	33.57	3.42	2.63	6.86	0.40	2	0.11	0.01	0.01	0.02	0.00
T-2(T-2C)	J85-GE-2	Inflight/Circle	75% normal	2.29	2155	28.38	5.67	0.64	16.60	0.40	2	0.14	0.03	0.00	0.08	0.00
T-33	J33-A-35	Inflight/Circle	Approach	1.44	1000	49.10	2.70	1.30	0.02	0.40	1	0.04	0.00	0.00	0.00	0.00
T-34(T-34C)	PT6A-27	Inflight/Circle	90%	4.56	400	23.02	8.37	2.19	2.21	0.40	1	0.02	0.01	0.00	0.00	0.00
T-38(T-38A)	J85-GE-2	Inflight/Circle	75% normal	3.26	2155	28.38	5.67	0.64	16.60	0.40	2	0.20	0.04	0.00	0.12	0.00
T-39(T-39D)	J60-P-5B	Inflight/Circle	Intermediate	0.12	1426	5.80	4.00	0.20	0.23	0.40	2	0.00	0.00	0.00	0.00	0.00
T-45(T-45A)	F405-RR-401	Inflight/Circle	71% Thrust	0.00	1000	4.72	6.13	0.29		0.40	1	0.00	0.00	0.00		0.00
TC-4C	T58-GE-16	Inflight/Circle	75% Normal	0.07	779	10.89	9.47	0.63		0.40	2	0.00	0.00	0.00		0.00
TF-51(TF-51D)	R-3350	Inflight/Circle	Intermediate	0.48	610	692.00	9.40	9.50	40.00	0.40	1	0.10	0.00	0.00	0.01	0.00
UV-18A	PT6A-27	Inflight/Circle	90%	2.16	400	1.20	7.00	0.00	2.21	0.40	2	0.00	0.01	0.00	0.00	0.00
U-21(U-21F)	PT6A-27	Inflight/Circle	90%	4.12	400	1.20	7.00	0.00	2.21	0.40	2	0.00	0.01	0.00	0.00	0.00
U-6(U-6A)	R-1820	Inflight/Circle	75% M/C	3.48	323	384.83	6.50	5.57		0.40	1	0.22	0.00	0.00		0.00
UH-3(UH-3H)	T58-GE-16	Inflight/Circle	75% Normal	2.32	779	10.89	9.47	0.63		0.40	2	0.02	0.02	0.00		0.00
V-22(NV-22B)	T406-AD-400	Inflight/Circle	70% IRP	18.66	1709	1.70	9.00	0.80		0.40	2	0.05	0.29	0.03		0.01
F/A-18 A/B/C/D	F404-GE-400	Inflight/Circle	76%	4.61	6541.3	1.09	14.80	0.35	6.11	0.40	2	0.03	0.45	0.01	0.18	0.01
								Total Emissions (tons/year):				**2.23**	**1.90**	**0.19**	**0.83**	**0.09**

Note:

1. Used average inflight/circle engine power setting provided by the Complex (Bock, 1997) except Load Factor of UAV,which is derived from Nonroad Engine and Vehicle Emission Study - Report (EPA, 1991)
2. Inflight/circle time were calculated using equation E-2 in the text of this Appendix.
3. Used same inflight/circle fuel flow rates and emission factors as in the calculation of total emissions.

Table E-38
Nonattainment Area Emissions (Workload II)

Aircraft Type	Engine Type Modeled	Operating Mode	Power Setting[1]	Time (hour)	Fuel flow rate(lb/hr)[3]	Emission Factors (lb/1000lb)[3] CO	NOx	VOC	PM_{10}	SO2	No. of Engines	Emissions (tons/year) CO	NOx	VOC	PM10	SO2
A-10(A-10A)	TF34-GE-100	Inflight/Circle	Intermediate	2.76	2460	14.59	0.49	3.80	2.11	0.40	2	0.10	0.00	0.03	0.01	0.00
A-6(A-6E)	J52-P-408	Inflight/Circle	Intermediate 2	0.00	5752	3.18	8.38	0.67	7.75	0.40	2	0.00	0.00	0.00	0.00	0.00
Beech C99	PT6A-41	Inflight/Circle	90% Thrust	24.62	473	6.49	7.57	2.03	2.21	0.40	2	0.08	0.09	0.02	0.03	0.00
C-12(UC-12B)	PT6A-41	Inflight/Circle	90%	10.15	473	6.49	7.57	2.03	2.21	0.40	2	0.03	0.04	0.01	0.01	0.00
C-130(C-130T, KC-130F)	T56-A-16	Inflight/Circle	Flight Idle	6.02	836	4.54	6.52	0.95	2.21	0.40	4	0.05	0.07	0.01	0.02	0.00
C-135	TF-33-P-5	Inflight/Circle	Intermediate	0.00	8960	1.70	10.70	0.50	0.90	0.40	4	0.00	0.00	0.00	0.00	0.00
Cessna 185	TSIO-360	Inflight/Circle	85%	0.29	99.6	960.80	4.32	9.55		0.40	1	0.01	0.00	0.00		0.00
C-5(C-5A)	CF6-80-C2B6	Inflight/Circle	85%	0.00	16516.2	0.52	22.94	0.08		0.40	4	0.00	0.00	0.00		0.00
E-2/C-2(E-2C/C-2A)	T56-A-16	Inflight/Circle	Flight Idle	1.62	836	0.42	9.93	0.17	2.21	0.40	2	0.00	0.01	0.00	0.00	0.00
E-6(E-6A)	CFM56-2A-2	Inflight/Circle	85%	0.00	7357	1.00	17.18	0.04		0.40	4	0.00	0.00	0.00		0.00
EA-6(EA-6B)	J52-P-408	Inflight/Circle	Intermediate 2	0.00	5752	3.18	8.38	0.67	7.75	0.40	2	0.00	0.00	0.00	0.00	0.00
F-111(F-111A)	TF-30-P103	Inflight/Circle	100%	0.00	5541	2.09	20.03	0.09		0.40	2	0.00	0.00	0.00		0.00
F-14(F-14A)	TF30-P-412A	Inflight/Circle	75% Thrust	0.96	4300	3.43	10.74	1.48	7.98	0.40	2	0.01	0.04	0.01	0.03	0.00
F-14(F-14D)	F110-GE-400	Inflight/Circle	75% IRP	0.96	7982	0.76	19.61	0.26	6.10	0.40	2	0.01	0.15	0.00	0.05	0.00
F-15	F100-PW-220	Inflight/Circle	Intermediate	0.17	5110	1.60	9.80	0.10	0.47	0.40	2	0.00	0.01	0.00	0.00	0.00
F-16(F-16N)	F110-GE-400	Inflight/Circle	75% IRP	1.30	7982	0.76	19.61	0.26	6.10	0.40	1	0.00	0.10	0.00	0.03	0.00
F/A-18E	F414-GE-400	Inflight/Circle	80% RPM	2.08	2109	7.79	6.52	0.60	8.47	0.40	2	0.03	0.03	0.00	0.04	0.00
F/A-18F	F414-GE-400	Inflight/Circle	80% RPM	1.04	2109	7.79	6.52	0.60	8.47	0.40	2	0.02	0.01	0.00	0.02	0.00
H-1(UH-1N)	T400-CP-400	Inflight/Circle	Cruise	8.99	283	2.64	4.90	0.15		0.40	2	0.01	0.01	0.00		0.00
H-1(AH-1W)	T700-GE-401	Inflight/Circle	60% MC	5.99	523	7.75	6.05	0.55	2.21	0.40	2	0.02	0.02	0.00	0.01	0.00
H-2(SH-2F)	T58-GE-8F	Inflight/Circle	Cruise	1.72	627	14.13	4.68	0.80	4.20	0.40	2	0.02	0.01	0.00	0.00	0.00
H-2(SH-2G)	T700-GE-401	Inflight/Circle	60% MC	1.72	523	7.75	6.05	0.55	2.21	0.40	2	0.01	0.01	0.00	0.00	0.00
H-3(SH-3H)	T58-GE-16	Inflight/Circle	75% Normal	5.64	779	10.89	9.47	0.63		0.40	2	0.05	0.04	0.00		0.00
H-3(NVU-3A)	T58-GE-8F	Inflight/Circle	Cruise	5.64	627	14.13	4.68	0.80	4.20	0.40	2	0.05	0.02	0.00	0.01	0.00
H-46(CH-46E)	T58-GE-16	Inflight/Circle	75% Normal	5.12	779	10.89	9.47	0.63		0.40	2	0.04	0.04	0.00		0.00
H-53(CH-53E)	T64-GE-415	Inflight/Circle	75%	6.00	1493	2.10	8.09	0.13	2.33	0.40	3	0.03	0.11	0.00	0.03	0.01
H-57(TH-57C)	T63-A-5A	Inflight/Circle	60%	6.55	157	20.79	4.11	0.68		0.40	1	0.01	0.00	0.00	0.00	0.00
H-58(OH-58A/C)	T63-A-5A	Inflight/Circle	60%	32.00	1000	20.79	4.11	0.68		0.40	1	0.33	0.07	0.01	0.00	0.01
H-6(TH-6B)	T700-GE-401	Inflight/Circle	60% MC	29.36	523	7.75	6.05	0.55	2.21	0.40	1	0.06	0.05	0.00	0.02	0.00
H-60(UH-60A,SH-60B,SH-60F,HH-60)	T700-GE-401	Inflight/Circle	60% MC	33.97	523	7.75	6.05	0.55	2.21	0.40	2	0.14	0.11	0.01	0.04	0.01
H-64(AH-64)	T700-GE-401	Inflight/Circle	60% MC	2.00	523	7.75	6.05	0.55	2.21	0.40	2	0.01	0.01	0.00	0.00	0.00
LEAR-24	J85-GE-2	Inflight/Circle	75% normal	1.53	2155	28.38	5.67	0.64	16.60	0.40	2	0.09	0.02	0.00	0.05	0.00

Table E-38 (continued)
Nonattainment Area Emissions (Workload II)

Aircraft	Engine Type	Operating	Power	Time	Fuel flow	Emission Factors (lb/1000lb)[3]					No. of	Emissions (tons/year)				
Type	Modeled	Mode	Setting[1]	(hour)	rate(lb/hr)[3]	CO	NOx	VOC	PM_{10}	SO2	Engines	CO	NOx	VOC	PM10	SO2
P-3(NP3-D, P-3C,UP-3A)	T56-A-16	Inflight/Circle	Flight Idle	11.72	836	4.54	6.52	0.95	2.21	0.40	4	0.09	0.13	0.02	0.04	0.01
NU-1B	R-1820	Inflight/Circle	75% M/C	1.80	323	384.83	6.50	5.57		0.40	1	0.11	0.00	0.00		0.00
S-3(S-3B)	TF34-GE-400	Inflight/Circle	75% rpm	8.19	460	33.57	3.42	2.63	6.86	0.40	2	0.13	0.01	0.01	0.03	0.00
T-2(T-2C)	J85-GE-2	Inflight/Circle	75% normal	2.29	2155	28.38	5.67	0.64	16.60	0.40	2	0.14	0.03	0.00	0.08	0.00
T-33	J33-A-35	Inflight/Circle	Approach	1.44	1000	49.10	2.70	1.30	0.02	0.40	1	0.04	0.00	0.00	0.00	0.00
T-34(T-34C)	PT6A-27	Inflight/Circle	90%	5.40	400	23.02	8.37	2.19	2.21	0.40	1	0.02	0.01	0.00	0.00	0.00
T-38(T-38A)	J85-GE-2	Inflight/Circle	75% normal	3.26	2155	28.38	5.67	0.64	16.60	0.40	2	0.20	0.04	0.00	0.12	0.00
T-39(T-39D)	J60-P-5B	Inflight/Circle	Intermediate	0.12	1426	5.80	4.00	0.20	0.23	0.40	2	0.00	0.00	0.00	0.00	0.00
T-45(T-45A)	F405-RR-401	Inflight/Circle	71% Thrust	0.00	1000	4.72	6.13	0.29		0.40	1	0.00	0.00	0.00		0.00
TC-4C	T58-GE-16	Inflight/Circle	75% Normal	0.07	779	10.89	9.47	0.63		0.40	2	0.00	0.00	0.00		0.00
TF-51(TF-51D)	R-3350	Inflight/Circle	Intermediate	0.48	610	692.00	9.40	9.50	40.00	0.40	1	0.10	0.00	0.00	0.01	0.00
UV-18A	PT6A-27	Inflight/Circle	90%	2.16	400	1.20	7.00	0.00	2.21	0.40	2	0.00	0.01	0.00	0.00	0.00
U-21(U-21F)	PT6A-27	Inflight/Circle	90%	4.12	400	1.20	7.00	0.00	2.21	0.40	2	0.00	0.01	0.00	0.00	0.00
U-6(U-6A)	R-1820	Inflight/Circle	75% M/C	3.48	323	384.83	6.50	5.57		0.40	1	0.22	0.00	0.00		0.00
UH-3(UH-3H)	T58-GE-16	Inflight/Circle	75% Normal	2.80	779	10.89	9.47	0.63		0.40	2	0.02	0.02	0.00		0.00
V-22(NV-22B)	T406-AD-400	Inflight/Circle	70% IRP	18.66	1709	1.70	9.00	0.80		0.40	2	0.05	0.29	0.03		0.01
F/A-18 A/B/C/D	F404-GE-400	Inflight/Circle	76%	5.46	6541.3	1.09	14.80	0.35	6.11	0.40	2	0.04	0.53	0.01	0.22	0.01
								Total Emissions (tons/year):				**2.37**	**2.13**	**0.21**	**0.92**	**0.10**

Note:

1. Used average inflight/circle engine power setting provided by the Complex (Bock, 1997) except Load Factor of UAV,which is derived from Nonroad Engine and Vehicle Emission Study - Report (EPA, 1991)
2. Inflight/circle time were calculated using equation E-2 in the text of this Appendix.
3. Used same inflight/circle fuel flow rates and emission factors as in the calculation of total emissions.

Table E-39
Nonattainment Area Emissions (Workload III)

Aircraft	Engine Type	Operating	Power	Time	Fuel flow	Emission Factors (lb/1000lb)[3]					No. of	Emissions (tons/year)				
Type	Modeled	Mode	Setting[1]	(hour)	rate(lb/hr)[3]	CO	NOx	VOC	PM_{10}	SO2	Engines	CO	NOx	VOC	PM10	SO2
A-10(A-10A)	TF34-GE-100	Inflight/Circle	Intermediate	2.76	2460	14.59	0.49	3.80	2.11	0.40	2	0.10	0.00	0.03	0.01	0.00
A-6(A-6E)	J52-P-408	Inflight/Circle	Intermediate 2	0.00	5752	3.18	8.38	0.67	7.75	0.40	2	0.00	0.00	0.00	0.00	0.00
Beech C99	PT6A-41	Inflight/Circle	90% Thrust	28.44	473	6.49	7.57	2.03	2.21	0.40	2	0.09	0.10	0.03	0.03	0.01
C-12(UC-12B)	PT6A-41	Inflight/Circle	90%	11.74	473	6.49	7.57	2.03	2.21	0.40	2	0.04	0.04	0.01	0.01	0.00
C-130(C-130T, KC-130F)	T56-A-16	Inflight/Circle	Flight Idle	6.94	836	4.54	6.52	0.95	2.21	0.40	4	0.05	0.08	0.01	0.03	0.00
C-135	TF-33-P-5	Inflight/Circle	Intermediate	0.00	8960	1.70	10.70	0.50	0.90	0.40	4	0.00	0.00	0.00	0.00	0.00
Cessna 185	TSIO-360	Inflight/Circle	85%	0.29	99.6	960.80	4.32	9.55		0.40	1	0.01	0.00	0.00		0.00
C-5(C-5A)	CF6-80-C2B6	Inflight/Circle	85%	0.00	16516.2	0.52	22.94	0.08		0.40	4	0.00	0.00	0.00		0.00
E-2/C-2(E-2C/C-2A)	T56-A-16	Inflight/Circle	Flight Idle	1.86	836	0.42	9.93	0.17	2.21	0.40	2	0.00	0.02	0.00	0.00	0.00
E-6(E-6A)	CFM56-2A-2	Inflight/Circle	85%	0.00	7357	1.00	17.18	0.04		0.40	4	0.00	0.00	0.00		0.00
EA-6(EA-6B)	J52-P-408	Inflight/Circle	Intermediate 2	0.00	5752	3.18	8.38	0.67	7.75	0.40	2	0.00	0.00	0.00	0.00	0.00
F-111(F-111A)	TF-30-P103	Inflight/Circle	100%	0.00	5541	2.09	20.03	0.09		0.40	2	0.00	0.00	0.00		0.00
F-14(F-14A)	TF30-P-412A	Inflight/Circle	75% Thrust	1.11	4300	3.43	10.74	1.48	7.98	0.40	2	0.02	0.05	0.01	0.04	0.00
F-14(F-14D)	F110-GE-400	Inflight/Circle	75% IRP	1.11	7982	0.76	19.61	0.26	6.10	0.40	2	0.01	0.17	0.00	0.05	0.00
F-15	F100-PW-220	Inflight/Circle	Intermediate	0.17	5110	1.60	9.80	0.10	0.47	0.40	2	0.00	0.01	0.00	0.00	0.00
F-16(F-16N)	F110-GE-400	Inflight/Circle	75% IRP	1.30	7982	0.76	19.61	0.26	6.10	0.40	1	0.00	0.10	0.00	0.03	0.00
F/A-18E	F414-GE-400	Inflight/Circle	80% RPM	2.08	2109	7.79	6.52	0.60	8.47	0.40	2	0.03	0.03	0.00	0.04	0.00
F/A-18F	F414-GE-400	Inflight/Circle	80% RPM	1.04	2109	7.79	6.52	0.60	8.47	0.40	2	0.02	0.01	0.00	0.02	0.00
H-1(UH-1N)	T400-CP-400	Inflight/Circle	Cruise	10.37	283	2.64	4.90	0.15		0.40	2	0.01	0.01	0.00		0.00
H-1(AH-1W)	T700-GE-401	Inflight/Circle	60% MC	6.91	523	7.75	6.05	0.55	2.21	0.40	2	0.03	0.02	0.00	0.01	0.00
H-2(SH-2F)	T58-GE-8F	Inflight/Circle	Cruise	2.00	627	14.13	4.68	0.80	4.20	0.40	2	0.02	0.01	0.00	0.01	0.00
H-2(SH-2G)	T700-GE-401	Inflight/Circle	60% MC	2.00	523	7.75	6.05	0.55	2.21	0.40	2	0.01	0.01	0.00	0.00	0.00
H-3(SH-3H)	T58-GE-16	Inflight/Circle	75% Normal	6.48	779	10.89	9.47	0.63		0.40	2	0.05	0.05	0.00		0.00
H-3(NVU-3A)	T58-GE-8F	Inflight/Circle	Cruise	6.48	627	14.13	4.68	0.80	4.20	0.40	2	0.06	0.02	0.00	0.02	0.00
H-46(CH-46E)	T58-GE-16	Inflight/Circle	75% Normal	5.92	779	10.89	9.47	0.63		0.40	2	0.05	0.04	0.00		0.00
H-53(CH-53E)	T64-GE-415	Inflight/Circle	75%	6.96	1493	2.10	8.09	0.13	2.33	0.40	3	0.03	0.13	0.00	0.04	0.01
H-57(TH-57C)	T63-A-5A	Inflight/Circle	60%	7.56	157	20.79	4.11	0.68		0.40	1	0.01	0.00	0.00	0.00	0.00
H-58(OH-58A/C)	T63-A-5A	Inflight/Circle	60%	32.00	1000	20.79	4.11	0.68		0.40	1	0.33	0.07	0.01	0.00	0.01
H-6(TH-6B)	T700-GE-401	Inflight/Circle	60% MC	29.36	523	7.75	6.05	0.55	2.21	0.40	1	0.06	0.05	0.00	0.02	0.00
H-60(UH-60A,SH-60B,SH-60F,HH-60)	T700-GE-401	Inflight/Circle	60% MC	39.25	523	7.75	6.05	0.55	2.21	0.40	2	0.16	0.12	0.01	0.05	0.01
H-64(AH-64)	T700-GE-401	Inflight/Circle	60% MC	2.00	523	7.75	6.05	0.55	2.21	0.40	2	0.01	0.01	0.00	0.00	0.00
LEAR-24	J85-GE-2	Inflight/Circle	75% normal	1.77	2155	28.38	5.67	0.64	16.60	0.40	2	0.11	0.02	0.00	0.06	0.00

Table E-39 (continued)
Nonattainment Area Emissions (Workload III)

Aircraft Type	Engine Type Modeled	Operating Mode	Power Setting[1]	Time (hour)	Fuel flow rate(lb/hr)[3]	Emission Factors (lb/1000lb)[3] CO	NOx	VOC	PM_{10}	SO2	No. of Engines	Emissions (tons/year) CO	NOx	VOC	PM10	SO2
P-3(NP3-D, P-3C,UP-3A)	T56-A-16	Inflight/Circle	Flight Idle	13.48	836	4.54	6.52	0.95	2.21	0.40	4	0.10	0.15	0.02	0.05	0.01
NU-1B	R-1820	Inflight/Circle	75% M/C	1.80	323	384.83	6.50	5.57		0.40	1	0.11	0.00	0.00		0.00
S-3(S-3B)	TF34-GE-400	Inflight/Circle	75% rpm	9.47	460	33.57	3.42	2.63	6.86	0.40	2	0.15	0.01	0.01	0.03	0.00
T-2(T-2C)	J85-GE-2	Inflight/Circle	75% normal	2.29	2155	28.38	5.67	0.64	16.60	0.40	2	0.14	0.03	0.00	0.08	0.00
T-33	J33-A-35	Inflight/Circle	Approach	1.44	1000	49.10	2.70	1.30	0.02	0.40	1	0.04	0.00	0.00	0.00	0.00
T-34(T-34C)	PT6A-27	Inflight/Circle	90%	6.24	400	23.02	8.37	2.19	2.21	0.40	1	0.03	0.01	0.00	0.00	0.00
T-38(T-38A)	J85-GE-2	Inflight/Circle	75% normal	3.26	2155	28.38	5.67	0.64	16.60	0.40	2	0.20	0.04	0.00	0.12	0.00
T-39(T-39D)	J60-P-5B	Inflight/Circle	Intermediate	0.12	1426	5.80	4.00	0.20	0.23	0.40	2	0.00	0.00	0.00	0.00	0.00
T-45(T-45A)	F405-RR-401	Inflight/Circle	71% Thrust	0.00	1000	4.72	6.13	0.29		0.40	1	0.00	0.00	0.00		0.00
TC-4C	T58-GE-16	Inflight/Circle	75% Normal	0.07	779	10.89	9.47	0.63		0.40	2	0.00	0.00	0.00		0.00
TF-51(TF-51D)	R-3350	Inflight/Circle	Intermediate	0.48	610	692.00	9.40	9.50	40.00	0.40	1	0.10	0.00	0.00	0.01	0.00
UV-18A	PT6A-27	Inflight/Circle	90%	2.16	400	1.20	7.00	0.00	2.21	0.40	2	0.00	0.01	0.00	0.00	0.00
U-21(U-21F)	PT6A-27	Inflight/Circle	90%	4.12	400	1.20	7.00	0.00	2.21	0.40	2	0.00	0.01	0.00	0.00	0.00
U-6(U-6A)	R-1820	Inflight/Circle	75% M/C	3.48	323	384.83	6.50	5.57		0.40	1	0.22	0.00	0.00		0.00
UH-3(UH-3H)	T58-GE-16	Inflight/Circle	75% Normal	3.20	779	10.89	9.47	0.63		0.40	2	0.03	0.02	0.00		0.00
V-22(NV-22B)	T406-AD-400	Inflight/Circle	70% IRP	18.66	1709	1.70	9.00	0.80		0.40	2	0.05	0.29	0.03		0.01
F/A-18 A/B/C/D	F404-GE-400	Inflight/Circle	76%	6.30	6541.3	1.09	14.80	0.35	6.11	0.40	2	0.04	0.61	0.01	0.25	0.02
								Total Emissions (tons/year):				**2.52**	**2.36**	**0.23**	**1.01**	**0.11**

Note:

1. Used average inflight/circle engine power setting provided by the Complex (Bock, 1997) except Load Factor of UAV,which is derived from Nonroad Engine and Vehicle Emission Study - Report (EPA, 1991)
2. Inflight/circle time were calculated using equation E-2 in the text of this Appendix.
3. Used same inflight/circle fuel flow rates and emission factors as in the calculation of total emissions.

APPENDIX F

RECORD OF NON-APPLICABILITY

DEPARTMENT OF DEFENSE
DEPARTMENT OF THE NAVY

CLEAN AIR ACT - GENERAL CONFORMITY RULE
Record of Non-Applicability
for
INCREASED FLIGHT AND RELATED OPERATIONS IN THE PATUXENT RIVER COMPLEX
NAS Patuxent River, Maryland

The Clean Air Act (CAA) as amended requires federal action to conform to an approved state implementation plan (SIP) designed to achieve or maintain an attainment designation for air pollutants as defined by the National Ambient Air Quality Standard (NAAQS). The General Conformity Rule (40 CFR Parts 51 and 93) implements these requirements for actions occurring in air quality nonattainment areas.

The Patuxent River Complex is located in portions of Delaware, Maryland, and Virginia, which are included in the northeast Ozone Transportation Region (OTR). All the counties lying within the footprint of the CTR, except Calvert County in Maryland and Sussex County in Delaware, are classified as attainment or unclassifiable/attainment for all six criteria pollutants. For ozone, Calvert County is classified as serious nonattainment and Sussex County is designated as marginal nonattainment

The proposed action is to increase flight and related operations in test areas of the Patuxent River Complex that are controlled and scheduled by the Naval Air Warfare Center, Aircraft Division (NAWCAD). The complex includes all the flight and ground test facilities at NAS Patuxent River and OLF Webster Field, as well as the restricted airspaces, aerial and surface firing range, and targets (Hooper, Hannibal, and Tangier Island) comprising the Chesapeake Test Range (CTR). The no action alternative would maintain the complex's current level of flight hours into the future (18,200 annually, which represents an approximate ten-year average of annual flight hours). The three workload alternatives propose increases in existing operations by as few as 2,500 annual flight hours or as many as 6,200 annual flight hours.

The Environmental Protection Agency (EPA) has ruled that some Federal actions are exempted from the requirements for conformity. Under Section 51.583(c) of the rule, exempts actions where the total of all reasonably foreseeable direct and indirect emissions do not equal or exceed the de minimis levels. Such actions are presumed to conform to the SIP.

As demonstrated in the attached table, the levels of nitrogen oxides (NO_x) and volatile organic compounds (VOCs) are each below 100 tons per year and do not meet or exceed the de minimis levels.

To the best of my knowledge, the information provided is correct and accurate and I concur in the finding that the proposed action will conform to the SIP.

Approved by: ____ Date ____________________________

Timothy S. Smith
Executive Director
NAS Patuxent River
Patuxent River, Maryland

Aircraft Emissions in of NO_x and VOCs in Nonattainment Areas
(All Alternatives)

Alternative	Emission Level (tpy)	
	NO_x	VOCs
Total Emissions		
Existing Level	2.4	0.2
No Action Alternative	1.7	0.2
Operational Workload I Alternative	1.9	0.2
Operational Workload II Alternative	2.1	0.2
Operational Workload III Alternative	2.4	0.2
Net Emission Change from No Action Alternative		
Operational Workload I Alternative	0.2	0.0
Operational Workload II Alternative	0.4	0.0
Operational Workload III Alternative	0.7	0.0
Serious Ozone Nonattainment Area *De minimis* Level[1]	50	50
Washington, DC-MD-VA Ozone Nonattainment Area 1999 Target Emissions[2]	232,542	132,459

Notes: 1. 40 CFR 93
2. Source: Washington, DC-MD-VA Ozone SIP Revision (MWCOG, 1997)

APPENDIX G

NOISE MODELS

APPENDIX G

NOISE MODELS

Analyses of aircraft noise exposure and compatible land uses around Department of the Navy facilities are normally accomplished using two groups of computer-based programs. The first group, for airfield analyses, is called NOISEMAP and the second group, for airspace analyses, is called MR_NMAP. The NOISEMAP and MR_NMAP suite of computer programs were developed by the US Air Force which serves as the lead Department of Defense (DoD) agency for aircraft noise modeling. Analysis of supersonic flight operations resulting in a sonic boom is accomplished using a computer program known as BOOMAP3.

G.1 NOISEMAP

The NOISEMAP suite of computer programs consists of BASEOPS Version 5.0, OMEGA10, OMEGA11, NOISEMAP Version 6.5, NMPLOT Version 3.05, and NOISEFILE Version 6.4:

- NOISEFILE is a noise database for many models of aircraft.

- The BASEOPS program allows for entry of runway coordinates, airfield information, flight tracks, flight profiles (powers, altitudes, and speeds) along each track by each aircraft, numbers of flight operations, run-up coordinates, run-up profiles, and run-up operations.

- The OMEGA10 program extrapolates/interpolates the SELs for each model of aircraft from the NOISEFILE database, taking into consideration the specified speeds, engine thrust settings, and environmental conditions appropriate to each type of flight operation.

- The OMEGA11 program calculates maximum A-weighted sound levels for each model of aircraft taking into consideration the engine thrust settings and environmental conditions appropriate to run-up operations.

- The core NOISEMAP program incorporates the number of daytime (0700–2200) and nighttime (2200–0700) operations, flight paths, and profiles of the aircraft to calculate DNL at many points on the ground around the facility.

- The NMPLOT program draws contours of equal DNL for overlay onto land-use maps. For AICUZ studies, as a minimum, DNL contours of 60, 65, 70, 75, and

80 dB are developed. Results of these computer programs and noise impact guidelines provide a relative measure of noise effects around air facilities.

NOISEMAP is most accurate for comparing "before-and-after" noise effects which would result from proposed airfield changes or alternative noise control actions, when the calculations are made in a consistent manner. It allows noise predictions for such proposed actions without the actual implementation and noise monitoring of those actions. Of course, DNL may be measured directly around an airfield rather than calculated. Calculated sound levels are often supplemented by on-site measurements, where useful. NOISEMAP also has the flexibility of calculating sound levels at any specified point so that noise impacts at representative locations around an airfield can be obtained.

G.2 MR_NMAP

MR_NMAP is a model, based on NOISEMAP technology, for predicting aircraft noise from aircraft operating in Military Operating Areas (MOAs), Range/Restricted Areas, and Military Training Routes (MTRs). The MR_NMAP suite of computer programs consists of MR_OPS Version 1.0, OMEGA10R, MR_NMAP Version 1.0, NMPLOT Version 3.05, and NOISEFILE Version 6.4.

The MR_OPS program allows for entry of airspace information, the horizontal distribution of operations, flight profiles (powers, altitude distribution, and speeds), and numbers of sorties.

MR_NMAP can model the way aircraft fly in a military airspace via three general representations: broadly distributed operations which generally occur in MOAs and ranges, distributed parallel track which occur along MTRs, and specific tracks which occur in target areas. MR_NMAP uses aircraft noise levels from OMEGA10R and NOISEFILE, summing these in a manner similar to NOISEMAP described in Section G.1. The resultant L_{dnmr} values can be developed into contours via the NMPLOT program or tabulated for each airspace.

G.3 BOOMAP3

BOOMAP3 is a computer program which creates L_{Cdn} contours representing the cumulative impact of sonic booms due to supersonic activity in an Air Combat Maneuver (ACM) training area. The program consists of two modules:

- BOOMAP3 itself, which performs the calculations and yields a file containing a grid of L_{Cdn} values
- BM3Plot, which draws the contours and uses user interface and graphics routines (including commercial libraries) which are specific to the PC.

APPENDIX H

LISTINGS IN THE NATIONAL REGISTER OF HISTORIC PLACES

Table H-1

Listings in the National Register of Historic Places for Sussex County, Delaware

Resource Name	Category of Property	Location
Barnes Woods Archaeological District	District	ADDRESS RESTRICTED
Bethel Historic District	District	½ mile west of Laurel, Bethel
Building at 200-202A High Street	Building	200-202A High Street, Seaford
Building at 218 High Street	Building	218 High Street, Seaford
Building at High and Cannon Streets	Building	Southeast corner of High and Cannon Streets, Seaford
Burton Hardware Store	Building	Corner of High Street and Spring Alley, Seaford
Cannon’s Ferry	Building, Site, and Structures	Across the Nanticoke River, Woodland
J. W. Cox Dry Goods Store	Building	214 High Street, Seaford
First National Bank of Seaford	Building	118 Pine Street, Seaford
Hearn and Rawlins Mill	Buildings and Structure	US 13A, Seaford vicinity
Lawrence	Building	US 13A, Seaford vicinity
Maston House	Building	Seaford-Atlanta Road, Seaford vicinity
Jesse Robinson House	Building	High Street, Seaford
Governor William H. Ross House	Building	Market Street, Seaford vicinity
St. Luke’s Protestant Episcopal Church	Building	Front Street, Seaford
Seaford Station Complex	Buildings and Structures	Nanticoke River at Delaware Railroad Bridge, Seaford
Sussex National Bank of Seaford	Building	130 High Street, Seaford
Source: US Department of the Interior, National Park Service, Cultural Resources Internet Website. Accessed May 20, 1997.		

Table H-2

Listings in the National Register of Historic Places for Calvert County, Maryland

Resource Name	Category of Property	Location
Chesapeake Bay Bugeye, William B. Tennison	Object**	Calvert Marine Museum, Solomons
Cove Point Lighthouse	Structure	Cove Point Beach
Drum Point Lighthouse	Structure	Solomons Island Road (MD 2), Solomons
J.C. Lore Oyster House	Building	Solomons Island Road (MD 2), Solomons
Middleham Chapel	Building	H.G. Trueman Road (MD 765), Lusby
Morgan Hill Farm	Building	Wohlgemuth Road, Lusby
Preston-on-the-Patuxent	Building	Turners Road, Lusby

Note: **National Historic Landmark

Sources: National Register of Historic Places Nomination Forms. On file at the Maryland Historical Trust Library.

US Department of the Interior, National Park Service, Cultural Resources Internet Website. Accessed October 27, 1997.

Table H-3

Listings in the National Register of Historic Places for Caroline County, Maryland

Resource Name	Category of Property	Location
Exeter	Building	Three Bridges Road, Federalsburg

Sources: National Register of Historic Places Nomination Forms. On file at the Maryland Historical Trust Library.

US Department of the Interior, National Park Service, Cultural Resources Internet Website. Accessed October 27, 1997.

Table H-4

Listings in the National Register of Historic Places for Dorchester County, Maryland

Resource Name	Category of Property	Location
Brinsfield I Prehistoric Village Archaeological Site (18DO24)	Site	NOT TO BE RELEASED
East New Market Historic District	District	Junction of MD 16 and 14, East New Market
K.B. Fletcher's Mill	Building	Hurlock Public Road, Cabin Creek (East New Market vicinity)
Friendship Hall	Building	Linkwood Road, East New Market
Glen Oak Hotel	Building	201 Academy Street (MD 331), Hurlock
Rehoboth	Building	Punkum Road, El Dorado
Yarmouth	Building	NOT TO BE RELEASED
Willin Village Archaeological Site (18DO1)	Site	NOT TO BE RELEASED

Sources: National Register of Historic Places Nomination Forms. On file at the Maryland Historical Trust Library.

US Department of the Interior, National Park Service, Cultural Resources Internet Website. Accessed October 27, 1997.

Table H-5

Listings in the National Register of Historic Places for St. Mary's County, Maryland

Resource Name	Category of Property	Location
Bard's Field/Trinity Manor	Building	Pratt Road, Ridge vicinity
Cecil's Mill Historic District	District	Indian Bridge Road (MD 471), Great Mills vicinity
Cross Manor	Building	Cross Manor Road, Beachville
Mattapany-Sewall Archaeological Site (18ST390)	Site	Lexington Park vicinity
Mulberry Fields	Building	Mulberry Field Road, Valley Lee
Piney Point Coast Guard Light Station	Structure	Hurry Road, Piney Point
Porto Bello	Building	Portobello Road, Drayden
St. Andrew's Church	Building	St. Andrew's Church Road, California
St. George's Protestant Episcopal Church	Building	McKays Beach Road, Valley Lee
St. Ignatius Church	Building	Webster Field Road, Beachville
St. Mary's City Historic District	District**	St. Mary's City
St. Richard's Manor	Building	Millstone Landing Road, California
West St. Mary's Manor	Building**	West St. Mary's Manor Road, Drayden
Woodlawn	Building	Woodlawn Road, Ridge

Note: **National Historic Landmark

Sources: National Register of Historic Places Nomination Forms. On file at the Maryland Historical Trust Library.

US Department of the Interior, National Park Service, Cultural Resources Internet Website. Accessed October 27, 1997.

Table H-6

Listings in the National Register of Historic Places for Somerset County, Maryland

Resource Name	Category of Property	Location
Academy Grove Historic District	District	Fairmont-Rumbley Road (MD 361), Landonville (Upper Fairmont vicinity)
Adams Farm	Building	Old Princess Anne-Westover Road, Princess Anne
All Saints Church at Monie	Building	Venton Road, Venton
Beckford	Building	North Bedford Avenue, Princess Anne
Beverly	Building	Perry Road, Kings Creek (Princess Anne vicinity)
Brentwood Farm	Building	Allen Road, Loretto (Allen vicinity)
Catalpa Farm	Building	Old Princess Anne-Westover Road, Princess Anne
Crisfield Armory	Building	East Main Street (MD 380), Crisfield
Crisfield Historic District	District	Crisfield
Grace Episcopal Church	Building	Mount Vernon Road (MD 362), Mount Vernon
Harrington	Building	Polk’s Road, Widgeon (Princess Anne vicinity)
Island Bell	Object	Ewell
George Maddox Farm	Building	River Road, Manokin vicinity
Makepeace	Building	Johnson’s Creek Road, Lawsonia (Crisfield vicinity)
Manokin Historic District	District	Manokin
Manokin Presbyterian Church	Building	Cemetery Lane and North Somerset Avenue, Princess Anne
Nelson Homestead	Building	MD 667 and Cash Corner Road, Mariners (Crisfield vicinity)
Panther’s Den	Building	Drawbridge Road, Venton vicinity
Princess Anne Historic District	District	Princess Anne
Dr. William B. Pritchard House	Building	29994 Polks Road, Princess Anne vicinity
Rock Creek Methodist Episcopal Church	Building	Deal Island Road (MD 363), Chance
St. John’s Methodist Episcopal Church and Joshua Thomas Chapel	Building	Deal Island Road (MD 363), Deal Island
St. Peter’s Methodist Episcopal Church	Building	St. Peter’s Church Road, Hopewell vicinity

Table H-6

Listings in the National Register of Historic Places for Somerset County, Maryland

Resource Name	Category of Property	Location
Schoolridge Farm	Building	Fairmont-Rumbley Road (MD 361), Landonville (Upper Fairmont vicinity)
Skipjack Thomas W. Clyde	Object	Lower Thorofare, Wenona
Skipjack Clarence Crockett	Object	Lower Thorofare, Wenona
Skipjack Fannie L. Daugherty	Object	Lower Thorofare, Wenona
Skipjack Howard	Object	Lower Thorofare, Wenona
Skipjack F.C. Lewis, Jr.	Object	Lower Thorofare, Wenona
Skipjack Ida May	Object	Upper Thorofare, Chance
Skipjack Susan May	Object	Lower Thorofare, Wenona
Skipjack Sea Gull	Object	Lower Thorofare, Deal Island
William S. Smith House	Building	Oriole Road, Oriole
Somerset Academy Archaeological Site (18SO141)	Site	Princess Anne vicinity
Sudler's Conclusion	Building	Hood Road, Manokin vicinity
Captain Leonard S. Tawes House	Building	Somerset Avenue, Crisfield
Teackle Mansion	Building	Prince William and Mansion Streets, Princess Anne
Tudor Hall	Building	Fairmont Road (MD 361), Upper Fairmont
Upper Fairmont Historic District	District	Upper Fairmont
Waddy House	Building	Perryhawkin Road, Princess Anne vicinity
Waterloo	Building	Mount Vernon Road, Jason
Water's River	Building	Hood Road, Manokin vicinity
White Hall	Building	Cooley Road, Polk Landing (Princess Anne vicinity)
Sources: National Register of Historic Places Nomination Forms. On file at the Maryland Historical Trust Library. US Department of the Interior, National Park Service, Cultural Resources Internet Website. Accessed October 27, 1997.		

Table H-7

Listings in the National Register of Historic Places for Wicomico County, Maryland

Resource Name	Category of Property	Location
Bennett's Adventure	Building	Cooper Road (MD 309), Allen
Bounds Lott	Building	Cooper Road (MD 309), Trinity
Long Hill	Building	Wetipquin Ferry Road (MD 478), Wetipquin
St. Bartholomew's Episcopal Church	Building	Green Hill Church Road, Green Hill (Quantico vicinity)
St. Giles	Building	Quantico Road (MD 347), Hebron
Spring Hill Church	Building	US 50 and Quantico Road (MD 347), Hebron
Western Fields	Building	Porter Mill Road (MD 437), Elliots Place (Hebron vicinity)
Whitehaven Historic District	District	Whitehaven
Whitehaven Hotel	Building	101 Whitehaven Road, Whitehaven
Yellow Brick House	Building	Capitol Road (MD 352), Coxs Corner
Sources: National Register of Historic Places Nomination Forms. On file at the Maryland Historical Trust Library. US Department of the Interior, National Park Service, Cultural Resources Internet Website. Accessed October 27, 1997.		

Table H-8

Listings in the National Register of Historic Places for Northumberland County, Virginia

Resource Name	Category of Property	Location
Coan Baptist Church	Building	VA 638, Heathsville
Heathsville Historic District	District	US 360 at VA 634 and VA 201 junction, Heathsville
Holley Graded School	Building	US 360, Lottsburg
Howland Chapel School	Building	VA 201 and VA 642 junction, Heathsville
Kirkland Grove Campground	Building	VA 779, Heathsville vicinity
Reedville Historic District	District	VA 644 at VA 722, Reedville
Rice's Hotel	Building	County Routes 1001 and 1002 junction, Heathsville
St. Stephen's Episcopal Church	Building	US 360, Heathsville
Shalango	Building	VA 666, Wicomico Church
Springfield	Building	US 360, Heathsville
Sunnyside	Building	US 360, Heathsville
Versailles	Building	US 360, Burgess

Source: US Department of the Interior, National Park Service, National Register of Historic Places Internet Website. Accessed May 20, 1997.

Table H-9

Listings in the National Register of Historic Places for Westmoreland County, Virginia

Resource Name	Category of Property	Location
Spence's Point	Building**	VA 749 on Sandy Point Neck, Westmoreland

Note: **National Historic Landmark

Source: US Department of the Interior, National Park Service, National Register of Historic Places Internet Website. Accessed May 20, 1997.

US Department of the Interior, National Park Service, National Historic Landmark Index Internet Website. Accessed May 29, 1997.

APPENDIX I

DESCRIPTION OF INERT ORDNANCE STORES EXPENDED IN THE CTR

TABLE OF CONTENTS

APPENDIX I

DESCRIPTION OF INERT ORDNANCE STORES EXPENDED IN THE CTR

The implementation of the proposed action (increased flight operations in the Patuxent River Complex) would result in the potential release of additional ordnance stores in the Chesapeake Test Range (CTR). An ordnance store (hereinafter, store) is defined as any item capable of being released or expended from aircraft. After release from the aircraft, these stores drop into the Chesapeake Bay. Both flight operations associated with RDT&E activities and those conducted in support of military training would involve the release of stores into the Bay.

The principal type of RDT&E activity that involves the release of stores in the CTR is weapons/stores separation testing. Weapons/stores separation tests are conducted to assess the ability of a store to safely and reliably separate (be released) from an aircraft. The types of tests undertaken during weapons/stores separation tests are summarized in Table I-1. In addition, activities conducted in support of military training involving the release of stores in the CTR would include firing at a target, dropping practice bombs, and using decoys in conducting electronic warfare (EW) exercises.

All stores released in the CTR, both for RDT&E activities and in support of military training, are inert (nonexplosive). Inert stores are steel shapes similar in appearance, size, and weight to the explosive ordnance type they are intended to replicate. These inert stores contain concrete, vermiculite, and/or other nonexplosive materials. Inert stores typically used for separation testing and in support of military training in the CTR can be categorized as follows:

- Missiles;
- Bombs (guided bombs, practice bombs, general purpose bombs, and cluster bombs);
- Rockets;
- Mines;
- Decoys (chaff, flares, and jammers);
- Gun Ammunition; and
- Miscellaneous Items (fuel tanks, launchers, rails, parachutes, etc.).

Each of these stores is further described below.

Table I-1

Summary of Weapons/Stores Separation Tests

Test Type	Test Objective
Weapons Separation Evaluation/Demonstration	Demonstrate safe and satisfactory stores separation under all conditions. Demonstrate that stores separation does not adversely affect the released stores' trajectory.
Dynamic Store Release	Verify analyses of wing, store, and fuselage structural response due to store release at critical load conditions.
Weapons Delivery Accuracy Evaluation/Demonstration	Demonstrate aircraft/weapon ballistic accuracy for three flight conditions and two store configurations.
Decoy Flight Evaluations/Demonstration	Verify satisfactory deployment, separation, and safe jettison of decoy expendables. Evaluate chaff bloom rate.
Gunfire Flight Evaluations/Demonstration	Demonstrate satisfactory operation of the light-weight gun. Determine gunfire vibration and aeroacoustic environment on aircraft structure, installed systems, and equipment.
Emergency Recovery System Functional Evaluation	Verify spin chute deployment and jettison.
Notes: The Glossary contains definitions of many of the terms in this table. Source: NAWCAD, January 1997.	

I.1 Missiles

Inert missile shapes (some with parachutes and telemetry units) are used for weapons/stores separation testing in the Patuxent River Complex. These shapes, mass-ballasted to account for the absence of the warhead and solid fuel rocket motor, are usually jettisoned or dropped in the CTR. The missile shapes used in weapons/stores separation testing in the complex may represent the following types of missiles:

- **Air-to-Air Missiles** - Sidewinder (AIM-9), Sparrow (AIM-7), and AMRAAM (Advanced Medium-Range Air-to-Air Missile, AIM-120). These shapes are not recovered.

- **Air-to-Ground Missiles** - Shrike (AGM-45), Maverick (AGM-65), Harpoon (AGM-84D), SLAM (Stand-Off Land Attack Missile - AGM-84E), SLAM ER (Stand-Off Land Attack Missile Enhanced Range), HARM (High-Speed Anti-Radiation Missile - AGM-88), and Hellfire (AGM-114). These missile shapes are usually recovered.

The missile shapes range in size from 2.5 m to 4.5 m (8.2 ft to 14.7 ft) in length, 13 cm to 34 cm (5 in to 13.5 in) in diameter, and weigh 86 kg to 662 kg (190 lbs to 1,470 lbs).

Recovery of air-to-ground missiles that have been dropped or jettisoned (including the parachute and telemetry package) occurs at an in-shore sandbar in the vicinity of Hooper target. The historic recovery rate has been nearly 100 percent (NAWCAD, January 1997). The use of the parachute allows the jettisoned/dropped missiles to slow down as they enter the water and significantly minimizes the potential for breakup of the missile and/or the telemetry unit.

Each telemetry unit is battery-powered. In the past, Ni-Cd batteries were used in telemetry units. However, weapons/stores separation testing being performed in conjunction with the F/A-18E/F program has proved successful in using lithium iron disulfide batteries in the telemetry units as a substitute for the Ni-Cd battery. The lithium iron disulfide battery is considered environmentally friendly. Consequently, the future use of a Ni-Cd battery in telemetry units would be greatly reduced and its use would be permitted only if other environmentally friendly batteries were not available or would not meet technical requirements.

I.2 Bombs

I.2.1 Guided Bombs

Guided bombs are designed to use electronic systems (laser or television) to improve the accuracy of delivery from an attack aircraft to a surface target. Weapons/stores separation tests in the CTR include, but are not limited to: Walleye (I, II, and II Extended Range Data Link [ERDL]), BLU-109, GBU-24, and JSOW (Joint Standoff Weapon - AGM-154). Some guided bombs are recovered from the Chesapeake Bay.

I.2.2 Practice Bombs

Practice bombs are manufactured as either solid cast-metal bodies or thin sheet-metal containers that can be filled with wet sand or water to meet desired weight requirements. They range in length from 0.53 to 0.64 m (21 to 25 in) and weigh between 2.3 and 11.3 kg (5 and 25 lbs) with a diameter of about 0.1 m (4 in) (NAWCAD, January 1997). Practice bombs used for separation purposes in the Patuxent River Complex include: MK-76, MK-106, BDU-48/B, and the Laser Guided Test Round (LGTR).

To assist in visual observation in weapon-target impact, a practice bomb signal cartridge (i.e., spotting charge) that emits smoke or flames for impact marking can be used. A spotting charge is similar in explosive strength to a firecracker. Three different signal cartridges are used with practice bombs (MK-4, CXU-3, and CXU-4). The MK-4 cartridge contains about 65 g (2.3 oz) of red phosphorus. The red phosphorus ignites on impact and produces a bright flash and white smoke. The bright flash is important for night training. The CXU-3 and CXU-4 cartridges contain about 30 cu cm (1 fluid oz) and 59 cu cm (2 fluid oz), respectively, of titanium tetrachloride. When exposed to air or moisture, titanium tetrachloride produces white smoke. While spotting charges are not used in support of RDT&E activities in the CTR, they are commonly used in military training activities.

Practice bombs become buried deeply in the sediment of the Chesapeake Bay. Therefore, they are not recovered.

I.2.3 General Purpose Bombs

At the Patuxent River Complex, the general purpose bombs (MK-80 Series) used are composed of a steel case containing concrete and can range in weight from 225 kg to 900 kg (500 lbs to 2,000 lbs) and in length from 2.2 m to 3.9 m (87 to 152 in). Diameters range from 25.4 to 46 cm (10 to 18 in) (NAVEDTRA 121308, June 1990 in NAWCAD, January 1997). These bombs are available with or without a guidance system. Those with guidance systems, also referred to as "smart bombs," detect a target illuminated by a laser beam.

The MK-80 Series general purpose bombs also can be modified by the addition of a Joint Direct Attack Munition (JDAM) guidance kit. Conversion of a general purpose bomb involves replacing the tail section with the JDAM guidance kit. This guidance kit contains a global positioning system (GPS)/inertial guidance system (IGS) unit to improve the accuracy of bomb delivery in adverse weather conditions.

Some of the general purpose bombs used in the Patuxent River Complex may be equipped with laser guidance systems (NAWCAD, January 1997) and/or JDAM kits and may be equipped with battery-powered telemetry units (the same telemetry units described above for missiles). A store may be instrumented with a telemetry unit if the potential exists for it to exhibit poor separation characteristics and thus be likely to contact the aircraft or another store (NAWCAD, January 1997). Stores with potentially poor separation characteristics are identified on the basis of wind tunnel data or historical knowledge.

General purpose bombs equipped with a battery-powered telemetry unit are not easily recovered. NAWCAD, January 1997). These bombs either break up upon impact with the water surface or become buried in bottom sediments.

I.2.4 Cluster Bombs

A cluster bomb is delivered in the same manner as a conventional practice bomb. After release from the aircraft and during free-fall, a strip of "low level" explosive (similar to a firecracker) detonates and opens the bomb canister releasing about 245 bomblets. The cluster bombs used in the CTR are filled with inert bomblets. Cluster bombs weigh about 370 kg (811 lbs), including the weight of the bomblets, are 2.4 m (8 ft) in length, have a diameter of 335 mm (13 in), and a tailspan of 437 mm (17 in) (NAWCAD, January 1997).

I.3 Mines

Mines are used as a subsurface anti-ship or anti-submarine weapon. The MK56 mine has been in use since its development in 1966. More advanced mines include the MK60 Captor (or "encapsulated torpedo"), the MK62, and the MK63 (Quickstrike), and the MK67 (Submarine Launched Mobile Mine - SLMM). Most mines are delivered to the target by aircraft. Mines released in the CTR are generally recovered and returned for refurbishment and reuse. Those mines attached to a MK-80 general purpose bomb or a Rockeye cluster bomb unit are not recovered.

1.4 Rockets

Rocket use in air warfare began during World War II. A rocket is generally launched at close range and is more accurate than a free-falling bomb. Rockets are driven forward by the discharge of rapidly expanding gases from the nozzle of a motor. These gases are produced from the burning of a solid propellant that consists of a fuel and an oxidizer. Inert rockets with a diameter of 6.3 cm (2.5 in) and 12.7 cm (5 in) are fired by the rocket test stand at NAS Patuxent River. Single firings of rockets are allowed at Hooper target (with inert warheads); at Hannibal both 6.3 cm (2.5 in) and 12.7 cm (5 in) rockets can be dropped or fired at either the Hannibal or Tangier Island targets if they contain inert warheads (US Navy, September 1989).

I.5 Decoys

Decoys are forms of electronic warfare countermeasures that allow an aircraft to foil or disable an adversary's offensive or defensive detection devices (e.g., communications and radar systems). The types of decoys tested in the Patuxent River Complex include chaff, flares, and jammers. All decoys are expelled from an aircraft by the electronic firing of an impulse cartridge (known as a cartridge actuated detonator or CAD). The CAD contains 210 to 270 mg (0.007 to 0.009 oz) of propellant inside a steel body.

I.5.1 Chaff

Chaff is the collective term for fiberglass fibers (or dipoles) coated with aluminum and biodegradable stearic acid and that are released by an aircraft or ship to thwart radar and radar-controlled weapons. Chaff fibers are about the thickness of fine human hair, typically about 1.5 cm (0.6 in) long, 0.025 cm (0.01 in) wide, and 0.003 cm (0.001 in) in diameter. Millions of these fibers are compressed into small packages or canisters. Only 45.4 g (1.6 oz) of chaff are needed to cause an echo equal in size to a large bomber (US Naval Academy, December 1996). Each chaff package dropped independently can simulate additional aircraft.

When released by an aircraft into its slipstream, the chaff packages burst open and the strips/cylinders scatter forming an "electronic smoke screen" or radar-reflective cloud about 90 to 180 m (300 to 600 ft) in diameter (Naval Facilities Engineering Command, Engineering Field Activity West, June 1997). The purpose of dispensing the chaff is two-fold: to confuse enemy radar by saturating radar signals so that radar operators are unable to locate or track the real targets within the chaff corridor; and to decoy enemy missiles in order to cause them to fire at the chaff cloud rather than at the aircraft (Naval Facilities Engineering Command, Engineering Field Activity West, June 1997).

Chaff drops very slowly and can take many hours to reach the ground. Chaff settles at an estimated fall rate of 15 m (50 ft) per minute or less. Initial chaff concentrations are about 120 micrograms per cubic meter (mg/m^3), but dissipate quickly because of its light weight and the effects of wind and air currents (US Air Force, November 1993). This causes the chaff to be widely dispersed, although clumps of chaff can be found occasionally.

I.5.2 Flares

Flares are released by an aircraft to attract heat-seeking or infrared-homing weapons targeted on that aircraft. When activated, an electrical firing mechanism ignites the flare and expels it from the aircraft. The flare begins burning immediately, reaching its highest temperature, 1,090EC (2,000EF), by the time it passes the tail of the aircraft (US Air Force, November 1993). The flare pellet is designed to provide a brief, high intensity heat source for up to ten seconds upon ejection (NAWCAD, January 1977). Normally, flares are completely consumed during this time (with the exception of small pieces of foil, felt, and plastic).

Flares are composed of powdered or pelleted magnesium imbedded in a matrix such as polytetrafluoroethylene (teflon). Fluoroelastomer (viton, fluorel, or hytemp) may also be a constituent of the flare.

I.5.3 Jammers

A jammer is an electronic warfare device that emits radar-like signals and interferes with the operation of an enemy's air/surface defense system. Jammer decoys released from aircraft in the Patuxent River Complex are made of aluminum alloy, cylindrical in shape, and usually dissolve in saltwater within 48 hours (NAWCAD, January 1997). After being expelled from the aircraft, they are designed to free-fall or are towed to misdirect enemy incoming missiles. Most jammers used in the complex are mass equivalent dummy jammers, although thermal or lithium battery-powered electronic transmitters may sometimes be released. Each lithium battery contains a total of 2.4 g (0.08 oz) of lithium and 0.1 milligrams per cubic meter (mg/m^3) of potassium chromate (NAWCAD, January 1997). The center fire primer used to activate the battery is similar in explosive force to a firecracker. Each thermal battery contains approximately 2.4 g (0.08 oz) of potassium perchlorate (NAWCAD, January 1997).

I.6 Gun Ammunition

Gun ammunition is fired from aircraft and in the firing tunnel at NAS Patuxent River. The gun ammunition is fired from aircraft during RDT&E weapons/store separation tests or during activities in support of military training. Ammunition fired in the firing tunnel is collected and expended bullets are properly disposed.

Gun ammunition expended by aircraft in the CTR is in the following calibers: 5.56 mm, 7.62 mm, .50 cal., 20 mm, 25 mm, 30 mm, and 40 mm. While cartridge cases are retained within the aircraft after firing, the projectile (bullet) is deposited into the Bay. The projectiles for 5.56 mm and 7.62 mm gun ammunition have lead cores. The amount of lead in each of these projectiles has been estimated at 4 g (0.14 oz) and 9.6 g (0.34 oz), respectively (Buxton, 1998). Projectiles for .50 cal., 20 mm, 25 mm, 30 mm, and 40 mm gun ammunition are mostly steel with minor constituents of aluminum, copper, and lead.

I.7 Miscellaneous Related Items

Other miscellaneous items and aircraft hardware that are released or dropped from aircraft include expendable fuel tanks (capacity ranging in size from 1,190 to 1,817 liters [4,522 to 6,905 gallons]), CADs, and launchers. Recovery rates for fuel tanks and launchers reach about 95 percent. When fuel tanks are dropped as part of a test event, they are first purged of residual fuel vapors, and are either dropped empty, or filled with water to simulate the weight/variable-center-of-gravity characteristics of a partially-filled liquid container.

Due to the Navy policy and concern for the environment, fuel dumping is a rare occurrence in the CTR. Navy policy only allows fuel dumps from aircraft only in emergency situations. In such situations, the test pilot attempts to dump fuel above 1,800 m (6,000 ft), if possible. Adherence to this policy allows the dumped fuel to completely evaporate in the atmosphere so that it does not reach ground or water surfaces. However, it may sometimes appear to a ground observer that an aircraft is dumping fuel, particularly in humid weather. This illusion occurs when normal water vapor condenses at the wingtips of the aircraft. The condensate spray in the atmosphere can cause the appearance of fuel dumping. This phenomenon is particularly common with modern aircraft with highly efficient wings such as the F/A-18 that flies out of NAS Patuxent River.

APPENDIX J

WRITTEN AND ORAL COMMENTS

APPENDIX J

TABLE OF CONTENTS

COMMENTS RECEIVED AT THE PUBLIC HEARINGS VIA THE STENOGRAPHER

Table J-1

Comments Received at the Public Hearings via the Stenographer

Name	Address	Comment
Patuxent High School, Lusby, MD		**June 10, 1998**
No comments received.		
Cambridge/South Dorchester High School, Cambridge, MD		**June 15, 1998**
Mr. Dan Corkran	P.O. Box 84 Rhodesdale, MD 21659	Lives in northern Dorchester County. Periodically, three planes fly directly over his house, breaking the sound barrier. It's not right to come across someone's place and "tear it up." He knows the US needs this military improvement, but would like them not to break the sound barrier while flying out towards the ocean.
Mr. Arnold Noland	1728 Hoopersville Road Hoopers Island, MD 21634	Fuel drops are killing off all of the trees around the airports -- and we want to find out what it (the fuel) is doing to the Bay.
Mr. Bill Schmidt	Maryland Department of the Environment Waste Management Administration 120 Broadway Centreville, MD 21617	Concerned with release of fuel from aircraft -- specifically what that is doing to the Bay. Also concerned with lead bullets. Why not use something less harmful than lead (why not steel)? Even though it's just a little (the amount of lead added), it's still something. Also concerned with the impact of the noise on the poultry industry.
Ms. Joan Bealefeld	2137 Farm Creek Road Wingate, MD 21675	Complaint: Breaking the sound barrier (continuously). Also, the planes are flying lower to the ground than they need to be. And, one week ago, a plane did a roll-over (on top of) next to their house. If this needs to be done (for training), it should be done over the Bay.
Northumberland High School, Heathsville, VA		**June 17, 1998**
Mr. Randolph Neal	3023 Fleeton Road Reedville, VA 22539	I am president of the Northumberland Association for Progressive Stewardship. (A group of 250 members.) He's very concerned with sonic booms (not addressed in this presentation). We need some insurance against the potential increase in those disturbances. I suggest that the scheduling people should coordinate their target practice when certain fishing is not in season -- for example, there are certain specific seasons for rockfish. After a certain period of time there are almost no fish in the Bay. You should try to schedule the practices then...it would be good for public relations.

<table>
<tr><th>Name</th><th>Address</th><th>Comment</th></tr>
<tr><td colspan="3">Northumberland High School, Heathsville, VA (Continued)</td></tr>
<tr><td>Mr. James Long</td><td>P.O. Box 85
Wicomico Church, VA 22579

Board of Supervisors
P.O. Box 129
Heathsville, VA 22473</td><td>He’s on the Board of Supervisors of Northumberland County. One of his concerns is the noise. With so many miles of shoreline in the county, and his understanding from the videos is that the noise will be taking place mostly near or over the waters, he’s concerned with the increase in overflight activities. From his understanding, an additional 1-2 hours of flights per day will be added. What effect will this have on the fishing industry and other related jobs? What effect will this have on the citizens of Northumberland County, particularly with its abundance of older citizens? Loud noise will affect quite a few persons. And what about the effects on wildlife and on the Bay? Has that been addressed? What about the materials released from the planes and their effects on the environment?</td></tr>
<tr><td>Ms. Teri Syslo</td><td>2122 Clarketown Road
Heathsville, VA 22473</td><td>She has questions about the expansion of business at Pax River. What do you mean by commercial and foreign business? How will that affect us over here in Northumberland County? What type of impacts would UAVs, Electromagnetic Pulses, etc. have? Are these tests any new or any different than programs that are in effect now? Are you anticipating any other different types of programs in the future? Has the Pax River Research Organization reviewed the DEIS? Have they had any input into the document?</td></tr>
<tr><td colspan="2">Great Mills High School, Leonardtown, MD</td><td align="right">June 22, 1998</td></tr>
<tr><td colspan="3">No comments received.</td></tr>
</table>

MESSAGES RECEIVED VIA THE TOLL-FREE NUMBER

Table J-2

Messages Received via the Toll-Free Number

Date	Messages
10/15/97	No new messages
10/22/97	No new messages
10/29/97	No new messages
11/5/97	No new messages
11/12/97	No new messages
11/20/97	**11/19/97, 7:01 pm: Message from Tom Corcoran** regarding aircraft traffic over Smith and Tangier Islands. Passed message on to Kelly Burdick, who is going to have Steve Riley call Mr. Corcoran.
11/26/97	No new messages
12/3/97	No new messages
12/10/97	No new messages
12/17/97	No new messages
12/24/97	No new messages
12/31/97	No new messages
1/7/98	No new messages
1/14/98	No new messages
1/21/98	No new messages
1/28/98	No new messages
2/4/98	No new messages
2/11/98	No new messages
2/18/98	No new messages
2/25/98	No new messages
3/4/98	No new messages
3/11/98	No new messages
3/18/98	No new messages
3/25/98	No new messages
4/2/98	No new messages
4/8/98	No new messages
4/15/98	No new messages
4/22/98	No new messages
4/29/98	No new messages

Date	Messages
5/6/98	No new messages
5/13/98	No new messages
5/19/98	No new messages
5/20/98	No new messages
5/21/98	No new messages
5/22/98	No new messages
5/26/98	No new messages
5/27/98	No new messages
5/28/98	No new messages
5/29/98	No new messages
6/1/98	No new messages
6/2/98	**6/2/98, 10:37 am: Message from Elinor Cofer, VP of Friends of the Chesapeake,** who called on behalf of her organization (301-872-4150). **6/2/98, 12:55 pm: Message from Jim Hagy of Solomons, MD,** who requested additional information on the DEIS.
6/3/98	No new messages
6/4/98	No new messages
6/5/98	No new messages
6/8/98	**6/8/98, 9:04 am: Message from a staff member of the VA governor's office.** Governor Gilmore will be unable to attend any of the hearings, but appreciates the invitation. **6/8/98, 3:00 pm: Message from Ms. M. Chawla of the US Army in Champaign, Illinois** requesting a copy of the DEIS.
6/9/98	**6/9/98, 9:29 am: Message from Richard LeBaron of Alexandria, VA.** He owns property in Northumberland County and requested a copy of the DEIS. **6/9/98, 11:01 am: Message from Jim Gatto** requesting to be placed on the mailing list.
6/10/98	**6/10/98, 12:42 pm: Message from Patricia Lawrence, who lives near Webster Field.** She complained that it is too noisy for the children and adults in her household to sleep at night because of the planes. The sound is annoying and they want them not to fly there anymore.
6/11/98	No new messages
6/12/98	**6/12/98, 1:54 pm: Message from Allison Taylor of Leonardtown, MD** requesting to be placed on the mailing list. She also stated that she is very against any increases in flights near her house since the flights are already very disturbing and annoying.

Date	Messages
6/15/98	**6/15/98, 11:55 am: Message from J.R. Aswell of Crisfield, MD.** He questioned why no public meetings would be held closer to Somerset and Worcester counties, especially with all the planes that fly &/or go down, pilots recovered, and daily operations that occur there. Also, the local fire companies and citizens provide assistance when the planes crash. Because of this, he feels it is "lame" that the government chose not to have a meeting in this vicinity. He plans to notify Wayne Gilchrest on the matter. **6/15/98, 3:28 pm: Message from Barry Brown of Marion Station who raises chickens.** He asked that the flights be restricted over the Eastern Shore chicken farms since thousands of chickens are killed when they pile in the corner out of fear and suffocate. He may be reached at (410) 623-2409. **6/15/98, 3:30 pm: Message from Mrs. Islay Kesecker** requesting to be placed on the mailing list.
6/16/98	**6/16/98, 12:47 pm: Message from Henry Immanuel** requesting to be contacted at one's earliest convenience in regard to the scheduled meetings (410-376-3643). This message forwarded to Kelly Burdick 6/18/98. **6/16/98, 6:24 pm: Message from a man who had intentions of offering favorable comments about Pax using extra flight hours.** He said that the recording was very long and all the info provided about the website address was confusing and not comprehendible. He decided to leave his number instead if we were interested in his comments (410-228-3695). This message forwarded to Kelly Burdick 6/18/98.
6/17/98	**6/17/98, 11:38 am: Message from William Garner** requesting a cd-rom.
6/18/98	No new messages
6/19/98	**6/19/98, 11:02 am: Message from Mollie Gieseman** requesting to be placed on the mailing list.
6/22/98	No new messages
6/23/98	No new messages
6/24/98	**6/24/98, 10:44 am: Message from Charles Kerr.** He is 100% in favor of the flight increases and feels they are needed for the base [NAS Pax] and the military in general. He has listened to many of the negative comments and believes many of them to be unfair, especially those regarding noise. He and his family lived next to a runway at a Navy base near Jacksonville, and his children were able to identify the planes by their noise alone. He feels that over time, the human body simply adapts to and ignores noise. He urges individuals to reflect on the saying "Jet noise is the sound of freedom." **6/24/98, 11:50 am: Message from Jerry Mazetis of Heathsville, VA** requesting to be placed on the mailing list. **6/24/98, 12:36 pm: Message from Leonard Kohl of Callaway, MD** requesting to be placed on the mailing list.
6/25/98	No new messages

Date	Messages
6/26/98	**6/26/98, 9:35 am: Message from Elizabeth Stallard of Irvington, VA** requesting to be placed on the mailing list. She lives in Weems, which has a small airport (4-5 planes) used by the fishspotters for the menhaden industry. These planes take off toward the south by the river and out towards the Bay. She sees/hears planes over her house that take off very low and very fast. Recently she witnessed a near collision of a plane taking off with one already in flight. She hopes a coordination effort could begin to prevent any such accidents. She is looking forward to a response, and plans to write a follow-up letter. **6/26/98, 10:48 am: Message from Lillian Ackley of Westover, MD.** She was trying to get in touch with Kelly Burdick regarding a previous phone conversation and her request to receive project information/materials. She wants Kelly Burdick to get in touch with her [410-651-2482]. **6/26/98, 11:39 am: Message from Ron Miller of Heathsville, VA.** He called to protest both the occurrence and the proposed increases of fly-overs. He feels the noise is very annoying, and has already complained to his county supervisor and is preparing to write to his state delegate. He does not understand why if NAS Pax River is in Maryland, then why do their planes fly over Virginia? **6/26/98, 3:39 pm: Message from Charles M. Smith of Lancaster, VA.** He is in favor of the Navy's proposal, and feels there would be only minimal impacts on the Lancaster area. He feels letters to the editor published recently have been "grossly exaggerated." If the Navy feels it would be in the best interest of national defense to implement the action, then he thinks the Navy should go ahead.
6/29/98	**6/29/98, 2:32 pm: Message from Joe Renowitz, currently of Warminster, PA and soon to be moving to Heathsville, VA.** He is building a house in Heathsville because it is quiet there compared to Warminster. Since the Warminster facility has moved to Pax River, he now feels that he will be moving into Pax's back yard, complete with its noise and drones. He hopes to see some type of governing situation to limit the noise and/or hours. He requested to be placed on the mailing list, and assured that he will contact us at a future date. **6/29/98, 3:09 pm: Message from Ann Hooker of the Federal Aviation Administration Office of Environment and Energy**. She requested an additional copy of the DEIS for her office. She voiced 3 questions: (1) How will the Navy avoid violations of the Clean Water Act for jet fuel dumping over the Chesapeake Bay and associated lands; (2) How is the Navy responding to concerns of low-flying aircraft over 4-F properties, wildlife, cultural resources, wilderness areas, refuges, and parks within the Affected Environment; (3) Is the Navy preparing an Environmental Justice analysis, and if so, what does it reveal and what are the significant disproportionate impacts and mitigation measures?
6/30/98	**6/30/98, 11:10 am: Message from Ron Miller of Northumberland County, VA** requesting to speak with Sue Evans again to voice his opposition against the drones and overflights [804-580-8611]. **6/30/98, 11:17 am: Message from Robert Thompson [19413 North Snow Hill Manor Road, city not specified]** who is in support of any increase in flight hours at PAX River.
7/1/98	No new messages

Date	Messages
7/2/98	**7/2/98, 10:21 am and 2:24 pm: Messages from Henry Immanuel** [ndrc@ezy.net or 410-376-3643]. He was having trouble sending his comments via e-mail. **7/2/98, 3:57 pm: Message from Bill Cowardin of Reedville, VA.** About 10 minutes prior to his call, an explosion occurred that shook his house. He feels it is ridiculous and "asinine" that the Navy is proposing more flights to damage his community (Northumberland County/Reedville area). He also feels that the Navy held false meetings, and questions why the tax payers should tolerate any of this. He gave his phone number in case someone wanted to contact him. **7/2/98, 4:12 pm: Message from Steve Mohyla of Ophelia, VA** requesting to be placed on the mailing list and submitting a formal complaint regarding a sonic boom that occurred at 3:41 pm earlier that day. This boom shook his entire house and was very disturbing. He has contacted Congressman Bateman and is planning to notify Senator Warner. He wants to be notified by someone from Pax River [804-453-7535].
7/3/98	**7/3/98, 12:17 pm: Message from Bob Burris of Easton, MD.** He was calling to confirm that nothing has changed with the sportsmen's recommendations when duck season starts near Bloodsworth Island.
7/6/98	**7/6/98, 1:46 pm: Message from James Smith of Burgess, VA** requesting to be placed on the mailing list and stating his opposition to overflights in the Northumberland County area. He is against the overflights since they are very noisy, are in the area for several hours at a time, and pose a safety threat (crash potential) for the community. He feels that the flights should be restricted to the Pax River area.
7/7/98	**7/7/98, 1:06 pm: Message from George Frischkorn of Lottsburg, VA**, who lives near Glebe Creek off the Coan River. After a previous conversation earlier today with Kelly Burdick, he called to say that he is in favor of increased air operations. He feels that the flights are no more of a bother than personal watercraft or the local lawnmower brigade!
7/8/98	**7/8/98, 11:24 am: Message from Mrs. Lloyd Abell of Valley Lee, MD.** She and her husband strongly object to increased flight hours in St. Mary's County.

Date	Messages
7/9/98	**7/9/98, 12:33 pm: Message from Don MacLeod of Heathsville, VA**. Upon reading comments in the local newspapers, he feels that many people have misinterpreted the difference between "sound" and "noise." He defined sound as beneficial and something that is necessary to do a project. Noise, on the other hand, is unnecessary (such as car horns or loud radios). He said the public is complaining about necessary air flights and wonders what they will complain about next. Will they complain about the watermen and their boats that are out at 6 am and disturbing their tranquility? Or perhaps all the farmers with their noisy tractors? He feels that these two examples illustrate sounds because the watermen and farmers are simply making a living, and therefore are not producing noise. He stressed that the military should make whatever sounds they want in their pursuit of protecting Americans. **7/9/98, 3:31 pm: Message from Rae Thompson of St. Mary's City, MD.** Although they [assuming she and her husband] were unable to attend any of the public hearings, they wanted to offer their support. They live close to Pax River (they are retired from there). They realize the importance of the activities and flights and are in support of the proposed action. **7/9/98, 4:30 pm: Message from Bill Cowardin of Reedville, VA.** He called to announce that another large boom had occurred just minutes before. He feels as if the Navy has already started their flight increases, and wants to know instead when the flights will decrease.
7/10/98	**7/10/98, 10:21 am: Message from Molly McDaniels of Preston, MD.** She suggested updating the recording to the new 7/29 comment period deadline. She is opposed to increases in any of the operations or flyovers in the area, stating that there are already enough jets coming from the Martins and Dover bases. If Pax River decides to increase their flights, too, then there will no longer be anymore peace and serenity in the area.
7/13/98	**7/13/98, 12:33 pm: Message from Mrs. Delores N. Huguley, of 24309 North Patuxent Beach Road.** She is against any increase in flights. Her house is in a flight pattern with many low-flying aircraft. Also, all the jet fuel in the air is turning her white house a dingy grey color. She wishes Pax would disseminate the flights somewhere else, or at least fly away from her house. **7/13/98, 6:53 pm: Message from Lloyd Dietrich of Kilmarnock, VA** requesting to be placed on the mailing list.
7/14/98	No new messages

Date	Messages
7/15/98	**7/15/98, 1:08 pm: Message from Jim Blankenship of Reedville, VA** who is opposed to any of the proposed expansion [increases]. He has had one window broken in his house, and heard 4 sound blasts today alone. He feels the Navy should keep their flights out over the Bay or practice elsewhere. **7/15/98, 2:24 pm: Message from an anonymous resident of Reedville, VA** who thinks the program stinks! He wants no more noise in the Northumberland County area, and feels the Navy should "play" out at sea instead. He mentioned a class action suit in Virginia Beach that goes into effect today and prohibits similar actions. He constantly hears loud booms, and has had damage to both his house and sea wall. Reedville is a quiet community with many retired people who do not need the Navy to destroy their peace. This just results in hard feelings toward the Navy. He feels that NAS Pax River is not even needed since we are not at war and have ample facilities in Norfolk, Washington, DC, Florida, and all over the east coast. The other installations are the only ones that are needed in order to make his community quieter and its residents happier. **7/15/98, 4:28 pm: Message from Janet Westberg of Northumberland County.** Sonic booms near her house have destroyed many of her windows and damaged the crown moldings in several rooms. Not only is it expensive to make replacements, it is a constant process. She wants the Navy to stop causing changes to her home.
7/16/98	No new messages
7/17/98	**7/17/98, 10:08 am: Message from Walter Kooker of Reedville, VA** requesting a copy of the DEIS. **7/17/98, 5:48 pm: Message from Carrie Toole of Ultra Systems Environmental, Inc. of Irvine, CA** requesting a copy of the DEIS.
7/20/98	**7/20/98, 2:19 pm: An anonymous caller** left a four digit number. **7/20/98, 2:23 pm: An anonymous caller** left an expletive.
7/21/98	No new messages
7/22/98	No new messages

Date	Messages
7/23/98	**7/23/98, 9:40 am: Message from Neil Carrigan of Northumberland County, VA.** He attended the public hearing on June 17, 1998 in Northumberland County and saw the video on the noise levels. He doesn't agree with the acceptable level of sound and the way it is measured (the Day-Night Average). He feels that the average doesn't work; it can be very noisy during the day -- 130 dB -- and very quiet at night -- 0 dB, and this would still average to 65 dB over the 24 hour period. This doesn't seem quite right. He is also upset with the drones. They fly over his house all the time. The engine noise is bothersome. Since the engine noise is not necessary for training, he would think that the muffler could be improved. He needs to turn on the radio inside his house in order to drown out the noise. When he is outside, the sound is annoying, and there is nothing he can do about it. In terms of noise, the sonic booms don't bother him even though they are very loud. However, several of the sliding glass doors on his house have had their thermal seals broken by the sonic booms. The glass then clouds up and you can't see through them. To replace the glass in the doors costs about $100 each. And, since the meeting on June 17, 1998, there has been a noticeable increase in the amount of jet overflights in their area. He wants to know why these exercises cannot be done over the ocean or someplace where no people live underneath. He is wondering if the increase in overflights is the Navy's way of retaliating for all of the noise complaints received at the public hearings. This is what he believes. If we need to contact him, his telephone number is (804) 453-4710. His address is: P.O. Box 478, Burgess, VA 22432. He would like to hear back in one way or another about how the 65 dB level was chosen.
7/24/98	**7/24/98, 9:24 am: Message from Joe Powell of Reedville, VA** who stated that the noise wouldn't occur if the Navy went out to sea like they do in Virginia Beach. He doesn't see a need for the Naval Air Station since we don't have an emergency. He moved to Reedville to retire and doesn't need the noise. Virginia Beach doesn't have it that way. **7/24/98, 3:10 pm: An anonymous caller** left an expletive.
7/27/98	**7/27/98, 10:02 am: An anonymous female caller** stated she finds the noise in her area very disturbing. She is unhappy because she moved out to the country to escape noise.
7/28/98	**7/28/98, 9:42 am: Message from Helen and David Vance of Heathsville, VA** requesting written material on the project. They are strongly opposed to the proposed actions, especially the drones. They feel that the persistent droning is detrimental to their rural lifestyle in Northumberland County. **7/28/98, 11:01 am: Message from George L. Perry of Heathsville, VA.** He lives on Blackwell's Creek off the Great Wicomico River, west of the Route 200 bridge. He feels the droning aircraft noise is bad enough now, but if the flights increase, then the noise will become intolerable. He said that planes circle over his house, and about 1-2 years ago one crashed only about 1 mile away. Because of the persistent noise of the drones, it is difficult to read a book or listen to music.

Date	Messages
7/29/98 **DEIS COMMENT PERIOD ENDS**	**7/29/98, 9:32 am: Message from William DeLavergne of Heathsville, VA.** He is concerned about the frequency of unmanned flights (drones) over the Burgess, VA/Great Wicomico River area. He feels the flights are very annoying and that they should be decreased considerably. His address and other comments are on file from last year. **7/29/98, 3:29 pm: Message from Leonard Eggert of Heathsville, VA** requesting to be placed on the mailing list.

COMMENTS FROM FEDERAL AGENCIES AND OFFICIALS

COMMENTOR F-1

STENY H. HOYER
5TH DISTRICT, MARYLAND

CO-CHAIR
DEMOCRATIC STEERING COMMITTEE

COMMISSION ON SECURITY AND
COOPERATION IN EUROPE

Congress of the United States
House of Representatives
Washington, DC 20515–2005

APPROPRIATIONS COMMITTEE

TREASURY, POSTAL SERVICE,
GENERAL GOVERNMENT

LABOR,
HEALTH AND HUMAN SERVICES,
EDUCATION

STATEMENT OF CONGRESS STENY HOYER ON THE PATUXENT RIVER NAVAL AIR STATION DRAFT ENVIRONMENTAL IMPACT STATEMENT:

June 10, 1998

1 At a time when Congress is committed to a balanced budget, federal agencies like the Navy are challenged to work more cost-efficiently. This Environmental Impact Statement will help the Navy at Patuxent River work more cost-efficiently and remain competitive as it works to preserve its business base in the face of declining DoD funding.

Currently, other federal agencies and industry are looking for places to do aircraft research, development, testing, and evaluation. The EIS presented here today by the Navy, positions the Patuxent River Complex to accept this work when requests come in and still assure that the needs of the community are considered, and the beautiful environment of Southern Maryland is protected.

I know that currently, Pax River undertakes environmental assessments and impact statements as each new operation arises. That process is an expensive, time-consuming way to do business. With this comprehensive EIS, the Complex will have an umbrella for operations, so that doing business here in Southern Maryland is simple, timely and less expensive to users and done in a responsible manner. That is a smart approach for Navy and other DoD customers who use Pax River, and it attempts to utilize these government assets efficiently and cost effectively.

This process is also very good for Southern Maryland. In today's budget environment, less efficient government facilities will be closed. As I have said many times, if this base is not growing, it will be going. We will face another round of base closings and if the Navy does not remain competitive at Pax, the work will go elsewhere. I am proud to endorse this undertaking by Pax River, for it represents another example of the serious approach taken by the Navy as a steward of their local environment and the greater Chesapeake Bay region. The Navy has demonstrated its strong commitment to performing its mission without harming our environment in this region and has received recognition from the Secretary of Defense for their exemplary record. I look forward to working with them to continue the excellent partnership they have established local communities. This is a very important process for the future of this installation and it is important to ~~the~~ both our local economy and to our environment.

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Custom House, Room 244
200 Chestnut Street
Philadelphia, Pennsylvania 19106-2904

IN REPLY REFER TO:

June 12, 1998

ER 98/315

Ms. Sue Evans
Naval Air Warefare Center, Aircraft Division
c/o Office of legal Counsel
47031 Liljencrantz Road, Bldg. 435, MS 39
Patuxent River, MD 20670-5440

Dear Ms. Evans:

1 Thank you for coordinating with the Department of the Interior (Department) concerning the draft Environmental Impact Statement (DEIS) - Increased Flight and Related Operations in the Patuxent River Complex, Patuxent River, Maryland.

The Department has no comment concerning the DEIS.

Again, thank you for providing the Department with the opportunity to review the draft document.

Sincerely,

Michael T. Chezik

Michael T. Chezik
Acting Regional Environmental Officer

COMMENTOR F-3

From: "Pittman, William LT" <WPittman@comdt.uscg.mil>
To: "'paxriver@tamsconsultants.com'" <paxriver@tamscon...
Date: 6/18/98 3:56pm
Subject: NO COMMENTS AFTER REVIEW OF YOU DEIS

1 Dear Staff Member:
Recently you sent copies of the Draft Environmental Impact Statement (DEIS) on Flight and Related Operations in the Patuxent River Complex at Patuxent River, Maryland. We have reviewed the DEIS and related documents and have no comments to offer.
Thank you for providing the Coast Guard the opportunity to review the report.

W. Michael Pittman
U.S. Coast Guard
G-MOR-1
202 267-0426 ph
202 267-4085 fax

99 International Oil Spill Conference

CC: "Whitson, William CDR" <WWhitson@comdt.uscg.mil>

COMMENTOR F-4

U.S. Department
of Transportation
**Federal Aviation
Administration**

800 Independence Ave., S.W.
Washington, D.C. 20591

JUL 29 1998

Ms. Sue Evans and
Ms. Kelly Burdick
c/o Office of Legal Counsel
47031 Liljencrantz Road
Bldg. 435, MS 39
Patuxent River, MD 20670-5440

Dear Ms. Evans and Ms. Burdick:

Please see the enclosed comments on the Draft Environmental Impact Statement (EIS) on related operations in the Patuxent River Complex.

If you have any questions or concerns, please contact Dr. Ann Hooker, Environmental Specialist, Office of Environment and Energy at, (202) 493-4018.

Sincerely,

William W. Albee

William W. Albee
Manager, Policy and Regulatory Division
Office of Environment and Energy

Enclosure

FAA Office of Environment and Energy

<u>Comments on Draft Environmental Impact Statement</u>: Increased Flight and Related Operations in the Patuxent River Complex, Patuxent River, Maryland, Department of the Navy, May 1998

We suggest that the Navy disclose whether and how it will mitigate the significant impact
4 of noise above 65 dNL on the more than 150 additional households that will be affected
eventually by the proposed action. That is, will the Navy soundproof the homes, relocate
affected populations, acquire development rights, or any one of several other possible
measures?

We also suggest that the Navy, in consultation with the Coast Guard and possibly also
MARAD, consider potential impacts, including safety risks and disruption, to commercial
5 shipping in the Chesapeake Bay. For example, some ships carry explosive fuels. We
also suggest that more information be provided about the nature of the disruption to
recreational boating and other forms of recreation (e.g., how many hours a day, how
6 many days a week each month the indicated areas would be closed, and how the clear
zones relate to the shipping channel). Similarly, how will the activities be scheduled to
avoid impacts on migratory bird and marine mammal seasonal activities and the risk of
7 wildlife to aircraft and persons and property on the ground (or in the Bay)? Will a
wildlife hazard mitigation plan be developed? What are the emergency response
resources in the area? We have forwarded the DEIS to Ed Cleary, Biologist (Wildlife
8 Hazards), FAA Office of Airport Safety and Standards, AAS-300, and to the Bill Marx,
Manager, Environmental Programs, Air Traffic Air Space Management, ATA-300, for
review.

We also suggest that once the Navy has begun consultation with Fish and Wildlife
Service and the National Marine Fisheries Service, it disclose in greater detail, possibly
9 as an appendix, the cumulative effects of the remnant ordinance, fuel dumping, and other
activities on marine flora and fauna, especially crabs and other animals in the upper levels
of the food chain.

HERBERT H. BATEMAN
1st DISTRICT, VIRGINIA

COMMITTEES:
NATIONAL SECURITY
CHAIRMAN, SUBCOMMITTEE ON MILITARY READINESS
CHAIRMAN, MERCHANT MARINE PANEL
MEMBER, SUBCOMMITTEE ON RESEARCH AND DEVELOPMENT
MEMBER, MORALE, WELFARE AND RECREATION PANEL
TRANSPORTATION AND INFRASTRUCTURE
MEMBER, SUBCOMMITTEE ON SURFACE TRANSPORTATION
MEMBER, SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT

CO-CHAIRMAN, CONGRESSIONAL AVIATION AND SPACE CAUCUS

Congress of the United States
House of Representatives
Washington, DC 20515–4601

2350 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515–4601
(202) 225–4261

DISTRICT OFFICES:
739 THIMBLE SHOALS BLVD.
NEWPORT NEWS, VA 23606–2545
(757) 873–1132

4712 SOUTHPOINT PARKWAY
FREDERICKSBURG, VA 22407
(540) 898–2975

BOX 447
ACCOMAC, VA 23301–0447
(757) 787–7836

IN VA CALL TOLL FREE
1–800–354–5527

COMMENTOR F-5

July 6, 1998

M. Sue Evans
Office of Legal Counsel
Naval Air Warefare Center
Patuxent River, Maryland

1

Dear Ms. Evans:

My office continues to receive complaints from residents of Northumberland County, Virginia as well as the Reedville area about sonic booms that cause their homes to vibrate and alarm families. In the past it has appeared that these booms were the result of aircraft operating from your facility.

My residents of this area attended a recent public hearing to complains about sonic booms and to protest any increase in flights from Pax River.

I am writing once again to urge that action be taken to minimize to the slightest degree possible the sonic booms that sometimes cause property damage and certainly cause alarm. Please direct your response to my Fredericksburg District Office listed above. The contact is John Goolrick. I would also be interested in knowing the nature of the sentiment on this issue once the July 19 deadline for receiving comments passes.

Sincerely,

Herbert H. Bateman

Herbert H. Bateman
Member of Congress

HHB: sk

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

JUL 29 1998

Ms. Sue Evans
c/o Office of Legal Counsel
Naval Air Warfare Center Aircraft Division
47031 Liljencrantz Road, Building 435, MS 39
Patuxent River, MD 20670-5440

Re: Increased Flight and Related Operations in the Patuxent River Complex, Patuxent River, Maryland

Dear Ms. Evans:

In accordance with the National Environmental Policy Act of 1969 and Section 309 of the Clean Air Act, the U.S. Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) for the above referenced project. EPA has assigned this DEIS a rating of EC-2 (Environmental Concerns/Insufficient Information), which indicates that we have environmental concerns regarding the proposal and that there is insufficient information in the document to fully assess the environmental impacts of the project. A copy of EPA's ranking system is enclosed for your information. The following comments should be addressed in the Final EIS (FEIS).

ALTERNATIVES

1 - It would be helpful to add backgroud information concerning other Naval facilities that could absorb additional flight operations and why they were not studied in greater detail. As it is now presented, the alternative section only presents different operational levels at the Patuxent River Complex.

NOISE

In general, the noise section has some fine examples of providing information that is both useful and understandable. We like the use of color for different DNL levels and particularly like the use of overlay "no action" transparencies. However, we believe that the following noise issues need additional clarification or explanation in the FEIS.

2 - The Onset-Rate Adjusted Day-Night Average Sound Level description in Table 3.6-2 of the noise metric indicates that the difference between this metric and DNL is how the average daily operations are obtained. Are there other differences, since the name implies that the metric is "onset-rate adjusted"?

3 - Figure 2-4 indicates that the total flight hours for 1996 was 20,600 (18400 +1400 + 800), but the "no action" in Table 2-8 indicates only 18,200. There is a difference in the RDT&E flight hours (Table 2-8 shows only 16,000 RDT&E flight hours and Figure 2-4 shows 18,400 RDT&E flight hours).

4 - Table 3.6-5 shows a DNL 57 dB for Lexington Park Elementary School (receptor 21) and DNL 66 dB for the Carver Elementary School (receptor 22). Figure 3.6-8 shows receptor 21 closer to the NAS Patuxent River than receptor 22, yet the DNL levels are higher at receptor 22.

5 - Figure 3.6-3 shows the noise contours for existing flight operations within the Chesapeake Test Range (CTR). Since it is clear that the noise contour near Princess Anne extends outside the CTR, it would be useful to acknowledge this fact and include the extended contours.

6 - Because of the different restricted airspaces involved, it would be useful if the tables that have sensitive receptor data include the minimum altitude at those sites. We believe that this additional data will help clarify some of the projected noise levels.

7 Also, while the use of an average SEL in these tables is understandable (based on the top ten contributors), we believe that this average may be somewhat misunderstood. It may be helpful to also provide the top SEL number.

8 - EPA believes that it would be useful to include some additional flight track information, such as arrival tracks for NAS Patuxent River, both departure and arrival tracks for OLF Webster Field and other high use areas such as near Princess Anne (note contour on Figure 3.6-3).

9 - EPA noticed that on Tables 4.6-5, 4.6-8, 4.6-11 and 4.6-14 titled "Noise Impact and Sensitive Receptor Locations," official nursery schools and day care centers were not listed as sensitive receptors. Is this because these receptors did not fall within the sensitive noise area or because they were not considered?

AIR QUALITY

10 - The emissions impacts from the use of chaff and flares have not been discussed. The largest amount of these units used per operation should be identified as well as stating whether they will create hot spots of pollution in either residential areas or in wildlife areas.

11 - Additional takeoffs and landings should be accounted for in the determination of compliance to the requirements of General Conformity. A table similar to Table 3.5-2 should accompany this discussion.

WATER AND SEDIMENT QUALITY

12 - The use of EMAP data to characterize the benthos in the specific geographic areas is not appropriate. Direct statistically designed comparison measurements should be made in, and adjacent to, the target sites if you intend to draw conclusions about impact from operations.

13 - Page 4.13.3 states that sediment sampling was conducted near the Hooper, Hannibal, and Tangier Island targets within the CTR. The closest sampling point to any of the targets was approximately one mile from the centerpoint of the Hooper Target. This sampling showed sediment concentrations of antimony, arsenic, cadmium, copper, lead, nickel, and zinc at slightly greater than or near the high end of the range of concentrations reported at other stations. Although concentrations in sediments were less than the ER-M thresholds, it would seem more accurate and prudent to test the sediments closer to the target.

14 - Overall, with much less sensitive areas than the Chesapeake Bay available for exersizes which require deploying stores, is there a plan to phase out all releases of these materials in the Bay?

15 - Page 4.12-10 states that "Titanium tetrachloride, based on limited data, can be acutely toxic to some species of algae and zooplankton at concentrations between 2 and 4.6 mg/l." What is the level of concentration of titanium tetrachloride within the stores? We know that the CXU-3 and CXU-4 contain about 1 fluid oz and 2 fluid oz of titanium tetrachloride. The EIS states that rapid dilution of titanium tetrachloride would occur as a result of wave action. However, is there enough wave action occurring at the target sites to allow for rapid dilution? With the proposed increased activity, what is the cumulative impact?

AIRCRAFT OPERATIONS AND SAFETY

16 - It has recently become evident that Navy aircraft had been conducting personnel deployment and recovery exersizes on one of the small Bay islands. MD Department of Natural Resources and U.S. Fish and Wildlife data document many sensitive species rookeries on these islands, making intrusions on them inappropriate. While it is indicated that the specific practice has been halted, the likelihood of similar "inadvertent" impacts will increase as the number and nature of flights, and the kinds of exersizes increase in the future. What are the Navy's plans in this regard?

17 - There is no historical data on aircraft accidents and losses for operations in the study area. Thus, it is not possible to judge risk levels. The Accident Potential Zones over water were not presented even though the potential for small commercial and recreational aircraft being in these areas during operations is significant.

ORDNANCE, HAZARDOUS MATERIALS MANAGEMENT, AND RADIO FREQUENCY SOURCES

18 - The DEIS ordnance data is insufficient to allow evaluation of environmental impact. Stores expended during exersizes do not disappear from the Chesapeake Bay, but despite some corrosion, accumulate indefinitely. Estimates should be provided regarding the overall quantities of Naval stores currently in the target areas, and while current quantities are reported in the DEIS, the projected quantities should be provided for future levels of operations.

19 - What are past and current quantitites of Hg and/or Ni-Cd batteries dropped during operations, and the projections for increased amounts (until they are completely phased out, as is your stated intention)? What is the fate and effect of unexpended propellants from air to sea
20 missiles?

INFRASTRUCTURE

21 - The DEIS does not discuss sewage treatment capacity at the Patuxent River Complex. Section 4.7 title "Infrastructure" states that increased demand for sewer would occur at NAS Patuxent River. Presently, the Patuxent River Complex is treated by the Piney Hill Run Municipal Waste Water Treatment Plant (WWTP). This WWTP is a 3 mgd plant currently discharging about 200,000 lbs/yr of Tn directly into the Chesapeake Bay. (The Plant is scheduled to have BNR by the year 2000.) From 1996 to 1998, an additional 4000 service personnel are projected, which could mean some 20,000 additional people in the area. (Maryland did not account for this expansion in their tributary strategy load which goes down to 75,000 lbs/yr due to BNR addition.) Thus, the added Tn discharged as a result of the expansion should be addressed in the FEIS. (EPA suggests that the Patuxent River Complex obtain a BNR system that would go to 4 mg/l instead of the planned 8 mg/l.)

WILDLIFE AND FISHERIES

22 - The area of fisheries closure is not accurately presented. The bulk of the area under the operations area perimeter is not normally fished intensely. The most active areas include: a) portions where upwelling from deep to shoal water occurs and these are popular with recreational fishers, b) relatively shallow areas where crab-potting occurs, and c) the extensive Bay grass beds where "scrapping" crabs with dredges occurs. The comparison should be made on this basis, so that watermen, dependent on these areas for their livelihood, can make a proper decision. Over the last five years, a serious and unexplained decline has occurred in the extraordinarily important grass beds surrounding Tangier, Smith, South Marsh and Bloodsworth Islands, making these areas especially vulnerable to further insult.

23 - The discussion of potential actual impact strikes on marine-life is not accurately presented. While there may average 3 fish per meter square in summer and 5 fish per meter

SUMMARY OF RATING DEFINITIONS AND FOLLOW UP ACTION*

Environmental Impact of the Action

LO–Lack of Objections
The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC–Environmental Concerns
The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO–Environmental Objections
The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU–Environmentally Unsatisfactory
The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

Adequacy of the Impact Statement

Category 1–Adequate
The EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2–Insufficient Information
The draft EIS does not contain sufficient information for the EPA to fully assess the environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3–Inadequate
EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640 Policy and Procedures for the Review of the Federal Actions Impacting the Environment square in autumn, the probability of impact is increased because of the attraction of fish to the structures in the target areas, and the natural dense schooling of many species in the Bay.

24 - Pages 3.12-12 and 4.12-4 of the DEIS state that the Atlantic sturgeon is being considered for listing as a threatened or endangered species and that it is the largest fish to be found in the Chesapeake Bay. The smaller shortnosed sturgeon which is federally listed as endangered is capable of sustaining populations in the Patuxent River and the Bay. The DEIS states that "the likelihood of a store striking an Atlantic or shortnosed sturgeon would be very unlikely," since they are present in very small numbers. However, the probability still exists and the impacts are great.

ENVIRONMENTAL JUSTICE

25 - The DEIS states that "About 26 percent of the population residing in the land area underlying the CTR belongs to minority groups. About nine percent of families and 12 percent of persons residing within the footprint of the CTR had incomes below the poverty level in 1989." Nine years later it is quite conceivable that this number can be larger. Also, a map depicting where these designated populations exist would be helpful in determining their proximity to the Patuxent Naval Air Station.

GENERAL

26 - The DEIS states that the level of operations proposed by the three Operational Workload Alternatives would be less intensive than the historic high point of Patuxent River operations in the 1970s. The text also states that "As recently as the 1970s, operational levels at NAS Patuxent River were about 28,000 to 30,000 flight hours per year, which is greater than the operational levels that would occur under any of the alternatives." Although this may be true, the surrounding areas may have been altered such that there may now be more people residing in the project area, there may be a larger number of minorities living within the impacted areas, and there may be a greater quantity and a more diverse habitat within the Chesapeake Bay, etc. Thus, this may not be a relative point as the impacts today may be far greater than in 1970.

Thank you for the opportunity to review and comment on this project. The staff contact for this review is Karen Del Grosso; she can be reached at 215-814-2765.

Sincerely,

Roy E. Denmark, Jr.

Roy E. Denmark, Jr., Deputy Director
Office of Environmental Programs

Enclosure

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
One Blackburn Drive
Gloucester, MA 01930-2298

Richard Gallant
Naval Air Warfare Center, Aircraft Division
Mail Stop 3, Building 3176
49040 Cartier Road
NAS Patuxent River
Patuxent River, Maryland 20670

Dear Mr. Gallant:

This pertains to a request by TAMS Consultants, Inc., dated October 2, 1997, for information on protected species under National Marine Fisheries Service (NMFS) jurisdiction, and occurring in the Patuxent River Complex, Chesapeake Test Range for Research, Development, Test and Evaluation (RDT&E) naval aircraft activities. Section 7 of the Endangered Species Act (ESA) requires consultation with federal agencies when listed species are present in the project area.

There are several species of protected sea turtles under NMFS jurisdiction which occur in mid-Atlantic coastal and estuarine waters. Of these, the threatened loggerhead sea turtle (Caretta caretta), and endangered Kemp's ridley sea turtle (Lepidochelys kempi) are present in the project area, and are the most likely species to be encountered within the Chesapeake Test Range. The lower and mid-Chesapeake Bay areas are known to be important developmental habitat for the juvenile stages of the latter species, and individuals are expected to be present from April through November, when water temperatures are at or exceed 11 degrees, Celsius. Other species of sea turtles, including the endangered green sea turtle (Chelonia mydas), and the endangered leatherback sea turtle (Dermochelys coriacea), could also be encountered in the test range area, but only as rare transients.

In addition to sea turtles, NMFS has jurisdiction over one species of finfish that occurs in the Chesapeake Bay region; i.e., the shortnose sturgeon (Acipenser brevirostrum). There is little ecological information on the shortnose sturgeon in the Chesapeake Bay. Since January 1996, there have been 29 documented takes of this species by commercial fishing activities in the Maryland portion of the Bay watershed. Most of these individuals have been caught in the upper Bay region, north of Pooles Island. Two individuals where caught off lower Kent Island, one near Hoopers Island, and a third near the mouth of the Potomac River. Based on this information, NMFS has made a preliminary determination that this species is present in the upper Chesapeake Bay (north of the Lane Memorial Bridge), and in the Potomac River. However, transient individuals may be present in the test range area. The Philadelphia and Baltimore District Offices of the Corps Of Engineers are currently sponsoring field studies on the shortnose sturgeon in the upper Bay and Potomac River as part of the consultation process on several federally sponsored dredging projects. The latter studies should provide more information on the ecology of this species, and allow us to make a more accurate determination on species occurrence throughout the upper and middle Chesapeake Bay regions.

Section 7 of the ESA requires that the federal action agency for this project (i.e., U.S. Navy, Patuxent River Complex) consult with NMFS to evaluate the potential impacts of the proposed activities on protected species. Of the proposed RDT&E activities, only the release of nonexplosive practice bombs into waters of the test range could
1 potentially affect sea turtles and shortnose sturgeon. However, a practice bomb is highly unlikely to result in death or injury to a turtle or sturgeon, and therefore we conclude that the proposed activities are not likely to adversely affect sea turtles or shortnose sturgeon in the test range area. Therefore, no additional consultation with be required with our agency at this time. If project plans change or new information become available that change the basis of this determination, consultation must be reinitiated.

Your letter also requested information on the location of oyster bars and submerged aquatic vegetation (SAV) beds in the test range area. We, therefore, recommend that you contact the following sources to obtain this information.

1) For oyster bar locations, you should contact:

   Dr. Gary Smith, Mapping & Analysis Project, Maryland Department Of Natural Resources, Cooperative Oxford Laboratory, Oxford, MD 21654; (410) 226-5193

2) For SAV bed locations, you should refer to the most recent issues of the publication, "Distribution of submerged aquatic vegetation in the Chesapeake Bay"; published annually by the Virginia Institute Of Marine Science, Gloucester Point, VA. Copies of recent issues of this publication can be obtained by contacting Peter Bergstrom, U.S. Fish & Wildlife Service, Chesapeake Bay Program Office, Annapolis, MD; (410) 573-4554.

If you have questions, or require additional information, you may call John S. Nichols at our Oxford Habitat Office; (410) 226-5771.

Sincerely,

Jon C. Rittgers
Acting Regional Administrator

cc: Haley, Milford
Nichols, Oxford

Janet O'Neill, TAMS Consultants, 2101 Wilson Blvd., Suite #300, Arlington, VA 22201

COMMENTS FROM STATE AGENCIES AND OFFICIALS

COMMENTOR S-1

CHESAPEAKE BAY CRITICAL AREA COMMISSION
45 Calvert Street, 2nd floor
Annapolis, MD 21401

PH: (410) 974-2426 FAX: (410) 974-5338

FACSIMILE TRANSMITTAL

TO: Ms Sue Evans FAX #:

COMPANY: Naval Air Warfare Center

FROM: Tracy Batchelder NUMBER OF PAGES SENT: 2 (w/cover)
Critical Area Commission

DATE: 5/26/98 TIME:

REMARKS:

① The Chesapeake Bay Critical Area Commission has no comments on this project at this time. Thanks for the opportunity to comment.

If you do not receive all of the pages, please contact us as soon as possible at (410) 974-2426.

MARYLAND *Office of Planning*

Parris N. Glendening
Governor

Ronald M. Kreitner
Director

May 26, 1998

Ms. Kelly Burdick
c/o Office of Legal Counsel
Naval Air Warfare Center, Patuxent Naval Air Station
47031 Liljencrantz Road, Building 435, MS 39
Patuxent River, MD 20670-5440

STATE CLEARINGHOUSE REVIEW PROCESS

Reply Due Date:	June 19,1998
State Application Identifier:	MD980520-0481
Project Description:	Draft Environmental Impact Statement - Increased Flight and Related Operations in the Patuxent River Complex - St. Mary's County. Includes Record of Non-Applicability of General Conformity Rule to Clean Air Act
State Clearinghouse Contact:	Bob Rosenbush

Dear Ms. Burdick:

1 This letter acknowledges receipt of the referenced project. We have initiated the Maryland Intergovernmental Review and Coordination Process (MIRC) as of the date of this letter. You can expect to receive review comments and recommendations on or before the reply date indicated. Please place the State Application Identifier Number on all documents and correspondence regarding this project.

This project has been sent to the following agencies or jurisdictions for comment: The Maryland Departments of Agriculture, Budget and Management, Business and Economic Development, Environment, Health and Mental Hygiene, Housing and Community Development including the Maryland Historical Trust, Natural Resources, Public Safety and Correctional Services, Transportation, the Maryland Military Department, and the University of Maryland System; the Counties of Calvert, Caroline, Dorchester, Somerset, St. Mary's, Talbot, Wicomico, and Worcester, the Cities of Cambridge, Crisfield, and Salisbury; the Towns of Denton, Easton, Federalsburg; La Plata, Leonardtown, Princess Anne, and Snow Hill; and the Maryland Office of Planning.

Your participation in the MIRC process helps to ensure that this project will be consistent with the plans, programs, and objectives of State agencies and local governments. Issues resolved through this process enhance the opportunities for project funding and minimize delays during project implementation.

If you need assistance or have questions concerning this review, please contact the staff person noted above. Thank you for your cooperation.

Sincerely,

Linda C. Janey

Linda C. Janey, J.D.
Manager, Clearinghouse & Plan Review Unit

LCJ:BR:vh

301 West Preston Street • Baltimore, Maryland 21201-2365
State Clearinghouse: (410) 767-4490 Fax: 767-4480

COMMENTOR S-2

Parris N. Glendening
Governor

Maryland Department of Natural Resources
ENVIRONMENTAL REVIEW
Tawes State Office Building, B-3
Annapolis, Maryland 21401

John R. Griffin
Secretary

Carolyn D. Davis
Deputy Secretary

May 20, 1998

RECEIVED

MAY 26 1998

CHESAPEAKE BAY
CRITICAL AREA COMMISSION

Memorandum

To: Meredith Lathbury, CCWS, EBPGM
Mike Slattery, FWHS
Arnold Norden, LWCS
Wanda Cole, LWCS
Regina Esslinger, CBCAC
Sgt. Robert Davis, NRP

From: RCD
Ray C. Dintaman, Jr., Director, Environmental Review Unit

Subject: Draft Environmental Impact Statement - Increased Flight and Related Operations in the Patuxent River Complex, Patuxent River, Maryland - Department of the Navy - May 1998.

Please review the attached information and send any comments you may have relative to the Department's concern to me by June 12, 1998. If you need to review the full report, please call me.

Please complete the following and return this memorandum with your response:

Check one:

____ Comments are attached.

✓ No comments.

Tracy Batchelder
Signature

CB Critical Area Commission
Agency

If no comments are received by June 12, 1998, it will be assumed that you have none.

RCD:red
Attachment

COMMENTOR S-2

MARYLAND *Office of Planning*

Parris N. Glendening
Governor

Ronald M. Kreitner
Director

MEMORANDUM

Please complete this form and return it to the State Clearinghouse upon receipt of notification that the project has been approved or not approved by the approving authority.

TO: Maryland State Clearinghouse
Maryland Office of Planning
301 West Preston Street
Room 1104
Baltimore, MD 21201-2365

DATE: ____________________
(Please fill in the date form completed)

FROM: ____________________
(Name of person completing this form.)

PHONE: (____) ____________
(Area Code & Phone number)

RE: **State Application Identifier:** MD980520-0481
Project Description: Draft Environmental Impact Statement - Increased Flight and Related Operations in the Patuxent River Complex - St. Mary's County, Includes Record of Non-Applicability of General Conformity Rule to Clean Air Act

PROJECT APPROVAL

This project/plan was:

☐ Approved ☐ Approved with Modification ☐ Disapproved

Name of Approving Authority:	Date Approved:

FUNDING APPROVAL

The funding (if applicable) has been approved for the period of

____________________, 199___ to ____________________, 199___ as follows:

Federal:	Local:	State:	Other:
$	$	$	$

OTHER

☐ Further comment or explanation is attached

301 West Preston Street • Baltimore, Maryland 21201-2365
State Clearinghouse: (410) 767-4490 Fax: 767-4480

James S. Gilmore, III
Governor

John Paul Woodley, Jr.
Secretary of Natural Resources

David G. Brickley
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

217 Governor Street, 3rd Floor
TDD (804) 786-2121 Richmond, Virginia 23219 (804) 786-7951 FAX (804) 371-2674
http://www.state.va.us/~dcr/vaher.html

June 11, 1998

Kelly Burdick
Office of Legal Counsel
47031 Liljencrantz Road, Bldg. 435, MS 39
Patuxent River, MD 20670-5440

Re: Increased Flight and Related Operations in the Patuxent River Complex

Dear Ms. Burdick;

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biological and Conservation Data System (BCD) for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered species, unique or exemplary natural communities, and significant geologic formations.

1

Please find attached a list of the natural heritage resources that have been documented in the project area. An explanation of species rarity ranks and legal status abbreviations is enclosed for your reference.

The Peregrine Falcon nests on cliffs, bluffs, talus slopes, old tree hollows, and abandoned nests of other birds of prey (Byrd, 1991). Currently, nesting pairs in Virginia use artificial structures such as tall buildings, bridge supports, and towers (Byrd, 1991). This species was once extirpated from Virginia, but breeding pairs now occur on the coastal plain.

Bald Eagle nest sites are often found in the midst of large wooded areas near marshes or other bodies of water (Byrd, 1991). Threats to this species include human disturbance of nest sites and development of feeding and breeding areas (Byrd, 1991).

The Northeastern tiger beetle inhabits wide, highly dynamic, sandy beaches with back beach vegetation along the Chesapeake Bay. Threats to this species include shoreline development, beach stabilization, high recreational use, pesticides, and natural events including winter beach erosion, flood tides, and hurricanes (Knisley, 1991).

Due to the status of the Peregrine Falcon, Bald Eagle, and Northeastern beach tiger beetle, DCR recommends coordination with the United States Fish and Wildlife Service (USFWS) and the

Virginia Department of Game and Inland Fisheries (VDGIF) to ensure compliance with protected species legislation.

Any absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks additional natural heritage resources. New and updated information is continually added to BCD. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

Should you have any questions or concerns, feel free to contact me at 804-371-2708. Thank you for the opportunity to comment on this project.

Sincerely,

Crystal D. Vance for

Lesa S. Berlinghoff
Project Review Coordinator

cc: Cindy Schulz, USFWS
Rebecca Wadja, VDGIF
Ray Fernald, VDGIF

DEPARTMENT OF CONSERVATION & RECREATION
DIVISION OF NATURAL HERITAGE

NATURAL HERITAGE RESOURCES AT
PATUXENT RIVER COMPLEX

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	STATE RANK	FEDERAL STATUS	STATE STATUS
* BIRDS					
FALCO PEREGRINUS	PEREGRINE FALCON	G4	S1	E(S/A)	LE
HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	G4	S2	LT	LT
* INVERTEBRATES					
CICINDELA DORSALIS DORSALIS	NORTHEASTERN BEACH TIGER BEETLE	G4T2	S2	LT	
* NON-VASCULAR PLANTS					
SPHAGNUM TORREYANUM	TORREY'S PEATMOSS	G3G4	S2		
* VASCULAR PLANTS					
LUDWIGIA BREVIPES	LONG BEACH SEEDBOX	G4G5	S2		
MATELEA DECIPIENS	OLD-FIELD MILKVINE	G5	S1		
THELYPTERIS SIMULATA	BOG FERN	G4G5	S1S2		

Records Processed

Literature Cited

Byrd, M.A. 1991. Bald eagle. In Virginia's Endangered Species: Proceedings of a Symposium. K. Terwilliger ed. The McDonald and Woodward Publishing Company, Blacksburg, Virginia. Pp. 499-501.

Byrd, M.A. 1991. Peregrine falcon. In Virginia's Endangered Species: Proceedings of a Symposium. K. Terwilliger ed. The McDonald and Woodward Publishing Company. Blacksburg, Virginia. Pp. 499-501.

Knisley, C.B. 1991. Northeastern beach tiger beetles. In Virginia's Endangered Species: Proceedings of a Symposium. K. Terwilliger ed. The McDonald and Woodward Publishing Company, Blacksburg, Virginia. pp. 233-234.

Virginia Department of Conservation and Recreation
Definition of Abbreviations Used in Natural Heritage Resource Lists

Natural Heritage Ranks

The following ranks are used by the Virginia Department of Conservation and Recreation to set protection priorities for natural heritage resources. Natural Heritage Resources, or "NHR's," are rare plant and animal species, rare and exemplary natural communities, and significant geologic features. The primary criterion for ranking NHR's is the number of populations or occurrences, i.e. the number of known distinct localities. Also of great importance is the number of individuals in existence at each locality or, if a highly mobile organism (e.g., sea turtles, many birds, and butterflies), the total number of individuals. Other considerations may include the quality of the occurrences, the number of protected occurrences, and threats; however, the emphasis remains on the number of populations or occurrences so that ranks will be an index of known biological rarity.

S1 Extremely rare and critically imperiled, with 5 or fewer occurrences or very few remaining individuals in Virginia; or because of some factor(s) making it especially vulnerable to extirpation in Virginia.

S2 Very rare and imperiled, with 6 to 20 occurrences or few remaining individuals in Virginia; or because of some factor(s) making it vulnerable to extirpation in Virginia.

S3 Rare to uncommon in Virginia with between 20 and 100 occurrences; may have fewer occurrences if found to be common or abundant at some of these locations; may be somewhat vulnerable to extirpation in Virginia.

S4 Common and apparently secure, with more than 100 occurrences; may have fewer occurrences with numerous large populations.

S5 Very common and demonstrably secure in Virginia.

SH Historically known from Virginia, but not verified for an extended period, usually > 15 years.

SU Status uncertain, often because of low search effort or cryptic nature of the element.

SX Apparently extirpated from Virginia.

S#B Breeding status of an animal within Virginia.

S#N Non-breeding status within the state. Usually applied to winter resident species.

Global ranks are similar, but refer to a species' rarity throughout its total range. Global ranks are denoted with a "G" followed by a character. Note that GA and GN are not used and GX means apparently extinct. A "Q" in a rank indicates that a taxonomic question concerning that species exists. Ranks for subspecies are denoted with a "T". The global and state ranks combined (e.g. G2/S1) give an instant grasp of a species' known rarity. ***These ranks should not be interpreted as legal designations.***

Federal Legal Status

The Division of Natural Heritage uses the standard abbreviations for Federal endangerment developed by the U.S. Fish and Wildlife Service, Division of Endangered Species and Habitat Conservation.

LE - Listed Endangered - threatened with extinction throughout all or a significant portion of its range
LT - Listed Threatened - likely to become endangered in the foreseeable future
PE - Proposed Endangered   **PT** - Proposed Threatened
E(S/A) - treat as endangered because of similarity of appearance   **T(S/A)** - treat as threatened because of similarity of appearance
C - Candidate - enough information is available to propose for listing, but listing is "precluded by other pending proposals of higher priority"

State Legal Status

The Division of Natural Heritage uses similar abbreviations for State endangerment.

LE - Listed Endangered   LT - Listed Threatened
SC - Special Concern - animals that merit special concern according to VDGIF (not a regulatory category)

For information on the laws pertaining to threatened or endangered species, contact:

U.S. Fish and Wildlife Service for all FEDERALLY listed species
Virginia Department of Agriculture and Consumer Services Plant Protection Bureau for STATE listed plants and insects
Virginia Department of Game and Inland Fisheries for all other STATE listed animals

MARYLAND DEPARTMENT OF THE ENVIRONMENT
2500 Broening Highway • Baltimore Maryland 21224
(410) 631-4120

Parris N. Glendening
Governor

Jane T. Nishida
Secretary

July 14, 1998

Ms. Sue Evans
c/o Office of Legal Counsel
47031 Liljencrantz Road
Building 435, MS 39
Patuxent River MD 20670-5440

MDE Identifier Number:	ES980520-0016
State Application Identifier:	MD980520-0481
Project Description:	Increased Flight and Related Operations in the Patuxent River Complex

Dear Ms. Evans:

Thank you for providing the Maryland Department of the Environment (MDE) with the opportunity to comment on the above-referenced project. Copies of the documents were circulated throughout MDE for review, and it has been determined that this project is consistent with MDE's plans, programs and objectives.

1

Again, thank you for giving MDE the opportunity to review this project. If you have any questions or need additional information, please feel free to call me at (410) 631-3656.

Sincerely,

Steven Bieber

Steven Bieber
MDE Clearinghouse Coordinator
Technical and Regulatory Services Administration

cc: Bob Rosenbush, State Clearinghouse

COMMONWEALTH *of* VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 10009, Richmond, Virginia 23240
Fax (804) 698-4500 TDD (804) 698-4021
http://www.deq.state.va.us

James S. Gilmore, III
Governor

John Paul Woodley, Jr.
Secretary of Natural Resources

Dennis H. Treacy
Director

(804) 698-4000
1-800-592-5482

July 29, 1998

Ms. Sue Evans
Department of the Navy
c/o Office of Legal Counsel
Naval Air Warfare Center, Aircraft Division
47031 Liljencrantz Road, Building 435, MS 39
Patuxent River, Maryland 20670-5440

RE: Draft Environmental Impact Statement and Finding of No Significant Impact for the proposed Increased Flight and Related Operations in the Patuxent River Complex, Patuxent River, Maryland proposed by the Naval Air Warfare Center, Aircraft Division (NAWCAD).

Dear Ms. Evans:

The Commonwealth of Virginia has completed its review of the Draft Environmental Impact Statement of the above referenced project. The Department of Environmental Quality is responsible for coordinating Virginia's review of federal environmental documents and responding to appropriate federal officials on behalf of the Commonwealth. The following agencies and planning district commission took part in this review:

Department of Environmental Quality
Department of Conservation and Recreation
Marine Resources Commission
Virginia Institute of Marine Sciences
Hampton Roads Planning District Commission.

In addition, the Department of Historic Resources, Department of Game and Inland Fisheries, Department of Aviation, and Northern Neck and Accomack-Northampton Planning District Commissions were invited to comment.

Ms. Sue Evans
Page 2

The Draft EIS identifies and evaluates the potential environmental impacts of increasing flight and related ground operations in test areas of the Patuxent River Complex that are controlled and scheduled by NAWCAD. The complex includes all the flight and ground test facilities at NAS Patuxent River and OLF Webster Field Annex, as well as the restricted airspaces, aerial and surface firing range, and targets (Hooper, Hannibal, and Tangier Island) comprising the Chesapeake Test Range. The DEIS assesses the impacts of the no action alternative with the current 18,400 flight hours annually and three workload alternatives with increases in baseline operations ranging from 2,500 to 6,200 annual flight hours.

1 The Commonwealth of Virginia has no objection to the proposed project provided it is carried out in strict accordance with all applicable federal, state, and local regulations. The Commonwealth concurs with the Navy's "finding of no significant impact" on the environment.

Environmental Impacts and Mitigation

2 *1. Water Quality.* Although the impacts on water quality from the release of stores, munitions, and flares are expected to be localized, potential adverse impacts must be minimized. Therefore, we discourage the (i) use of Ni-Cd batteries in store telemetry units, (ii) use of large quantities of small arms rounds in the Chesapeake Bay target areas to prevent bioaccumulation effects of lead in aquatic organisms; and (iii) release of aircraft fuel especially in recreational and environmentally sensitive areas located in the Chesapeake Bay Rest Range. We commend the Navy for its response to concerns previously expressed pertaining to the use and recovery of Ni-Cd batteries and other nonrecoverable stores used in the three target ranges. The Stores Database and the move away from Ni-Cd batteries, when fully implemented, should significantly reduce potential adverse impacts of these pollutant sources to water quality and benthic organisms.

3 *2. Air Quality.* DEQ-Air Division indicated that if the flights and testing are extended outside of the Chesapeake Test Range to include Northern Virginia or the Tidewater area, air quality issues discussed in the DEIS should be re-evaluated and air conformity determination provided (see detailed comments). For clarification of comments on air conformity, contact Dona Huang at (804) 698-4405.

4 *3 Natural Heritage Resources.* According to the information in the files of the Department of Conservation and Recreation's Division of Natural Heritage (DNH), there are several natural heritage resources within the project area (detailed comments are attached). Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations. The species present include: (1) Peregrine Falcon (**Falco peregrinus**), (2) Bald Eagle (**Haliaeetus leucocephalus**), (3) Northeastern Beach Tiger Beetle (**Cicindela dorsalis dorsalis**), (4) Torrey's Peatmoss (**Sphagnum torreyanum**), (5) Long Beach Seedbox (**Ludwigia brevipes**), (6) Old-field Milkvine (**Matelea decipiens**), and (7) Bog Fern (**Thelypteris simulata**). The DNH recommends coordination with the U.S. Fish and Wildlife

Service and the Department of Game and Inland Fisheries, Raymond T. Fernald at (804) 367-1000 to ensure compliance with protected species legislation. For updated natural heritage resource information, please contact the DNH at (804) 786-7951 if this project is not implemented soon.

5 *4. Solid and Hazardous Wastes.* All solid or hazardous wastes generated at the site during construction should be reduced at the source, re-used, or recycled. All solid waste, hazardous waste, and hazardous material must be managed in accordance with all applicable federal, state, and local environmental regulations. For more information, contact DEQ-Tidewater Regional Office at (757) 518-2000.

6 *5. State Scenic River and Scenic Byways.* The Department of Conservation and Recreation has indicated that this project will not affect any streams on the National Park Service Nationwide Inventory, Final List of Rivers, or existing or potential State Scenic Rivers. Nor will the project affect existing or potential State Scenic Byways.

7 *6. Pesticides and Herbicides.* The use of herbicides or pesticides for landscape maintenance should be in accordance with the principles of integrated pest management. The least toxic pesticides that are effective in controlling the target species should be used. We recommend that the use of pesticides containing volatile organic compounds as their active ingredient be avoided to the maximum extent practicable in order to protect air quality. Please contact the Department of Agriculture and Consumer Services at (804) 786-3501 for more information.

8 *7. Federal Consistency Determination.* Pursuant to the Coastal Zone Management Act of 1972, as amended, the proposed action must be consistent, to the maximum extent practicable, with the Virginia Coastal Resources Management Program (VCRMP). Based on the information provided in the Draft EIS (page 4.1-2), we concur with Navy's determination that this proposal is consistent with the VCRMP. The Navy must ensure that all the applicable permits and approvals listed under the Enforceable Programs of the VCRMP (Attachment 1) have been addressed prior to commencing this project.

Thank you for the opportunity to review the Draft EIS and FONSI for this undertaking. For clarification of these comments, contact Ellie Irons at (804) 698-4325. We urge your review of the detailed comments of reviewing agencies which are attached.

Sincerely,

Michael P. Murphy, Director
Division of Environmental Enhancement

Enclosures

cc. John R. Davy, Jr., DCR
Dona Huang, DEQ-AAS
Sheri Kattan, DEQ-TRO
Curtis Linderman, DEQ-PRO
Raymond T. Fernald, DGIF
David Dutton, DHR
Robert W. Grabb, VMRC
Thomas A. Barnard, Jr., VIMS
Arthur L. Collins, Hampton Roads PDC

COMMENTOR S-6

COMMONWEALTH of VIRGINIA

James S. Gilmore, III
Governor

John Paul Woodley, Jr.
Secretary of Natural Resources

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 10009, Richmond, Virginia 23240
Fax (804) 698-4500 TDD (804) 698-4021
http://www.deq.state.va.us

Dennis H. Treacy
Director

(804) 698-4000
1-800-592-5482

Enforceable Regulatory Programs comprising Virginia's Coastal Resources Management Program

a. Fisheries Management - The program stresses the conservation and enhancement of finfish and shellfish resources and the promotion of commercial and recreational fisheries to maximize food production and recreational opportunities. This program is administered by the Marine Resources Commission (Virginia Code §28.2-200 to §28.2-713) and the Department of Game and Inland Fisheries (Virginia Code §29.1-100 to §29.1-570).

The State Tributyltin (TBT) Regulatory Program has been added to the Fisheries Management program. The General Assembly amended the Virginia Pesticide Use and Application Act as it related to the possession, sale, or use of marine antifoulant paints containing TBT. The use of TBT in boat paint constitutes a serious threat to important marine animal species. The TBT program monitors boating activities and boat painting activities to ensure compliance with TBT regulations promulgated pursuant to the amendment. The MRC, DGIF, and VDACS share enforcement responsibilities (Virginia Code §3.1-249.59 to §3.1-249.62).

b. Subaqueous Lands Management - The management program for subaqueous lands establishes conditions for granting or denying permits to use state-owned bottomlands based on considerations of potential effects on marine and fisheries resources, wetlands, adjacent or nearby properties, anticipated public and private benefits, and water quality standards established by the Department of Environmental Quality, Water Division. The program is administered by the Marine Resources Commission (Virginia Code §28.2-1200 to §28.2-1213).

c. Wetlands Management - The purpose of the wetlands management program is to preserve tidal wetlands, prevent their despoliation, and accommodate economic development in a manner consistent with wetlands preservation. This program is administered by the Marine Resources Commission (Virginia Code §62.1-1301 through §62.1-1320).

d. Dunes Management - Dune protection is carried out pursuant to The Coastal Primary Sand Dune Protection Act and is intended to prevent destruction or alteration of primary dunes. This program is administered by the Marine Resources Commission (Virginia Code §62.1-1400 through §62.1-1420).

e. Non-point Source Pollution Control - Virginia's Erosion and Sediment Control Law requires soil-disturbing projects to be designed to reduce soil erosion and to decrease inputs of chemical nutrients and sediments to the Chesapeake Bay, its tributaries, and other rivers and waters of the Commonwealth. This program is administered by the Department of Conservation and Recreation (Virginia Code §10.1-560 et.seq.).

f. Point Source Pollution Control - The point source program is administered by the State Water Control Board pursuant to Virginia Code §62.1-44.15. Point source pollution control is accomplished through the implementation of:

(i) The National Pollutant Discharge Elimination System (NPDES) permit program established pursuant to Section 402 of the federal Clean Water Act and administered in Virginia as the VPDES permit program.

(ii) Water Quality Certification pursuant to Section 401 of the Clean Water Act administered in Virginia through the Virginia Water Protection Permit which includes protection of wetlands --both tidal and non-tidal.

g. Shoreline Sanitation - The purpose of this program is to regulate the installation of septic tanks, set standards concerning soil types suitable for septic tanks, and specify minimum distances that tanks must be placed away from streams, rivers, and other waters of the Commonwealth. This program is administered by the Department of Health (Virginia Code §32.1-164 through §32.1-165).

h. Air Pollution Control - The program implements the federal Clean Air Act to provide a legally enforceable State Implementation Plan for the attainment and maintenance of the National Ambient Air Quality Standards. This program is administered by the State Air Pollution Control Board (Virginia Code §10-1.1300).

The College of
WILLIAM & MARY

Department of Resource Management and Policy

Chartered 1693

Virginia Institute of Marine Science
School of Marine Science
P.O. Box 1346
Gloucester Point, Virginia 23062 USA
804/684-7387 Fax: 804/684-7179

27 July 1998

Ms Ellie Irons
Environmental Program Planner
Department of Environmental Quality
Office of Environmental Impact Review
629 East Main Street, 6th Floor
Richmond, VA 23219

RE: Increased Flight and Related Operations in the Patuxent River Complex EIS

Dear Ms Irons:

1 We have reviewed the subject document from a marine environmental perspective and have no significant comments to make at the present time. We have not had the opportunity to review the full EIS document but do not see any outstanding omissions in the Executive Summary.

We would like to commend the Navy for its response to the concerns previously expressed regarding the use and recovery of Ni-Cad batteries and the other nonrecoverable stores used in the three target ranges in the Patuxent River and Chesapeake Bay. The Stores Database and the move away from the NI-Cad batteries should, when fully implemented, significantly reduce the potential adverse impacts of these pollutant sources to water quality and benthic communities.

We will be happy to answer any questions regarding these comments.

Sincerely,

TABarnard Jr

Thomas A. Barnard, Jr.
Marine Scientist

If you cannot meet the deadline, please notify ELLIE IRONS at 804/698-4325 or PAUL SPAULDING at 804/698-4337 prior to the date given. Arrangements will be made to extend the date for your review if possible. An agency will not be considered to have reviewed a document if no comments are received (or contact is made) within the period specified.

REVIEW INSTRUCTIONS:

A. Please review the document carefully. If the proposal has been reviewed earlier (i.e. if the document is a federal Final EIS or a state supplement), please consider whether your earlier comments have been adequately addressed.

B. Prepare your agency's comments in a form which would be acceptable for responding directly to a project proponent agency.

C. Use your agency stationery or the space below for your comments. **IF YOU USE THE SPACE BELOW, THE FORM MUST BE SIGNED AND DATED.**

Please return your comments to:

DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF ENVIRONMENTAL IMPACT REVIEW
629 EAST MAIN STREET, SIXTH FLOOR
RICHMOND, VA 23219
FAX #804/698-4319

Ellie L. Irons/vf
Environmental Program Planner

COMMENTS

1 PROVIDED YOUR PROPOSED PROJECT DOES NOT EXTEND CHANNELWARD OF MEAN LOW WATER MARK, NO AUTHORIZATION IS REQUIRED FROM THE MARINE RESOURCES COMMISSION.

I DID NOT RECEIVE YOUR PROPOSAL/DOCUMENT.

- GEORGE H. BROGAN III

(signed) [signature] (date) 6/5/98

(title) ENVIRONMENTAL ENGINEER

(agency) VA. MARINE RESOURCES COMMISSION

PROJECT # 98-036F 2/97

COMMENTOR S-9

James S. Gilmore, III
Governor

John Paul Woodley, Jr.
Secretary of Natural Resources

David G. Brickley
Director

COMMONWEALTH *of* VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

203 Governor Street, Suite 326
TDD (804) 786-2121 Richmond, Virginia 23219-2010 (804) 786-2556 FAX (804) 371-7899

MEMORANDUM

DATE: June 24, 1998

TO: Ellie L. Irons, Department of Environmental Quality

FROM: John R. Davy, Jr., Planning Bureau Manager

SUBJECT: DEQ#98-036F, Increased Flight and Related Operations in the Patuxent River Complex, Patuxent River, Maryland. Department of the Navy-Naval Air Warfare Center.

Comments are provided herein on the above referenced project:

DIVISION OF NATURAL HERITAGE

The Department of Conservation and Recreation (DCR) has searched its Biological and Conservation Data System (BCD) for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

Please find attached a list of the natural heritage resources that have been documented in the project area. An explanation of species rarity ranks and legal status abbreviations is enclosed for your reference.

The Peregrine Falcon nests on cliffs, bluffs, talus slopes, old tree hollows, and abandoned nests of other birds of prey (Byrd, 1991). Currently, nesting pairs in Virginia use artificial structures such as tall buildings, bridge supports, and towers (Byrd, 1991). This species was once extirpated from Virginia, but breeding pairs now occur on the coastal plain.

Bald Eagle nest sites are often found in the midst of large wooded areas near marshes or other bodies of water (Byrd, 1991). Threats to this species include human disturbance of nest sites and development of feeding and breeding areas (Byrd, 1991).

The Northeastern tiger beetle inhabits wide, highly dynamic, sandy beaches with back beach vegetation along the Chesapeake Bay. Threats to this species include shoreline development, beach stabilization, high recreational use, pesticides, and natural events including winter beach erosion, flood tides, and hurricanes (Knisley, 1991).

Due to the status of the Peregrine Falcon, Bald Eagle, and Northeastern beach tiger beetle, DCR recommends coordination with the United States Fish and Wildlife Service (USFWS) and the Virginia Department of Game and Inland Fisheries (VDGIF) to ensure compliance with protected species legislation.

Any absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks additional natural heritage resources. New and updated information is continually added to BCD. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

Virginia Department of Conservation and Recreation
Definition of Abbreviations Used in Natural Heritage Resource Lists

Natural Heritage Ranks

The following ranks are used by the Virginia Department of Conservation and Recreation to set protection priorities for natural heritage resources. Natural Heritage Resources, or "NHR's," are rare plant and animal species, rare and exemplary natural communities, and significant geologic features. The primary criterion for ranking NHR's is the number of populations or occurrences, i.e. the number of known distinct localities. Also of great importance is the number of individuals in existence at each locality or, if a highly mobile organism (e.g., sea turtles, many birds, and butterflies), the total number of individuals. Other considerations may include the quality of the occurrences, the number of protected occurrences, and threats; however, the emphasis remains on the number of populations or occurrences so that ranks will be an index of known biological rarity.

S1 Extremely rare and critically imperiled, with 5 or fewer occurrences or very few remaining individuals in Virginia; or because of some factor(s) making it especially vulnerable to extirpation in Virginia.

S2 Very rare and imperiled, with 6 to 20 occurrences or few remaining individuals in Virginia; or because of some factor(s) making it vulnerable to extirpation in Virginia.

S3 Rare to uncommon in Virginia with between 20 and 100 occurrences; may have fewer occurrences if found to be common or abundant at some of these locations; may be somewhat vulnerable to extirpation in Virginia.

S4 Common and apparently secure, with more than 100 occurrences; may have fewer occurrences with numerous large populations.

S5 Very common and demonstrably secure in Virginia.

SH Historically known from Virginia, but not verified for an extended period, usually > 15 years.

SU Status uncertain, often because of low search effort or cryptic nature of the element.

SX Apparently extirpated from Virginia.

S#B Breeding status of an animal within Virginia.

S#N Non-breeding status within the state. Usually applied to winter resident species.

Global ranks are similar, but refer to a species' rarity throughout its total range. Global ranks are denoted with a "G" followed by a character. Note that GA and GN are not used and GX means apparently extinct. A "Q" in a rank indicates that a taxonomic question concerning that species exists. Ranks for subspecies are denoted with a "T". The global and state ranks combined (e.g. G2/S1) give an instant grasp of a species' known rarity. ***These ranks should not be interpreted as legal designations.***

Federal Legal Status

The Division of Natural Heritage uses the standard abbreviations for Federal endangerment developed by the U.S. Fish and Wildlife Service, Division of Endangered Species and Habitat Conservation.

LE - Listed Endangered - threatened with extinction throughout all or a significant portion of its range
LT - Listed Threatened - likely to become endangered in the foreseeable future
PE - Proposed Endangered **PT** - Proposed Threatened
E(S/A) - treat as endangered because of similarity of appearance **T(S/A)** - treat as threatened because of similarity of appearance
C - Candidate - enough information is available to propose for listing, but listing is "precluded by other pending proposals of higher priority"

State Legal Status

The Division of Natural Heritage uses similar abbreviations for State endangerment.

LE - Listed Endangered **LT** - Listed Threatened
SC - Special Concern - animals that merit special concern according to VDGIF (not a regulatory category)

For information on the laws pertaining to threatened or endangered species, contact:

U.S. Fish and Wildlife Service for all FEDERALLY listed species
Virginia Department of Agriculture and Consumer Services Plant Protection Bureau for STATE listed plants and insects
Virginia Department of Game and Inland Fisheries for all other STATE listed animals

COMMENTOR S-9

DEPARTMENT OF CONSERVATION & RECREATION
DIVISION OF NATURAL HERITAGE

NATURAL HERITAGE RESOURCES AT
PATUXENT RIVER COMPLEX

	SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	STATE RANK	FEDERAL STATUS	STATE STATUS
** BIRDS						
	FALCO PEREGRINUS	PEREGRINE FALCON	G4	S1	E(S/A)	LE
	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	G4	S2	LT	LT
** INVERTEBRATES						
	CICINDELA DORSALIS DORSALIS	NORTHEASTERN BEACH TIGER BEETLE	G4T2	S2	LT	
** NON-VASCULAR PLANTS						
	SPHAGNUM TORREYANUM	TORREY'S PEATMOSS	G3G4	S2		
** VASCULAR PLANTS						
	LUDWIGIA BREVIPES	LONG BEACH SEEDBOX	G4G5	S2		
	MATELEA DECIPIENS	OLD-FIELD MILKVINE	G5	S1		
	THELYPTERIS SIMULATA	BOG FERN	G4G5	S1S2		

7 Records Processed

DIVISION OF SOIL AND WATER CONSERVATION

1 The Division of Soil and Water Conservation has no comment on this project.

DIVISION OF PLANNING AND RECREATION RESOURCES

The proposed project is not anticipated to have any adverse impacts on existing or planned recreational facilities nor will it impact any streams on the National Park Service Nationwide Inventory, Final List of Rivers, potential Scenic Rivers or existing or potential State Scenic Byways.

Thank you for the opportunity to comment on this project.

/saw

cc: Cindy Schulz, USFWS
Rebecca Wadja, VDGIF
Ray Fernald, VDGIF

Literature Cited

Byrd, M.A. 1991. Bald eagle. In Virginia's Endangered Species: Proceedings of a Symposium. K. Terwilliger ed. The McDonald and Woodward Publishing Company, Blacksburg, Virginia. Pp. 499-501.

Byrd, M.A. 1991. Peregrine falcon. In Virginia's Endangered Species: Proceedings of a Symposium. K. Terwilliger ed. The McDonald and Woodward Publishing Company, Blacksburg, Virginia. Pp. 499-501.

Knisley, C.B. 1991. Northeastern beach tiger beetles. In Virginia's Endangered Species: Proceedings of a Symposium. K. Terwilliger ed. The McDonald and Woodward Publishing Company, Blacksburg, Virginia. pp. 233-234.

COMMONWEALTH *of* VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

James S. Gilmore, III
Governor

John Paul Woodley, Jr.
Secretary of Natural Resources

5636 Southern Boulevard
Virginia Beach, VA 23462
(757) 518-2000
http://www.deq.state.va.us

Dennis H. Treacy
Director

Francis L. Daniel
Tidewater Regional Director

MEMORANDUM

TO: Ellie Irons - Office of Environmental Impact Review

FROM: Sheri Kattan - Tidewater Regional Office

DATE: July 2, 1998

SUBJECT: Review of the Draft Environmental Impact Statement titled "Increased Fight Operations in the Patuxent River Complex, Patuxent River, Maryland", Project #98-036F.

The Tidewater Regional Office has finished its review of the Draft Environmental Impact Statement Report and we are submitting the following comments. Thank you for the opportunity to participate in the review process.

WATER QUALITY: The use of Ni-Cd batteries in store telemetry units is discouraged due to potential
1 adverse effects to water quality and the abundant fishery and wildlife resources in and adjacent to
the waters of the Chesapeake Bay. The use of large quantities of the small arms rounds in
2 Chesapeake Bay target areas is discouraged due to the lead content of the ammunition and potential,
adverse bioaccumulation effects in aquatic organisms. While not mentioned in the above referenced
project report, the release of aircraft fuel is not recommended, especially over the several special,
3 recreational and environmentally sensitive areas located in the Chesapeake Test Range.

4 **STORM WATER:** Inclusion of a monitoring schedule in the NPDES Permit No. MD0020150 for anti-icing/deicing parameters is recommended.

5 **GROUND WATER:** No comments were solicited from our Ground Water Program as impacts to ground water are not anticipated.

6 **UNDERGROUND STORAGE TANKS:** No comments were solicited from our Underground Storage Tank (UST) Program as impacts from USTs are not anticipated.

7 **WASTE:** There are no comments concerning waste issues in relation to this project.

8 **AIR:** There are no comments concerning air quality impacts in relation to this project.

COMMENTOR S-11

COMMONWEALTH *of* VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

James S. Gilmore, III
Governor

John Paul Woodley, Jr.
Secretary of Natural Resources

PIEDMONT REGIONAL OFFICE
4949-A Cox Road
Glen Allen, Virginia 23060
(804) 527-5020
Fax (804) 527-5106
http://www.deq.state.va.us

Dennis H. Treacy
Director

Gerard Seeley, Jr.
Piedmont Regional Director

July 10, 1998

Ms. Ellie Irons
Department of Environmental Quality
Office of Environmental Impact Review
629 E. Main Street
Richmond, Virginia

RE: #98-036F, Draft Environmental Impact Statement, U.S. Naval Air Warfare Center Increased Fligh and Related Operations in the Patuxent River Complex

Dear Ms. Irons: Ellie

1 Staff of the Department of Environmental Quality's (DEQ) Piedmont Regional Office (PRO)
have reviewed the above subject document and believe that no significant areawide impacts are
2 anticipated to occur within Virginia from Alternatives I, II or III during normal operational conditions.
Water quality impacts from the release of stores, munitions, and flares are expected to be localized
and minor due to the diluting effects of the Chesapeake Bay. An Oil and Hazardous Substance
3 Spill Contingency Plan will be followed to minimize impacts resulting from the emergency release
of fuels. The draft report references projected air emissions; however, the report would be
enhanced with additional analyses to address air quality impacts these emissions may have within
4 the Virginia portion of the Test Range.

Thank you for the opportunity of review.

Sincerely,

Curtis J. Linderman
Planning Manager

CJL\

cc: Denise Mosca, KO
James Kyle, PRO

If you cannot meet the deadline, please notify ELLIE IRONS at 804/698-4325 or PAUL SPAULDING at 804/698-4337 prior to the date given. Arrangements will be made to extend the date for your review if possible. An agency will not be considered to have reviewed a document if no comments are received (or contact is made) within the period specified.

COMMENTOR S-11

REVIEW INSTRUCTIONS:

A. Please review the document carefully. If the proposal has been reviewed earlier (i.e. if the document is a federal Final EIS or a state supplement), please consider whether your earlier comments have been adequately addressed.

B. Prepare your agency's comments in a form which would be acceptable for responding directly to a project proponent agency.

C. Use your agency stationery or the space below for your comments. **IF YOU USE THE SPACE BELOW, THE FORM MUST BE SIGNED AND DATED.**

Please return your comments to:

DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF ENVIRONMENTAL IMPACT REVIEW
629 EAST MAIN STREET, SIXTH FLOOR
RICHMOND, VA 23219
FAX #804/698-4319

Ellie L. Irons / VK
Environmental Program Planner

COMMENTS

The Office of Air Data Analysis does not believe the proposed project will pose a significant air quality problem to the Virginia jurisdictions within the Chesapeake Test Range. If the flights & testing proposed here remain in the CTR, the General Conformity Determination presented in the DEIS will not apply to the affected areas of Virginia. However, if there are flights & testing done to the NW ~~of CTR affecting~~ or south of CTR affecting Northern Virginia or the VA Tidewater (Hampton Roads) area, then air quality issues will need to be reevaluated & conformity determination provided

(signed) Dona Huang (date) 7-8-98

(title) SR. ENVT ENG.

(agency) VA DEQ - Office of Air Data Analysis

PROJECT # 98-036F

If you cannot meet the deadline, please notify ELLIE IRONS at 804/698-4325 or PAUL SPAULDING at 804/698-4337 prior to the date given. Arrangements will be made to extend the date for your review if possible. An agency will not be considered to have reviewed a document if no comments are received (or contact is made) within the period specified.

COMMENTOR S-12

REVIEW INSTRUCTIONS:

A. Please review the document carefully. If the proposal has been reviewed earlier (i.e. if the document is a federal Final EIS or a state supplement), please consider whether your earlier comments have been adequately addressed.

B. Prepare your agency's comments in a form which would be acceptable for responding directly to a project proponent agency.

C. Use your agency stationery or the space below for your comments. **IF YOU USE THE SPACE BELOW, THE FORM MUST BE SIGNED AND DATED.**

Please return your comments to:

DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF ENVIRONMENTAL IMPACT REVIEW
629 EAST MAIN STREET, SIXTH FLOOR
RICHMOND, VA 23219
FAX #804/698-4319

Ellie L. Irons/vk
Environmental Program Planner

COMMENTS

1 No comments. Action has no effect on Water Programs.

(signed) Joseph P. Hassell (date) June 8, 1998
(title) Env. Prog. Manager
(agency) DEQ - OPS

PROJECT # 98-036F

COMMENTOR S-13

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL
DIVISION OF SOIL AND WATER CONSERVATION
89 KINGS HIGHWAY
P.O. BOX 1401
DOVER, DELAWARE 19903

OFFICE OF THE DIRECTOR

TELEPHONE: (302) 739 - 3451

July 27, 1998

Kelly Burdick
Office of Legal Counsel
47031 Liljencrantz Road
Building 435, MS 39
Patuxent River, Maryland 2070-5440

Dear Ms. Burdick:

1 The Delaware Coastal Management Program (DCMP) has received and reviewed the Draft Environmental Impact Statement for *Increased Flight and Related Operations in the Patuxent River Complex, Patuxent River, Maryland.* Based upon our review and pursuant to National Oceanic & Atmospheric Administration regulations (15 CFR 930), the DCMP concurs that the proposed *Increased Flight and Related Operations* in the Patuxent River Complex will be consistent with its policies. Our concurrence is based upon the restrictions and/or conditions placed on any and all permits issued to you for this project.

Sincerely,

Sarah W. Cooksey

Sarah W. Cooksey, Administrator
Delaware Coastal Management Program

SWC/jlj

Cc: File 97.091
Francine Booth, Budget Office

SENATE OF VIRGINIA

COMMENTOR S-14

WARREN E. BARRY
37TH SENATORIAL DISTRICT
P.O. BOX 1146
FAIRFAX, VIRGINIA 22030-1146

Ms. Evans,

In response to the proposed
1 expanded military exercises over the No. Neck of Va I would like to express my objection to continued or expanded Drones and the maddening drone they create. Expanded Jet & helicopter exercises are tolerable but the damn drones drive people nuts.

Thanks

Warren E Barry

COMMENTOR S-15

MARYLAND *Office of Planning*

Parris N. Glendening
Governor

Ronald M. Kreitner
Director

July 22, 1998

Ms. Kelly Burdick
c/o Office of Legal Counsel
Naval Air Warfare Center, Patuxent Naval Air Station
47031 Liljencrantz Road, Building 435, MS 39
Patuxent River, MD 20670-5440

REVIEW AND RECOMMENDATION

State Application Identifier: MD980520-0481
Description: Draft Environmental Impact Statement - Increased Flight and Related Operations in the Patuxent River Complex - St. Mary's County. Includes Record of Non-Applicability of General Conformity Rule to Clean Air Act
Applicant: Naval Air Warfare Center, Patuxent Naval Air Station
Location: St. Mary's County, Lexington Park
Approving Authority: NAVY

Recommendation: **Endorsement Contingent Upon Certain Actions**

Dear Ms. Burdick:

In accordance with Presidential Executive Order 12372 and Code of Maryland Regulation 14.24.04, the State Clearinghouse has coordinated the intergovernmental review of the referenced project. This letter with attachments constitutes the State process review and recommendation based upon comments received to date. This recommendation is valid for a period of three years from the date of this letter.

Review comments were requested from the Maryland Departments of Agriculture, Business and Economic Development, Budget and Management, Environment, Health and Mental Hygiene, Housing and Community Development including the Maryland Historical Trust, Natural Resources, Public Safety and Correctional Services, Transportation, the University of Maryland System, and the Maryland Military Department; the Towns of Denton, Easton, Federalsburg, La Plata, Leonardtown, Princess Anne, and Snow Hill; the Cites of Cambridge, Crisfield, Salisbury; the Counties of Calvert, Caroline, Dorchester, St. Mary's, Somerset, Talbot, Wicomico, and Worcester; and the Maryland Office of Planning. As of this date, Calvert and Caroline Counties; the Towns of Denton, Federalsburg, Princess Anne, and Snow Hill have not submitted comments. This endorsement is contingent upon the applicant considering and addressing any problems or conditions that may be identified by their review. Any comments received will be forwarded. The Maryland Department of Health and Mental Hygiene and the University of Maryland System had no comments.

1

The Maryland Departments of Agriculture, Environment, Housing and Community Development including the Maryland Historical Trust, Budget and Management, Natural Resources, Transportation, Public Safety and Correctional Services, and Business and Economic Development; the Maryland Military Department; the Counties of Dorchester, St. Mary's, Somerset, Talbot, Wicomico, and Worcester; the Towns of La Plata, Easton, and Leonardtown; the Cites of Cambridge, Crisfield, and Salisbury; and the Maryland Office of Planning found this project to be consistent with their plans, programs, and objectives.

Summary of Comments:

2 The Maryland Historical Trust has determined that the project will have "no effect" on historic properties and that the federal and/or State historic preservation requirements have been met.

3 The Town of LaPlata expressed support for the regional economic development connected with the Navy's planned expansion at the Patuxent River Naval Air Station. See the attached comments.

Any statement of consideration given to the comments should be submitted to the approving authority, with a copy to the State Clearinghouse. Additionally, the State Application Identifier Number must be placed on any correspondence pertaining to this project. The State Clearinghouse must be kept informed if the recommendation cannot be accommodated by the approving authority.

Please remember, you must comply with all applicable state and local laws and regulations. If you have any questions about the comments contained in this letter or how to proceed, please contact the State Clearinghouse at (410) 767-4490. **Also please complete the attached form and return it to the State Clearinghouse as soon as the status of the project is known.** ***Any substitutions of this form must include the State Application Identifier Number.*** **This will ensure that our files are complete.**

We appreciate your attention to the intergovernmental review process and look forward to your continued cooperation.

Sincerely,

Linda C. Janey

Linda C. Janey, J.D.
Manager, Clearinghouse & Plan Review Unit

LCJ:BR:da
Enclosures
(* indicates with attachments)
cc:

*McMillian - DAGR	*Gatto - DBED	*Richardson - DBM	*Dintaman - DNR
*Kay - MDOT	*Barnard - DHMH	*Adkins - MILT	*Wooten - Cambridge
*Phoebus - Crisfield	*Butler - Easton	Miller - La Plata	*Guyther - Leonardtown
*Pick - Salisbury	*Dodd - DRCH	*Hughes - WCMC	*Mason - WRCS
*Bieber - MDE	*Salt - UMS	*Krempasky - CRLN	*Massey - SMST
*Fearins - Denton	*Chelton - Princess Anne	*Kachmar - STMA	*Colburn - Federalsburg
*Hartman - DHCD	*Bezanson - DPSCS	*Jaklitsch -CLVT	*Cowee - TLBT
*Warren - Snow Hill	*Abrams - OPC	*Sheafor - OPL	

COMMENTOR S-16

COMMONWEALTH OF VIRGINIA
HOUSE OF DELEGATES
RICHMOND

W. TAYLOE MURPHY, JR.
BOX 277
WARSAW, VIRGINIA 22572

NINETY-NINTH DISTRICT

COMMITTEE ASSIGNMENTS:
LABOR AND COMMERCE (CHAIRMAN)
APPROPRIATIONS
CORPORATIONS, INSURANCE AND BANKING
CHESAPEAKE AND ITS TRIBUTARIES

August 13, 1998

Naval Air Warfare Center
Aircraft Division
47031 Liljencrantz Road, Bldg. 435, MS 39
Patuxent River, Maryland 20670-5440

Gentlemen:

Several of my constituents have expressed concerns relating to increases in future flights over the eastern portion of the Northern Neck of Virginia, and I am writing to request that you give careful consideration to these concerns.

1 I am enclosing a copy of a letter I have received from Ms. Winnifred Carrigan dated July 29, 1998, which details the concerns that she and her fellow citizens have in regard to this matter.

Thank you very much for your consideration of this request to address the concerns of the residents of the lower Northern Neck affected by these activities.

Very truly yours,

W. Tayloe Murphy, Jr.

W. Tayloe Murphy, Jr.

WTMJR/jh
enclosure

July 29, 1998

Dear Honorable H. Tayloe Murphy, Jr.

COMMENTOR S-16

Enclosed is a copy of a letter I sent to the Office of Legal Counsel, Naval Air Warfare Center Aircraft Division, 47031 Liljencrantz Road, Building 435, MS 39, Patuxent River, MD 20670-5440.

On Wednesday, June 17, there was a public meeting at the Northumberland High School in Heathsville, Virginia with representatives from the Department of the Navy. The subject: assessing the Navy's Environmental Impact Statement which relates to increase in future flights over our area (Northumberland County and a small part of Lancaster County) of manned and unmanned aircraft. Present flight hours per year are 18,200. Proposed flight hours per year Phase I 20,700; Phase II 22,600; Phase III 24,400.

This meeting was an opportunity for the citizens to express their concerns. Some of the citizens concerns were:

1) safety if one of the planes, even the unmanned, is downed;
2) concern that the local police and firefighters need to be trained to handle a downed plane;
3) distress from the noise;
4) structural damage to buildings, cracked and broken glass windows and doors from the sonic boom;
5) commercial and pleasure boaters may be further restricted in their access to certain water areas (that is the situation now but it may increase).

Noise levels have been simulated by a computer. A Day-Night Average Sound Level (DNL) of 65 decibels (DB) is considered acceptable. My concern with this is whether the simulation is for the duration we are subjected to this sound and what damage (short or long term) can be experienced.

My concern is that this can be interpreted to mean that during the day 130 DB noise level can be produced (unacceptable but when coupled with zero (0) DB at night can still result in a 65 DB Day-Night Average Sound Level. To me this is unacceptable. The Unmanned Aerial Vehicle (UAV) is overhead for relatively long periods and frequently, whereas sonic booms are short lived (seconds) and infrequent. Consequently the UAV is more disturbing from the point of view of noise.

Any assistance you can provide to resolve these issues with Patuxent Naval Air Station will be appreciated. This problem originates outside the state of Virginia but it affects people who live in Virginia.

Respectfully yours,

Winnifred Carrigan
P. O. Box 478
Burgess, VA 22432-0478

COMMONWEALTH *of* VIRGINIA

Department of Historic Resources
2801 Kensington Avenue, Richmond, Virginia 23221

James S. Gilmore, III
Governor

John Paul Woodley, Jr.
Secretary of Natural Resources

H. Alexander Wise, Jr.
Director

Tel: (804) 367-2323
Fax: (804) 367-2391
TDD: (804) 367-2386

13 August 1998

Ms. Sue Evans
Department of the Navy
c/o Office of Legal Counsel
Naval Air Warfare Center, Aircraft Division
47031 Liljencrantz Road, Building 435, MS 39
Patuxent River, Maryland 20670-5440

Re: Draft Environmental Impact Statement and Finding of No Significant Impact for the proposed Increased Flight and Related Operations in the Patuxent River Complex, Patuxent River, Maryland, proposed by the Naval Air Warfare Center, Aircraft Division (NAWCAD)
VDHR Project No. 98-1979

Dear Ms. Evans,

① The Virginia Department of Environmental Quality requested the comments of the Virginia Department of Historic Resources (VDHR) on the above-referenced document, which was received by VDHR on 28 May 1998. Based on the information provided in the Draft EIS, the VDHR concurs with the Navy's recommendation that the undertaking will have no adverse effect on historic resources listed in or eligible for listing in the National Register of Historic Places.

If you have questions about the VDHR's review, please contact Susan Smead at 804-367-2323, extension 110.

Sincerely,

David H. Dutton
Director, Division of Project Review

c: Michael P. Murphy, Virginia Department of Environmental Quality

Petersburg Office
10 Courthouse Avenue
Petersburg, VA 23803
Tel: (804) 863-1620
Fax: (804) 863-1627

Portsmouth Office
612 Court Street, 3rd Floor
Portsmouth, VA 23704
Tel: (804) 396-6707
Fax: (804) 396-6712

Roanoke Office
1030 Penmar Avenue, SE
Roanoke, VA 24013
Tel: (540) 857-7585
Fax: (540) 857-7588

Winchester Office
107 N. Kent Street, Suite 203
Winchester, VA 22601
Tel: (540) 722-3427
Fax: (540) 722-7535

COMMENTS FROM REGIONAL AGENCIES AND OFFICIALS

COMMENTOR R-1

HAMPTON ROADS
PLANNING DISTRICT COMMISSION

JOE S. FRANK, CHAIRMAN · ROBERT C. CLAUD, SR., VICE-CHAIRMAN · [illegible] STANDISH, TREASURER

AFFAIRS & COMPLIANCE ASSISTANCE

ARTHUR L. COLLINS, EXECUTIVE DIRECTOR/SECRETARY

June 4, 1998

Ms. Ellie L. Irons
Environmental Impact Review Coordinator
Department of Environmental Quality
629 East Main Street
Richmond, Virginia 23219

Re: Draft Environmental Impact Statement: Increased Flight and Related Operations in the Patuxent River Complex, Patuxent River, Maryland
DEQ #98-036F (ENV:GEN)

Dear Ms. Irons:

Pursuant to your request of May 19, 1998, the staff of the Hampton Roads Planning District Commission has reviewed the Draft Environmental Impact Statement: Increased Flight and Related Operations in the Patuxent River Complex, Patuxent River, Maryland.

Based on this review, it appears that the project is consistent with local and regional plans. We have no significant comments concerning the project. 1

We appreciate the opportunity to review this project. If you have any questions, please do not hesitate to call.

Sincerely,

Arthur L. Collins

Arthur L. Collins
Executive Director/Secretary

HRV:fh

NORTHERN NECK PLANNING DISTRICT COMMISSION

Post Office Box 1600 Warsaw, Virginia 22572
Telephone (804) 333-1900 Fax (804) 333-5274
e-mail: nnpdc17@nnpdc17.state.va.us

July 27, 1998

COMMENTOR R-2

Ellie Irons
Department of Environmental Quality
Office of Environmental Review
629 East Main Street, 6th Floor
Richmond, Virginia 23219

Dear Ms. Irons,

Re: Comments on the Environmental Review
Project: **Increased Flight and Related Operations in the Patuxent River Complex, Patuxent River, Maryland**
Project Sponsor: **Department of the Navy, Naval Air Warfare Center Division**
DEQ Project #: **98-036F**

I have reviewed the Environmental Impact Statement for the Increased Flight Operations for the Patuxent River Naval Air Station. One concern the PDC had, that of the use of nickel cadmium batteries in the telemetry equipment attached to released stores, has been mitigated by the replacement of those battery packs with the environmentally friendly lithium iron disulfide battery packs, where possible. Other comments follow:

1 1. The EIS discusses noise in great detail, however, the emphasis is placed on the higher noise level areas, associated with takeoffs and landings in and around the airstrips in Maryland. In the Northern Neck, (mainly Northumberland County), the noise from circling Unmanned Aerial Vehicles (UAV's) is bothersome to many residents, especially during the warmer months of the
2 year, when more time is spent outside their homes. Another type of noise event, the sonic boom affects many persons on the east coast of Northumberland County, particularly Reedville. The effects of sporadic sonic booms, are magnified by their unexpected nature, and are very troubling to some residents. More attention in the EIS should address these concerns, and the estimated increase in these noise events in each of the three proposed alternatives.

3 2. Another concern is the increased closure and clearing of the target areas of the Chesapeake Bay Test Range. It is not necessarily the increased amount of time the areas are closed, but the timing of those closures that could effect Northern Neck watermen, and charter boat activity. Most watermen work from sun up to about 10:00 am in the morning, tending their crab pots. Saltwater sport fishing charter boats usually depart early in the mornings also. Closures in the target areas could cause interruption of the watermen's work schedule, and diversion of charter boats to less productive fishing areas. Some discussion on the scheduling of the closures needs to be included in the EIS. It would be preferable to schedule these events, when possible, around midday during the week.

Thank you for the opportunity to review the Environmental Impact Statement. Please call if I can be of further assistance.

Sincerely,

Stuart L. McKenzie
Environmental Planner

COMMENTS FROM LOCAL AGENCIES AND OFFICIALS

ST. MARY'S COUNTY GOVERNMENT

NIGP MEMBER

CENTRAL SERVICES

COMMENTOR L-1

July 12, 1998

ADMINISTRATIVE/ FISCAL SERVICES
P.O. Box 653
23115 Leonard Hall Drive
Leonardtown, MD 20650
Phone: 301-475-4120
Fax: 301-475-4949

AIRPORT OPERATIONS
44174 Airport Road
Suite 800
California, MD 20619
Phone: 301-373-5416
Fax: 301-373-4621

BUILDING SERVICES
P.O. Box 653
23115 Leonard Hall Drive
Leonardtown, MD 20650
Phone: 301-475-4497
Fax: 301-475-4964

PROCUREMENT
P.O. Box 653
23115 Leonard Hall Drive
Leonardtown, MD 20650
Phone: 301-475-4770
Fax: 301-475-4949

TRANSPORTATION
Non-Public Schools
P.O. Box 653
23115 Leonard Hall Drive
Leonardtown, MD 20650
Phone: 301-475-4496
Fax: 301-475-4949

St. Mary's Transit System
44174 Airport Road
Suite 800
California, MD 20619
Phone: 301-475-5100
Fax: 301-475-4512

Vehicle Maintenance
P.O. Box 508
44829 St. Andrews Church Rd.
California, MD 20619
Phone: 301-866-6719
Fax: 301-866-6792

Ms. Sue Evans
Office of Legal Council
47031 Lilgencrantz Road
NAS Patuxent River, MD 20670

Re: **Draft Environmental Impact Statement (DEIS) – Increased Flight and Related Operations in the Patuxent River Complex**

Dear Ms. Evans,

Upon review of the above subject Draft Environmental Impact Statement (DEIS) by the Director of the Office of Capital Projects for St. Mary's County, it appears that the proposed alternatives will only impact test areas already under the exclusive control and scheduling authority of the Naval Air Warfare Center, Aircraft Division. We are recommending that the 1 Navy add comments to address their awareness of the extent of existing and planned flight operations at the St. Mary's County Airport. The County is beginning an aggressive capital improvement program to take place over the next ten years. Specifically, the planned extension of the runway and the construction of improvements designed to attract commuter air service to the area should be addressed, both in terms of socio-economic impact as well as safety of aviation operations.

Please document your findings on the above in the Environmental Impact Statement process. Should you have any questions, please do not hesitate to contact me.

Sincerely,

James P. Haley
Manager

cc: John J. Kachmar Jr., County Administrator
Bruce Mundie, Regional Director, Maryland Aviation Assistance
Thomas A. Priscilla, Jr., P. E., Federal Aviation Administration
James S. Stirling, P.E., Director, Office of Capital Projects

St. Mary's County Public Schools

-CENTRAL ADMINISTRATION 41770 Baldridge Street P.O. Box 641, Leonardtown, MD 20650 (301)475-4230 FAX (301)475-4228
-DEPARTMENT OF INSTRUCTION 27190 Point Lookout Road Loveville, MD 20656 (301)475-5511 FAX (301)475-4229
-STUDENT SERVICES 22899 Washington Street P.O. Box 1410, Leonardtown, MD 20650 (301)475-6626 FAX (301)475-2469

DR. PATRICIA M. RICHARDSON
Superintendent of Schools

June 30, 1998

Ms. Sue Evans
c/o Office of Legal Counsel
Naval Air Warfare Center Aircraft Division
47031 Liljencrantz Road, Building 435, MS 39
Patuxent River, Maryland 20670-5440

Re: **Increase Flight and Related Operations in the Patuxent River Complex**

Dear Ms. Evans:

I attended the Navy's public hearing on June 22, 1998, at Great Mills High School. I gathered from the presentation that the AICUZ Zone II was going to increase slightly. From the documentation available at the hearing, no one was able to determine if this increase would affect the Lexington Park Elementary School site.

1 At the present time, St. Mary's County Public Schools has planned to renovate, expand, and modernize Lexington Park Elementary School. We have concerns over the AICUZ Zone's potential encroachment on the Lexington Park Elementary School site. We do not want to invest in this school and then have the Navy request that we relocate the school. If at all possible, I would appreciate a detailed map showing Lexington Park Elementary School and any potential encroachment. If there is any encroachment on the Lexington Park Elementary School site, the school system would have to consider opposing the increased flight and related operations alternates to the Patuxent River complex.

If you have any questions, please do not hesitate to contact my office at 301-475-4256.

Sincerely,

J. Bradley Clements
Director of Facilities Management

JBC:jma

cc: Dr. Patricia Richardson
Karen Abrams, Esq.

COMMENTOR L-5

SUPERVISORS
A. Joseph Self, Sr., Chairman
Callao, VA 22435
District I
Ronald L. Jett, Vice-Chairman
Heathsville, VA 22473
District V
David R. Hundley
Heathsville, VA 22473
District II
James M. Long
Wicomico Church, VA 22579
District III
Thomas H. Tomlin
Heathsville, VA 22473
District IV

Northumberland County, Virginia
Board of Supervisors
Heathsville, Virginia 22473

COUNTY ADMINISTRATOR
John E. Burton
Heathsville, VA 22473
804-580-7666
804-580-7053 FAX

July 29, 1998

Ms. Kelly Burdick
Office of Legal Counsel
Naval Air Warfare Center, Aircraft Division
47031 Liljencrantz Road, Building 435, MS 39
Patuxent River, MD 20670-5440

Re: Draft Environmental Impact Statement – Increased Flight and Related Operations in
The Patuxent River Complex, Maryland

Dear Ms. Burdick:

The Board of Supervisors of Northumberland County, Virginia, asked me to write you to express their concerns about the proposed Increase Flight and Related Operations in the Patuxent River Complex, Maryland.

As you are aware, Northumberland County, Virginia is located only twenty miles from the Patuxent River Naval Air Station, on the southern side of the Potomac River and the western side of the Chesapeake Bay.

From the maps provided in the Draft Environmental Impact Statement, you can see that Northumberland County is included in the area where all of the testing is done.

At the present, we are receiving two types of complaints from County residents.

1 Most of the complaints are about the noise from the unmanned aerial vehicles (UAV's) which residents say disturbs them because of the constant droning sound, which is annoying. It seems that the UAV's are over certain areas on a somewhat regular basis at different times.

2 The other complaint is in regard to the sonic boom which comes from residents that are mostly located on the Potomac River and Chesapeake Bay. Some of these have reported cracked or broken windows.

3 The Board of Supervisors of Northumberland County, being aware of their complaints, is very much concerned about what we can expect when the activity is to be increased as proposed.

NORTHUMBERLAND COUNTY 350 1648 ANNIVERSARY 1998

4 They are also concerned about any effects that the increase in one of the target areas on the Chesapeake Bay Test Range may have on fishing which is a critical industry to Northumberland County.

The Board of Supervisors of Northumberland County recognizes the need for the United States to maintain its testing program but hopes that in making the final decision, the Department of Navy will consider its concerns and will do whatever it can to lessen the impact on the citizens of Northumberland County.

Thanking you for the opportunity to express the Board of Supervisors concerns, I am,

Yours truly,

John E. Burton
County Administrator

cc: Congressman Herb Bateman
JEB/jm

OFFICE
COMMISSIONERS FOR SOMERSET COUNTY
P.O. BOX 37
PRINCESS ANNE, MARYLAND 21853
TELEPHONE 651-0320, FAX 651-0366

COMMISSIONERS
PHILLIP L. GERALD, PRESIDENT
JAMES N. RING, VICE PRESIDENT
M. WILLIAM WARD
CLARENCE I. LAIRD
CHARLES F. FISHER

COUNTY ADMINISTRATOR - CLERK
CHARLES E. MASSEY
KIRK G. SIMPKINS, ATTORNEY

July 29, 1998

Ms. Sue Evans
Office of Legal Counsel
Naval Air Warfare Center, Aircraft Division
47031 Liljencrantz Road, Bldg. 435, MS 39
Patuxent River, Maryland 20670-5440

Dear Ms. Evans:

1 Many of our citizens living in close proximity to our shoreline are concerned about noises and sonic booms that may be frequent from "Increased flights and related operations in the Patuxent River Complex" as proposed.

Citizens realize the necessity to conduct military research and development and testing to protect our nation. This is not our major concern. Noise and creation of sonic booms caused by aircraft from Patuxent Naval Air Station was a problem to this area several years ago. Since that period, the Department of the Navy has responded to our citizens and minimized the problem. However, we are once again concerned that the proposed test range area and increased flights will present us with a noise problem.

2 The test range area outlined in Figure 3.1-1 (Counties Underlying the Chesapeake Test Range) is also heavily populated with poultry houses producing thousands of birds every eight weeks. Excessive noises and shadows could be damaging to flock production and could cause heavy losses of birds due to smothering. If this occurred, damage claims against the government could be staggering.

Thanks for your consideration and assistance. We will be awaiting your response.

Sincerely,

Charles E. Massey

Charles E. Massey
County Administrator

Enc.

COMMENTS FROM GROUPS AND ASSOCIATIONS

COMMENT FORM

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

Please print your comment. Feel free to attach an additional sheet if necessary.

I AM VERY INTERESTED IN ANY INFO ON THE
1 EMPRESS I & II PROGRAMS. FROM THE
INFO THAT I HAVE GOTTEN FROM THE PEOPLE
AT THIS MEETING, THE EMPRESS PROGRAMS
WAS ON HOLD.

ALSO IF YOU ARE PLANNING TO DO EXERCISES
IN A TARGET AREA, SEE IF IT CAN'T BE
2 ANNONCED ON THE WEATHER CHANNELS. THIS
WAY THE BOATING PEOPLE CAN GET INFO
ON YOUR EXERCISES.

Name: CLINT WATERS

Address: 5512 MALLARD LANE
CAMBRIDGE, MARYLAND 21613
PRES. MSSA DORCHESTER CO.

Fold this form along the lines shown on the other side and mail to the address shown. This form may also be faxed to 301-342-1840.

COMMENT FORM

COMMENTOR G-3

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

Please print your comment. Feel free to attach an additional sheet if necessary.

THE TESTS ARE NOTED AS BEING OF 1-3 HR. DURATION.
(1) THESE TESTS WILL INCREASE BY 50% (FROM 22 TO 34 HRS/MO.).
THEREFORE, THE PROBABILITY OF BEING AFFECTED IF YOU ARE ON
THE WATER FOR RECREATION OR WORK, DRAMATICALLY INCREASES.
SHOULDN'T BE A SIMPLE DAY OF FISHING PLANS ARE MADE,
EQUIPMENT PURCHASED, ETC, ETC, AND THEN YOU ARE TURNED
AWAY BY A WARNING BOAT OR PLANE FROM THE TARGET
AREA.

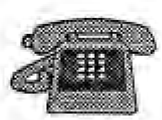
SUGGESTION: PUBLISH A SCHEDULE AS COMPLETE AS REASONABLY
CAN BE DONE OF THE INTENDED TEST DATES, TIMES & LOCATIONS.
(2) THE MARINE RADIO SERVICE WEATHER STATIONS 2-3 #'S
WOULD BE IDEAL, PERHAPS JUST ON ONE PARTICULAR DAY
SO IT WOULDN'T GET OUT OF HAND. THEN WE COULD ALL LISTEN
IN FOR THE FOLLOWING WEEK'S SCHEDULE OF TESTS AND AVOID
WASTING SO MUCH TIME & EXPENSE.

Name: JESSE MAGFUID

Address: 2218 JENKINS CREEK RD
CAMBRIDGE, MD 21613
PRESIDENT, DORCHESTER FISHING CLUB.

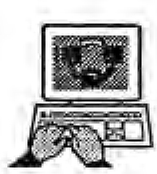
Comments may be mailed to (postmarked by July 6, 1998):

Ms. Sue Evans or Ms. Kelly Burdick
c/o Office of Legal Counsel
Naval Air Warfare Center Aircraft Division
47031 Liljencrantz Road, Building 435, MS 39
Patuxent River, MD 20670-5440



Or Fax to: 301-342-1840 (received by 5:00 pm on July 6, 1998)

Or Call Toll-Free: 1-888-276-5201 (by 5:00 pm on July 6, 1998)



Or E-mail via: http://www.tamsconsultants.com/paxriver/
(By 5:00 on July 6, 1998)

FEDERATION OF SOUTHERN CALVERT COMMUNITIES
P.O. BOX 258
Solomons, Maryland 20688
(410) 326-3983
Fax: (410) 326-0643

Chesapeake Ranch Estates POA
Drum Point Property Owners Assn.
Harbor at Solomons
Harbor Light Beach
Mill Creek Condominium Assn.
Patuxent Point

Solomons Civic Assn.
Solomons Landing
Spring Cove
Twin Cove
White Sands Civic Assn.

June 26, 1998

Ms. Sue Evans or Ms. Kelly Burdick
c/o Office of Legal Counsel
Naval Air Warfare Center Aircraft Division
47031 Liljencranz Road, Building 435, MS 39
Patuxent River, MD 210670-5440

Dear Ms. Evans or Ms. Burdick:

The Federation (FSCC) is an organization of eleven (11) communities in Southern Calvert County. We function or take actions on matters affecting one or more of these communities where there is a consensus of opinion among our community members.

The following comments, suggestions, and recommendations are respectfully submitted for formal evaluation and consideration in response to your requests for comments at the public hearings on your Patuxent River Complex Environmental Impact Statement (EIS) for Increased Flight and Related Operations and related Patuxent River Complex Integrated Management Plan (PRCIMP).

We want to first commend the Navy for the extra-ordinary efforts made to develop the plans for increasing operations at PAX RIVER NAS. We especially commend you for the detailed and carefully prepared Management Plan and the comprehensive Environmental Impact Statement covering the NAWCAD proposed Operational Plans. The detailed analysis done to evaluate the impact on the environment, air quality, infrastructure, cultural, topographical, vegetation and wetlands, wildlife and fisheries and water and sediment quality is particularly reassuring. We commend the Navy for these costly and excellent analyses and studies.

1 However, we are concerned that the studies do not contain more current and relevant data. We feel that some of the essential U.S. Census data used throughout the EIS, is obsolete and inadequate for use in developing your Operations Plans. It is particularly deficient as it relates to the Drum Point peninsula including Solomons and Lusby, Maryland and adjacent population areas of Chesapeake Ranch Estates (CRE); Drum Point (D.P.); Harbor Light Beach; The Soundings; Olivet; Mill Creek; Patuxent Point, Spring Cove, Twin Cove, Solomons Landing,

Harbor at Solomons; the town center of Solomons and to a lesser degree White Sands. While there are other subdivision developments and other populated areas on the Drum Point peninsula who are not members of FSCC, we feel that they, combined with the residents of our member communities must be considered in the final operational plans adopted by NAWCAD and NAS PAX RIVER.

In addition, these studies do not comment on the large number of visitors to this area. The Calvert County Department of Economic Development figures for 1997, show more than
(2) 424,502 visitors at the major sites in the County, with Solomons being the leading attraction.
This number includes 27, 951 visitors at Anne Marie Gardens, an outdoor park, and 65, 321 at the Calvert Museum in Solomons.

Also there are a large number of boaters who enjoy the use of the facilities in Solomons
(3) and elsewhere in the southern part of the County. Our informal survey of the major marinas in
this area indicates that there are over 2,500 transient boats with approximately 7,500 persons on board, just during the period June through September. Additionally, there are 6,510 boats registered to users in Calvert County. These boats attract thousands of visitors. The University of Maryland estimates that recreational boaters spent $27,432,000 in 1996. Most of these persons are outdoor users and need to be considered in the EIS.

Most importantly, your EIS and PRCIMP publications rely upon 1990 U.S.Census data
(4) that **does not** reflect the inordinate population expansion that has occurred in Southern Maryland
from 1990 to date.

In fact your publications refer to the population growth in Northern Calvert County but appear to ignore the robust, almost explosive growth that is common knowledge among public officials and private residents of this area. CRE has 3,400 dwellings with approximately 10,200 residents; D.P. has 1,100 dwellings with 3,300 residents. We estimate that there are an additional 1,000 dwellings located throughout the other developed subdivisions and contiguous areas of the Drum Point peninsula with an additional 3,000 residents. These estimates are based on using the U.S. Census Bureau multiplier of three (3) times the number of dwellings. **This makes the population of this peninsula approximately 16,500 residents, plus our seasonal visitor population of more than 7,500.**

In your EIS Chapter 3, page 3.1-2 and Figure 3.1-2 you erroneously show Southern
Calvert County, e.g. Solomons, Lusby, D.P., CRE etc. as "**rural residential**". In fact, this area
(5) is one of the seven (7) largest population concentrations in the State of Maryland. Calvert County
records show that this area has had the highest growth rate within the County for over five (5)
years and one of the highest growth rates in the State of Maryland in recent years. Because of
this population change and your reliance on 1990 data, most of the assumptions, tables and
(6) conclusions in chapters 3, 4 and 5, particularly as they relate to "noise", are seriously flawed.

Please note that EIS Table 3.6-3 and figure 3.6-4 and 3.6-5 incorrectly show the areas that
(7) are impacted by noise levels in excess of 65 dB. This Table and figure estimate of 3, 138 off-base

population affected within the 60dB contour is erroneous! Under current operations there are multiple and frequent low altitude flights occurring over this highly populated area **with about 16,500 residents**. Although Figure 3.6-5 shows VFR Departure Flight Tracks over the Patuxent River, actual arrival and departures to runways 14-32 and 08 frequently overfly this populated area, rather than remaining over water.

8

We respectfully urge that flight operations be kept over open waters to the extent safety and mission requirements permit. We believe that if Reagan Washington National Airport can minimize noise levels by requiring hundreds of daily flight arrivals and departures to use the small air space over the Potomac River, it is reasonable to hope that NAS PATUXENT RIVER, with much more open water space, can develop flight tracks, routes and operational procedures to minimize noise levels over these populated areas.

9

Finally, we recommend that engine testing at the end of runway 14 incorporate a muffler device which we believe will minimize the sleep interruption noise of nighttime tests.

10

We have tried to review the EIS relevant chapters and have made detailed comments in the margins of the copy of EIS provided to us. We will be pleased to meet with you or the appropriate staff to discuss these if you wish to do so. We will be happy to return the EIS with our comments and receive another copy to retain for our records.

Respectfully submitted,

Don Randall

Donald A. Randall
Chairperson

FSCNAV.623

Potomac River Association

Box 76
Valley Lee, MD 20692

June 22, 1998

Ms. Sue Evans
Naval Air Warfare Center, Aircraft Division
c/o Office of Legal Counsel
47031 Liljencrantz Road, Bldg. 435, MS 39
Patuxent River, Maryland 20670-5440

Re: Draft Environmental Impact Statement: Increased Flight and Related Operations in the Patuxent River Complex, May 1998

Dear Ms. Evans,

In looking over the draft EIS on increased flight hours at the Patuxent River Complex, there seemed to be at least two missing items that really need to be addressed. We hope that you can amend the Draft EIS to include these items:

1 1) <u>Dumping of Fuel While Airborne:</u> We have received reports from residents in Lexington Park and elsewhere about having fuel dumped upon them by landing aircraft.

This is a proven health problem at commercial airports, and there are some epidemiology studies of this problem. Yet, the Draft EIS does not mention the problem nor to propose ways to solve or minimize it.

2 2) <u>Increased Greenhouse Gas Emissions:</u> Perhaps you cannot offset all the increased carbon dioxide emitted by these flights, but the problem really needs to be mentioned in a Draft EIS. The Office of the President is pushing on this issue, and it needs to be acknowledged by all departments.

With best regards,

Erik Jansson

Erik Jansson, Pres.
(301) 475-8366

Potomac
River
Association

Box 76
Valley Lee, MD 20692

July 6, 1998

Ms. Sue Evans
Naval Air Warfare Center, Aircraft Division
c/o Office of Legal Counsel
47031 Liljencrantz Road, Bldg. 435, MS 39
Patuxent River, Maryland 20670-5440

Re: **Additional Comment on Draft EIS:** Increased Flight and Related Operations in the Patuxent River Complex, May 1998

Dear Ms. Evans,

On June 22nd, I faxed you comments concerning dumping of fuel while airborne and increased greenhouse gas emissions. Another copy of that letter is enclosed. As I noted, there are some available epidemiology studies on the neurological effects of exposure to dumped aircraft fuel over residential areas, and the effects are adverse.

We would like to offer an additional comment:

3 ■ Inadequate Disclosure of Effects of Aircraft Noise on Children

There is a large literature on the effects of noise on health, learning ability of children, as well as upon property values of people who live next to noisy facilities. Property values tend to fall.

A very quick search of the psychology literature finds the studies, described in the following abstracts. Note in particular the effects of noise from aircraft in children at an international airport in Germany. Note that these effects take place at levels less than where hearing loss takes place. There is much more published literature than this, and it is easy to find.

Many airports, including Washington National, make efforts to reduce noise levels in residential areas and over schools by altering flight patterns.

Your draft EIS does not adequately disclose the adverse effects of noise or offer alternatives as is required by law. We think that you need to do more. After all, you are talking about exposure to more than 1 thousand people in their homes. And 950 acres is well over a square mile.

With best regards,

Erik Jansson

Erik Jansson, Pres.

c

Enclosures

PC-SPIRS 3.40 PsycLIT 1996-6/98

No.	Records	Request
#1:	619	NOISE
#2:	15624	CHILDREN
#3:	42	NOISE and CHILDREN

1 of 2
Marked Record

AN: 1997-39043-014
DT: Journal-Article
TI: Chronic noise exposure and physiological response: A prospective study of children living under environmental stress.
AU: Evans,-Gary-W.; Bullinger,-Monika; Hygge,-Staffan
SO: Psychological-Science. 1998 Jan; Vol 9(1): 75-77
IS: 0956-7976
PY: 1998
AB: Presents data from a natural experiment created by the opening of a new international airport in a rural area in Munich, Germany. Resting blood pressure, overnight levels of neuroendocrine hormones, and quality of life were measured over a 2 yr period among 217 9-11 yr old children living near to the airport. Comparison groups of sociodemographically well-matched children from nearby rural communities were also assessed over the same time period. Results show that chronic exposure to aircraft noise elevated children's psychophysiological stress (resting blood pressure and overnight epinephrine and norephinephrine) and depressed quality of life indicators. Data collected before and after the inauguration of the new airport in noise impacted vs comparison communities show that noise significantly elevated stress among children at ambient levels far below those necessary to produce hearing damage. (c) 1998 APA/PsycINFO, all rights reserved)

2 of 2
Marked Record

AN: 1997-38767-003
DT: Journal-Article
TI: A population study on risk factors for insomnia among adult Japanese women: A possible effect of road traffic volume.
AU: Kageyama,-Takayuki; Kabuto,-Michinori; Nitta,-Hiroshi; Kurokawa,-Yoshika; Taira,-Kazuhiko; Suzuki,-Shosuke; Takemoto,-Tai-ichiro
SO: Sleep. 1997 Nov; Vol 20(11): 963-971
IS: 0161-8105
PY: 1997
AB: To identify risk factors for insomnia and determine the contribution of nighttime road traffic volume to insomnia in the general population, a questionnaire survey was carried out among 3,600 20-80 yr old Japanese women living in 8 urban residential areas. The crude prevalence rate of insomnia was 1.2%. Multivariate analysis revealed that aging, living with a child/children aged 6 or younger, undergoing medical treatment, experiencing major life events, having an irregular bedtime, having a sleep apnealike symptom, and living near a road with a heavy volume of traffic are risk factors for insomnia. Taking into account other risk factors, there was a level-response relationship between the nighttime traffic volume of main roads and the risk of insomnia in the Ss living in the zones 0-20 m from these roads. Results suggest

that road traffic noise raises the sound level in bedrooms in such zones, and consequently the prevalence rate of insomnia among the residents, and that noise-induced insomnia is an important public health problem, at least in highly urbanized areas.

PC-SPIRS 3.40 PsycLIT 1996-6/98

No.	Records	Request
#1:	619	NOISE
#2:	15624	CHILDREN
#3:	42	NOISE and CHILDREN
#4:	153	AIRCRAFT
#5:	20	FUEL
#6:	0	AIRCRAFT and FUEL
#7:	20	FUEL
#8:	882	NEUROLOGICAL
#9:	0	FUEL and NEUROLOGICAL
#10:	20	FUEL
#11:	619	NOISE
#12:	15624	CHILDREN
#13:	42	NOISE and CHILDREN
#14:	619	NOISE
#15:	9972	LEARNING
#16:	41	NOISE and LEARNING

1 of 2
Marked Record

N: 1997-06705-016
T: Journal-Article
I: Age of second-language acquisition and perception of speech in noise.
U: Mayo,-Lynn-Hansberry; Florentine,-Mary; Buss,-Soren
O: Journal-of-Speech-and-Hearing-Research. 1997 Jun; Vol 40(3): 686-693
S: 0022-4685
Y: 1997
B: To determine how age of acquisition influences perception of second-language speech, the Speech Perception in Noise (SPIN) test was administered to native Mexican-Spanish-speaking listeners who learned fluent English before age 6 (early bilinguals) or after age 14 (late bilinguals) and monolingual American-English speakers (monolinguals). Results show that the levels of noise at which the speech was intelligible were significantly higher and the benefit from context was significantly greater for monolinguals and early bilinguals than for late bilinguals. These findings indicate that learning a second language at an early age is important for the acquisition of efficient high-level processing of it, at least in the presence of noise. ((c) 1997 APA/PsycINFO, all rights reserved)

2 of 2
Marked Record

: 1996-02403-003
: Journal-Article
: Classroom acoustics: The problem, impact, and solution.
: Berg,-Frederick-S.; Blair,-James-C.; Benson,-Peggy-V.
: Praxis-der-Kinderpsychologie-und-Kinderpsychiatrie. 1996 Dec; Vol 45(10): -20
: 0023-7034
: 1996
: Describes the parameters of classroom acoustics, its impact on students and teachers, and possible solutions to the problem. Excessive noise, room modes

echoes, and reverbation interfere with the ability to understand speech. Studies show that acoustical problems in school exacerbate the learning difficulties of school beginners, second language learners, children with learning deficits and hearing losses. Students with bilateral hearing losses are negatively affected by poor classroom acoustics. Poor speech recognition leads to increase in off-task student behavior, and lack of discipline and cooperation. This demands vocal adjustments by the teacher, leading to tiredness. In order to improve the listening, learning, and teaching in a classroom environment, attempts have been made to reduce the levels of noise in schools, to improve the signal without amplification systems and to use sound amplification systems.

COMMENT FORM

COMMENTOR G-7

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

Please print your comment. Feel free to attach an additional sheet if necessary.

1 I hope Pax River will minimize the additional air traffic it needs to take on and still stay afloat, and that every effort will be made to move additional operations to less heavily-settled areas, where noise will affect fewer people and where air and water quality and wildlife etc. are not already under strain.

In future meetings, please allow the testifying people to face into the auditorium. Having their backs to almost every one put them at a psychological disadvantage and made them harder to understand. The "warning card" could have been flashed to them from the back of the auditorium.

I am very mindful of the ~~threat~~ burden our heavy automobile traffic places on the environment. Here is an issue that needs a lot more work; it is often ignored because it is so "everyday." I applaud the fact that the Navy runs shuttles up to Washington, enabling people to share rides. The town is following the Navy's example slowly, with commuter buses and now a Hollywood-based airport shuttle.

I also like this form, which is its own envelope. Little things like this may not be glamorous but they add up to help the environment!

Christiane Marks, Environmental Chair, St. Mary's Parish, and Board member, Friends of the Chesapeake

Name: Christiane Marks

Address: PO Box 207

Ridge MD 20680-0207

I enjoyed meeting you, Sue and Kelly! Christiane

Fold this form along the lines shown on the other side and mail to the address shown. This form may also be faxed to 301-342-1840.

EAST FAIRWAY DRIVE RESIDENTS ASSOCIATION, INC.

July 20, 1998

Ms. Kelly Burdick
c/o Office of Legal Council
Naval Air Warfare Center
Aircraft Division
47031 Liljincrantz Road, Bldg. 435, MS39
Patuxent River, MD 20670-5440

Dear Ms. Kelly:

I am writing on behalf of the East Fairway Drive Residents Association, Inc. concerning the proposed increased flights over our area (Northumberland County).

Our Association is comprised of Homeowners who's property is located on Indian Creek just inside the Chesepeake Bay area. The area of our location is directly in line with your proposed increase fly over zone.

1 We wish to express our concerns regarding noise pollution; the impact on our community, fish and wildlife as well as the safety and damage caused by sonic booms.

Please report and record our objections to any additional fly overs in our area than you are currently conducting.

Thank you for your consideration.

Sincerely,

EAST FAIRWAY DRIVE
RESIDE~~NTS,~~ A~~S~~SOC.

A. J. Penley, Jr.
President

AJPJR/pd

Route 1, Box 1037, Kilmarnock, Virginia 22482 (703) 435-3674

From: Robert Stansbury <bstansbury04@rivnet.net>
To: TAMSVA.PO_VA(paxriver)
Date: 7/21/98 10:17am
Subject: Proposed changes in the "Fly Over" area of Northumberland County,Va.

1 THIS IS AN OFFICIAL PROTEST TO THE PROPOSED CHANGES IN THE "FLY OVER"PROGRAM INVOLVING NORTHUMBERLAND COUNTY,VA.SEVERAL RESIDENTS HAVE COMPLAINED ABOUT HEARING A SONIC BOOM.OTHERS HAVE COMPLAINED ABOUT THE EXCESSIVE NOISE CREATED BY LOW FLYING "JETS".THE SAMPSONS WHARF PROERTY OWNERS ASSOCIATION STRONGLY OBJECTS TO ANY INCREASE OF AVTIVITY IN THIS AREA.

ROBERT H STANSBURY
PRESIDENT SAMPSONS WHARF PROPERTY OWNERS ASSOCIATION
183 TREE FARM RD.
HEATHSVILLE,VA. 22473

COMMENTOR G-10

Sampson Wharf Property Owners
Association
P O Box 429
Heathsville, Virginia 22473

23 July 1998

Mrs., Kelly Burdick
C/O Office of Legal Counsel
47031 Liljencranty Road
Building 435 MS 39
Patuxent River, Maryland 20670-54406

Dear Mrs. Burdick ,

The Sampson Wharf Property Owners Association (SWPOA), which has 56 members, held our annual meeting on 18 July 1998.

One of the most important topics on the minds of the homeowners is the Navy's plan to increase flights over Northumberland County and the impact on our County and our subdivision in particular.

1 This correspondence is forwarded to you to inform you of our strong protest of the Navy's plan to increase flight operations at the Patuxent River Complex that will certainly impact all of Northumberland County.

The majority of our Association members are made up of retirees, or those who purchased property in this subdivision for that purpose. Many of us have chosen this area to live along the Great White Wicomico River, or very near the Bay to enjoy its peace, tranquility and wildlife.

It is this Association's understanding that Northumberland County is already the recipient of over 18,000 hours of these flights, creating a significant amount of noise. Furthermore, this increase will not provide jobs or any other benefits to our County.

We believe the most prudent measure would be to remove our County from the plan of the Chesapeake Test Range.

Thank you for any consideration you will give to our Association in this matter.

Dorothy T. Schipp

Dorothy T, Schipp
Secretary
Sampson Wharf Property Association

FACIMILE TRANSMISSION

07/23/98

To: Ms. Sue Evans, c/o Office of Legal Counsel
Naval Air Warfare Center Aircraft Division
Fr: The Staff at Art Calendar Magazine
Upper Fairmount, Maryland
Re: "Increased flights and related operations in the Patuxent River Complex"

Dear Ms. Evans et all:

We are sending you this fax to express our concern about the plans for the Patuxent River Naval Air Station's "Increased Flights and Related Operations in the Patuxent River Complex".

While as citizens, we appreciate the military's valiant efforts to keep us all safe from foreign aggressors, we agree with our neighbors and friends down here that we need protection from our protectors.

1 Just a few seconds by jet is the entirety of the Atlantic Ocean, whose residents, if they are disturbed by the endless sonic booms of the aircraft, have the advantage of being able to dive to the bottom of the ocean to escape it. Here, down in quiet Fairmount, we enjoy no such escape, and virtually jump out of our chairs time after time, as these aircraft race about, doing whatever it is they must do.

We urge you as citizens who have come to the bucolic countryside to escape loud noises and fright in general that if the air tests are to be expanded, they be expanded somewhere way out over the deep blue sea.

The undersigned are the staff, editors and publishers of Art Calendar Magazine, a national business magazine for the visual arts that is published in the (normally quiet) countryside of Somerset County, Maryland.

cc: Charles Massey, Somerset County Administrator
cc: Charles Corcoran
cc: Rep. Wayne Gilchrest

Angela Herbert-Hoopes
2718 Amoship Dr.
Greenbackville
VA

Barb Dougherty Pres.
27528 Fairmount Rd
Upper Fairmount.

Jefferson Boyer
2709 Church St
Whitehaven MD 21856

Chris Papalia
7491 Titleist Dr.
Salisbury MD 21801

COMMENTS FROM PRIVATE INDIVIDUALS

COMMENTOR P-1

St. Mary's College of Maryland

St. Mary's City, Maryland 20686

ision of History and Social Science

FAX TRANSMISSION

ATTENTION: Ms. Kelly Burdick

FROM: Dr. Nancy P. Smith

DATE: May 20, 1998

NUMBER OF PAGES INCLUDING COVER PAGE: 1

Fax (301) 862-0450
Telephone (301) 862-0392
History & Social Science Division

Per our telephone conversation and the public hearings:

(1) Please consider a public hearing
at Frank Knox Auditorium in Lexington
1 Park MD re EIS for Increased Flight
operations in June 1998 to allow full local input

(2) Please address EXPLICITLY the issue
of the use of the increased flight
hours to accommodate the testing of
2 nonmilitary aircraft — i.e. private
corporations planes so that this community
has the complete picture.

(3) Please address EXPLICITLY the issue of increas. air pollution. Is it considered point source or nonpoint source for regulatory purposes.
3

WRITTEN COMMENTS FOR EIS
FOR INCREASED FLIGHT HOURS

COMMENTOR P-1

To: Kelley Burdick, NAWCAD
Office of Counsel / Dan Laguaite
NAWCAD / Bldg. 435
47076 Liljencrantz Rd.
Patuxent River, MD 20670

From: Nancy P. Smith, General Delivery,
St. Mary's City, MD 20686
301-862-3615 (residence telephone)

Date: June 8, 1998

I will not be able to make the EIS for Increased Flight and Related Operations meeting on either June 10th or June 22, 1998 in the area near my residence (Lusby, MD or Great Mills, MD) due to a schedule conflict both nights. I am really sorry.

I do believe increasing the flight hours will cause increased stress on Chesapeake Bay environs residents and fauna. I do not 4
believe the Dept. of Navy should increase to flight hours without a very compelling national security reason. Our community is fragile peninsula with many species of wildlife and waterfowl. Residents of all ages will have to tolerate more noise and therefore I do not support this action. The draft EIS does not provide compelling reasons for this change in flight hours.

Biographical Information
of Nancy Paige Smith
as of June, 1998 **COMMENTOR P-1**

- Ph.D. Columbia University, 1979
  in political science
- Twenty-five years researching
  environmental policy at local, State,
  national and international level
  specializing in transboundary pollution,
  ecosystem management and sustainable
  development.
- Seventeen years as a faculty
  member of St. Mary's College of Maryland
- Member of: Patuxent River Restoration
  Advisory Board to provide citizen
  input into the hazardous waste cleanup
  of National Priority List sites on the
  Base since 1994;
- member of St. Mary's County Commission on
  the Environment since 1993. Currently
  serve as Vice-chairperson. Advises
  County Commissioners on environmental matters.
- member of the Governor's Lower Potomac
  Tributary Team. Advises governor and citizens.
- Coordinator of the St. Mary's River Watershed
  Project which has gathered environmental
  data about the watershed since 1993.

COMMENTOR P-2

6-10-98

To Mrs. Burdick,

I'm writing you this short note to voice my opinion on the increase of Flight and releated operations at the Patuxent River complex.

As a home owner and tax payer. (1) I Feel any Further increase would effect the community negative, I live in the Chesapeake Ranch Estates next to the water and in the Flight path For Patuxent River, I work a rotating shift which means that a week out of each month I sleep in the day time and work at night, On many occasions I have been awakened by a plane Flying over my residence, very low and very Fast, That isn't a good Feeling! Could you ~~be~~ imagne being at your home sleeping at 3 in the morning and be awaken by such a loud noise, I don't think you would.

This isn't a letter to complain, but any increase of Flight hours would make life unpleasant where I live,

Thank You,
Roy Mahar
POB 177, Lusby, MD 20657

June 11, 1998

916 Locust Cove Road
Heathsville, Virginia 22473

To the Attention of Ms. Kelly Burdick
c/o Office of the Legal Counsel
47031 Liljencrantz Road
Building 435, MS 39
Patuxent River, Maryland 20670-5440

Dear Ms. Burdick:

Thank you for the opportunity to comment on the Draft Environmental Impact Statement on Increased Flight and Related Operations in the Patuxent River Complex of the Department of the Navy. I also appreciate being provided with a copy of the draft report by your office. Unfortunately my schedule does not allow me to attend the public meeting at Northumberland High School on June 17. Therefore I hope these comments will be made part of the record.

1 I believe the draft study gives inadequate consideration to the impact of increased flights on the environment in Northumberland County, the only county on the Northern Neck of Virginia that lies under the Chesapeake Test Range. As you note in your report, there are already over 18,000 hours of flights on this range every year. Many of these flights are over populated areas of Northumberland County where they create a significant amount of noise. As noted in the draft report, aircraft noise levels would increase under any of the three proposals for increased flights.

2 In my view, the method used in the report to measure the noise impact is flawed. It fails to recognize the real impact of increased aircraft noise on Northumberland County.

By choosing the 65 decibel DNL noise standard, the analysis fails to measure the disturbance in Northumberland County. One of the most important reasons people choose to live in this county is for the peace and quiet it possesses and the many opportunities for outdoor recreation, including fishing, hunting and recreational boating. In such an environment, even low levels of aircraft noise are an unwelcome intrusion on an otherwise quiet environment.

The draft study only considers the impact of aircraft noise that literally cuts
off conversation inside a house. This unacceptable standard was meant to
apply to populations living directly adjacent to airports, as the study itself
3 notes. It does not even attempt to measure noise impacts on the
communities overflown by aircraft. Using such an obviously biased
measurement led your analysis further to identify a very small number of
households that would be impacted by increased noise, completely ignoring
Northumberland County. Piling these analytical biases one on another led
the study to conclude that, although noise levels would increase, no
mitigating measures would be necessary.

Furthermore, the report makes no effort to analyze the impact of the noise
from unmanned vehicles or UAVs, even though it records the fact that
disturbance reports related to UAVs have come largely from
4 Northumberland County and one other location. Given the persistent and
irritating high-pitched noise from UAVs, it seems obvious that their impact
merits separate and thorough study.

I would suggest a different line of analysis that starts from the fact that
5 Northumberland County is a semi-rural environment. It is an environment
with a growing population of retirees and people living there and moving
there seeking peace and quiet. The draft study makes it clear that
population centers in this county are already some of the most impacted by
flight operations. Even low levels of noise from aircraft create annoyance
in such an environment, where the ambient noise is much lower than in
heavily populated areas. Common sense leads to the conclusion that
activities that increase noise in such a place will have an adverse impact.

Northumberland County has done its duty to the nation by accepting the need for the current level of overflights and testing, but it should not now be asked to increase further its burden and risk the tranquillity of its way of life. Furthermore, as the report states, the proposed increase in flights brings no new employment or other benefits to the area, only increased noise.

6 I urge strongly that flight operations at the Patuxent River Complex not be increased. At the very least, your analysis must pay much more serious attention to the impact in Northumberland County and therefore consider mitigating measures as appropriate. Measures such as attempting to direct flights over water have proven inadequate, especially for Northumberland County, where most of the population lives on the banks of or very near rivers and the Bay. A more effective measure would be to remove the county from the area of the Chesapeake Test Range, perhaps asking some other area to carry its share of the burden.

Thank you for this opportunity to share my views on the draft environmental impact statement.

Sincerely,

Richard LeBaron

Richard LeBaron

cc: John Burton, County Administrator

COMMENT FORM

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

Please print your comment. Feel free to attach an additional sheet if necessary.

1\. WHAT IS REAL NUMBER INCREASE IN DRONE

1 FLYING AT WEBSTER FIELD PER DAY, NIGHT

AND WEEK.

2 2, WHAT IS REAL NUMBER / HRS INCREASE IN

HELICOPTER HOVER OVER FIELD

3 3. WHY IS PAX RIVER FLYING THE NOISIEST

TOW PLANES FOR GLIDER FLYING INSTEAD OF

USING ENVIRONMENTALLY FRIENDLY MECHANICAL OR

TRUCK TOWS FOR LAUNCHING OF GLIDERS.

OR WHY NOT USE SELF LAUNCHING (SMALL CONTAINED

ENG) ON MOTOR GLIDERS WHICH ARE QUITE AND

MORE EFFICIENT.

Name: ALEX KAMPF

Address: 17833 GRAYSON ROAD

ST INIGOES MD 20684

Fold this form along the lines shown on the other side and mail to the address shown. This form may also be faxed to 301-342-1840.

COMMENT FORM

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

Please print your comment. Feel free to attach an additional sheet if necessary.

4 1. VERY CONCERNED ABOUT SINGLE EVENT DECIBEL LEVELS OF: DRONES, HELICOPTORS, GLIDER TOW'S OUTSIDE WEBSTER FIELD PROPERTY LINE. FLIGHTS CONTINUALLY TRANSGRESS SE SIDE OF MOLLS COVE AND OVERFLY PROPERTIES ALONG CREEK & GRAYSON ROAD.

5 2. WHY ARE FLIGHT PATTERNS CONCENTRATED TO NE OF WEBSTER FIELD AND NOT OVER ST INIGOES CREEK & ST. MARY'S RIVER OR EVEN OVER THE BASE BUILDINGS, IS IT TOO NOISY

6 3. WHY EARLY MORNING & LATE NIGHT ENG RUN UPS ON DRONES & CONCENTRATED HELICOPTER ACTIVITY AFTER 2100 HRS?

Name: ALEX KAMPF

Address: 17833 GRAYSON ROAD
ST. INIGOES MD 20684

Fold this form along the lines shown on the other side and mail to the address shown. This form may also be faxed to 301-342-1840.

COMMENT FORM

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

Please print your comment. Feel free to attach an additional sheet if necessary.

7 1. WHY ARE TRANSIENT FLIERS NOT BRIEFED ON NOISE SENSATIVE AREA'S WHEN VISITING FLYING FIELDS; ie WEBSTER FIELD, PAX RIV.

8 2. WHY ARE MILITARY FLIERS NOT HELD ACCOUNTABLE FOR DELIBERATE TRANSGRESSIONS & RESIDENTIAL OVERFLIGHTS ?

9 3. ARE THERE PUBLISHED INGRESS & EGRESS ROUTES TO WEBSTER FIELD?

10 4. HOW ABOUT PUBLISHING OR MAKING AVAILABLE A DAILY FLT SCHEDULE HOTLINE SO I CAN PLAN MY LAWN MOWING & LAWN PARTIES TO POSITIVELY COINCIDE WITH LOCAL FLIGHT SCHEDULES.

Name: ALEX KAMPF

Address: 17833 GRAYSON ROAD
ST. INIGOES MD 20684

Fold this form along the lines shown on the other side and mail to the address shown. This form may also be faxed to 301-342-1840.

Comments for Meeting Regarding PAX River NAS Operational Expansion

(1) 1. Proposed increase in flight hours by 34% or 6,200 hours per year (17 hours/day) from the present level of 18,200 hours represents a dramatic increase in flight time and resulting noise. Current flight hours are sufficient to reduce the "quiet enjoyment" of our homes well below tolerable levels. We are currently subject to, by policy, being inundated from 6 am to 11 pm daily when ever aircraft are using the base for tests or other applications. Pre flight preparations begins even earlier in the day. The result is that, when aircraft are flying, sleep is lost, peaceful recovery from illness is prevented and the quality of life diminished.

(2) 2. Past experience indicates that allowing other Naval air uses as well as other military services to train at PAX River NAS means that the well intentioned minimum altitudes to be maintained by aircraft will be continuously violated. Aircraft unfamiliar with the policies of the NAS employed to minimize air traffic annoyance tend to fly too low and spend a great deal of time over populated areas at low altitudes. This is in spite of the Bases attempt to prevent these occurrences as documented by several years of experience. To add the training of 350 to 400 Army airborne personnel with exercises two to three times per year as reported in the Southern Maryland edition of the June 7, 1998 Washington Post will just add to our burdens.

(3) 3. Current levels of particulate pollution from unburned fuel is currently at a level sufficient to coat homes and outdoor furniture with a black greasy film. If this is occurring now, consider how the environment will be affected by a 34% increase in flight hours. Consider, also, the effect on the Bay and its wildlife.

(4) 4. The Solomons area has a fast growing population resulting from the current level of expansion at PAX River NAS, the increased interest in retiring in one of the most beautiful areas of Maryland, and the popular recreational uses for boating, and fishing. Increases as called for in the current proposal would diminish the perception and enjoyment of the area by those of us currently living here and those that might come in the future.

(5) 5. These changes seem driven by an attempt to justify the existence of the PAX River NAS by wrapping it in the cloak of a national crisis and future assumed challenges. The ultimate result of this proposed expansion will be to decrease enjoyment of the area and reduce the value of its homes, businesses, and tax base. Southern Calvert County and particularly the Solomons Island area will pay a disproportionate price for these unproven national needs.

(6) 6. We appreciate the value of the jobs and income resulting from the Airbase. This is a trade off for the loss of peaceful enjoyment. However, the proposed increases suggested in the additional flight hours and opening of the NAS to other military services, brings no value with it. These uses are transitory, irritating to the local population, and serve to further erode the area's benefits.

Joan and Elliot Kocen, 13248 Rousby Hall Road, Lusby, Maryland 20657

COMMENT FORM

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

Please print your comment. Feel free to attach an additional sheet if necessary.

> WOEFULLY INADEQUATE PRESENTATION

> WORSE THAN NO INFORMATION AT ALL

> INSULT TO INTELLIGENCE AND CONCERNS OF THE COMMUNITY

7 > SOUND AVERAGING IS RIDICULOUS AND IS CLASSIC EXAMPLE OF POLITICAL DOUBLE SPEAK

8 > WE'VE DONE OUR HOMEWORK AND YOU HAVE CONVENIENTLY ATTEMPTED TO GIVE AS LITTLE INFORMATION AS POSSIBLE TO THE COMMUNITY

> YOU P.R. EFFORTS ARE AS BAD AS YOUR ASSURANCES

Name: JOHN KOCEN

Address: 13248 ROUSBY HALL RD
LUSBY, MD. 20657

Fold this form along the lines shown on the other side and mail to the address shown. This form may also be faxed to 301-342-1840.

COMMENT FORM

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

Please print your comment. Feel free to attach an additional sheet if necessary. (P. 3.8-1)

1 I object very strongly to the use of the term "BP" (Before Present) for dating prehistory. This is an imprecise term that is meaningless to anyone who is not in the "Cultural History Elite Academia". BC is much clearer, as it references dates against a specific, even if mythical (to some people) event.

"BP" will be interpreted as 1998 by the public (at best), but it is really 1946 (or 2000, depending on which so-called "cultural expert" you talk to).

BP is a stupid, meaningless "politically correct" term. It is confusing, and should not be used.

Name: Wolf H. Bock

Address: 22373 Enoch Road

Leonardtown, MD 20650

Fold this form along the lines shown on the other side and mail to the address shown. This form may also be faxed to 301-342-1840.

COMMENT FORM

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

Please print your comment. Feel free to attach an additional sheet if necessary.

2 The use of hectares instead of acres throughout this document is confusing. It is a unit that is used NOWHERE in this country. The purpose of language is to communicate. To the average person, the term "hectare" is meaningless, and thus is useless for communication. I have no problem with the metric system, I prefer it, and at least the terms are generally ~~[illegible]~~ understood. "Hectare" is not. Don't use it just because it is politically correct.

Name: Wolf Bock

Address: 22373 Enoch Road
Leonardtown, MD 20650

Fold this form along the lines shown on the other side and mail to the address shown. This form may also be faxed to 301-342-1840.

COMMENT FORM

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

Please print your comment. Feel free to attach an additional sheet if necessary.

1 I Live approximately 20 M: North of the zone where It was less than 65 DB. I have Aircraft fly Directly over my house, Rattling things and such. this is much louder than Normal Speaking tone. This doesn't Bother me as I enjoy watching them But The estimate on the map Aren't always correct.

Name: [illegible]

Address: [illegible]
St. Leonard

Fold this form along the lines shown on the other side and mail to the address shown. This form may also be faxed to 301-342-1840.

COMMENTOR P-8

COMMENT FORM

1

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

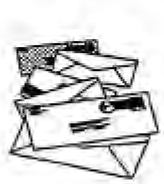
Please print your comment. Feel free to attach an additional sheet if necessary.

if the Navy isn't contributing sign. pollution to the Bay how would eliminating nickel cadium batteries benefit the Bay?

why not use computer slide show

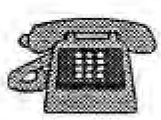
Name:

Address:



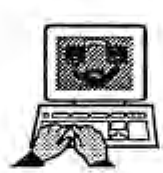
Comments may be mailed to (postmarked by July 6, 1998):

Ms. Sue Evans or Ms. Kelly Burdick
c/o Office of Legal Counsel
Naval Air Warfare Center Aircraft Division
47031 Liljencrantz Road, Building 435, MS 39
Patuxent River, MD 20670-5440



Or Fax to: 301-342-1840 (received by 5:00 pm on July 6, 1998)

Or Call Toll-Free: 1-888-276-5201 (by 5:00 pm on July 6, 1998)



Or E-mail via: http://www.tamsconsultants.com/paxriver/
(By 5:00 on July 6, 1998)

COMMENTOR P-13

From: "Richard Woolwine" <wooly@olg.com>
To: TAMSVA.PO_VA(paxriver)
Date: 6/14/98 9:27pm
Subject: Comment on Proposed Expansion of Pax River Flight Hours

Gentlemen,
I live in Saint Indigoes, MD which is located within 5 miles of the Webster
Field Naval facility and
approximately 10 miles from the Pax River base. I attended one of the
initial public hearings wherein plans were unveiled to increase the number
of Pax River/Webster Field flight hours. At that hearing I expressed
several concerns with the Navy's current flight operations and their impact
on local homeowners. Having recently reviewed the draft environmental
impact statement prepared by Navy officials my concerns have not diminished
but have significantly increased. I am sure Navy officials have performed
sufficient studies and are confident that increased air flights "will not
harm wetlands, soils, or air quality, or damage any historic structures in
the area". However the report does not address the noise pollution
1 generated by current flights nor quantify the increase in misery that will
accompany increased flight hours. I have called Pax River several times to
complain about the extremely noisy and low flying unmanned flights that seem
to consistently follow the same flight path over my house. I believe at
least one, possibly more, of these planes have crashed in the local area
2 within the last several years. Given that fact why do Naval authorities
continue to allow these planes to endanger and irritate heavily populated
land areas when there are miles of open water areas to practice over? If
there is a valid mission reason that dictates that these flights must occur
over land areas, the Navy should alternate flight paths to avoid
consistently flying over the same areas, and either muffle the engines or
restrict the planes to a very high altitude to minimize noise reaching
ground level. Low flying and hovering helicopters also add to the drone of
3 unmanned planes to produce to an almost constant level of irritating noise
through out the day and into evening hours. On a half dozen occasions
within the last two months a low flying helicopter has hovered in the same
spot close to my home around 7:30 PM for approximately 30 minutes at a time.
Helicopter noise is never pleasant and these "hovering" flights are
unbearable if you are outside or have your windows open. This is suppose to
be "the land of pleasant living" however it is not pleasant living beneath
Pax River flight paths. It is clear to me and my neighbors that Pax River
should initiate a plan to minimize current noise pollution before increasing
the number of total hours flown.

Richard F. Woolwine

COMMENT FORM

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

Please print your comment. Feel free to attach an additional sheet if necessary.

DEAR SIRS,

MY REASONS FOR REQUESTING A NO ACTION SITUATION ARE TWO FOLD.

1 THE FIRST IS THAT IN THIS QUIET, PEACEFUL PART OF THE WORLD, I FEEL THERE ALREADY MORE AIR TRAFFIC AND SONIC BOOMS THAN WE NEED. THE BOOMS RATTLE THE ENTIRE HOUSE AND ITS CONTENTS.

2 THE SECOND REASON IS A LITTLE MORE POLITICAL. WITH ALL THE MEDIA REPORTING THE UNDER FUNDING OF OUR MILITARY, WHY THIS COSTLY INCREASE IN FLIGHT TIME? IT FLIES IN THE FACE OF CURRENT INFORMATION. THIS PAST SUNDAY'S RICHMOND TIMES-DISPATCH REPORTED THAT NORFOLK NAVAL AIR STATION HAS ONLY 2 OUT OF 14 FIGHTER AIRCRAFT IN WORKING ORDER. IN ANOTHER INSTANCE PLANES ARE BEING CANNABILIZED TO KEEP OTHER PLANES FLIGHT WORTHY.

AND TO SUM UP, ANY ADDITIONAL FLIGHTS WILL NOT ENHANCE THE BEAUTIFUL, PEACEFUL ENVIRONMENT WE NOW ENJOY. NO MORE NOISE POLLUTION.

Name: ARTHUR C. JOHNSON, JR

Address: 232 LEE DALE DR.
HEATHSVILLE, VA 22473

Fold this form along the lines shown on the other side and mail to the address shown. This form may also be faxed to 301-342-1840.

COMMENTOR P-15

15 June 1998

Kelly Burdick
N.A.W.C. Aircraft Division
Patuxent River, Md.

Dear Ms. Burdick:

1 This letter is to inform you and to be made a part of the public record that I "strongly oppose" any increased flight hours of aircraft at Pax River. My reason being noise and chemical pollution.

Sincerely,
Mary C. Abell
Valley Lee, Md. 20692

Mary Louise M. Graf
13382 Rousby Hall Road
Lusby, MD 200657

June 15, 1998

Sue Evans
Office of Legal Counsel
Naval Air Warfare Center Aircraft Division
47031 Liliencrantz Road, Bldg 435, MS 39
Patuxent River, MD 20670

Dear Ms Evans;

1 I am writing to comment on the issue of "noise impact" on the area surrounding Pax. River Naval Air Station. I am sorry to have missed the public hearing to learn more about the problem. We live across the Patuxent river, west of Drum Point, right on the river. Planes fly directly overhead at times. I understand the need for practice and testing and while the fly-overs of air craft are annoying at times they are at least periodic in nature. My objection is to what sounds like engine testing which usually goes on for hours at a time with no let-up. The noise is most persistent and aggravating. In addition there is an accompanying vibration which has the potential for knocking a wall hanging loose. It would seem that something could be done to insulate the world from this source of air pollution.

Sincerely,

Mary Louise M. Graf

COMMENTOR P-17

1610 Deep Water Road
Woolford, MD 21677
June 17, 1998

Ms. Sue Evans
Naval Air Warfare Center Aircraft Division
c/o Office of Legal Counsel
47031 Liljencrantz Road
Bldg. 435 MS 39
Patuxent River, MD 20670-5440

Dear Ms. Evans:

Thanks for the Navy's recent appearance in Dorchester County to discuss potential flight exercise plans for Pax River.

1 As a resident of Dorchester County, I want to express support for the Navy and for whatever level of exercises you deem necessary to maintain readiness. I have always enjoyed the sound and sight of military aircraft as they fly overhead.

Sincerely,

Lee R Waggoner

Lee R. Waggoner
LCDR (ret) USNR

June 17, 1998

Kelly M. Burdick

RE: Proposed increase in flights over Pax River

I believe that our quality of life in St. Mary's County has been greatly decreased by the sudden increase in population at Pax River. We suffer unheard of traffic jams, rush hours, and an increase in fatal accidents with the sudden influx of people.

We are also losing open land, woods and farm land at an alarming rate; due to proposed housing and commercial projects, we stand to lose even more. This county should not become like Prince George's County around Andrews Air Force base, or even like Charles County around St. Charles--what a mess!

I would agree that it is impossible to avoid some amount of growth to an area--usually it is spaced out enough that roads, schools, public services, etc. can grow accordingly. This is normal growth and expansion. However, artificially moving this number of people to an area within a short period of time creates an incredible impact on the environment and the people involved.

2 How does this pertain to the proposed increase in flights over the Pax River area? Another increase in stress to the people and animals and environment which this will inherently impact. I am for QUALITY OF LIFE, and for maintaining the rural character of this county. I decided to check out just how many airplanes I could hear in one day. I later decided that I didn't really need to count them. Every single time I went outside on Friday, June 12, 1998, I could hear at least one plane, sometimes two or three at the same time.

Granted, perhaps these are not all military flights; but all flights have to be considered noise pollution. The private sector flights at the local airport have also increased secondarily.

I feel very sorry for the folks who don't have air-conditioning to help to shut out the noise disturbance. The planes fly very low, so that at times I have been able to read the numbers. Also, when they fly low like that, they shake the house and are easily heard indoors with the windows closed.

3 I live on the shores of the Potomac, and we get both helicopters and jets. Sometimes there are hovering maneuvers over the water, which causes noise over a long period of time. Enough is enough. Everyone wonders why there is such a thing as road rage--I submit that it is the increasing stress of living in modern society with all of the stresses that "progress" creates.

Let's not increase the stress any further! Please, please listen to the voices of reason. Many people are afraid to speak up because their jobs may be directly or indirectly base-related. This may be why the numbers of protests are lower than I would have hoped.

Sincerely,

Alison Clarke Taylor, V.M.D. 19660 Tower Hill Road, Leonardtown, MD

Alison Clarke Taylor, V.M.D.

Naval Air Warfare Center Aircraft Division

COMMENTOR P-23

My primary concern is the noise pollution produced by the drone (Unmanned Aerial Vehicle).

Visualize sitting in the dentists chair. The dentist is using the drill. Part of the discomfort is the heat from the drill and pain to the area being drilled. Part of the discomfort is the abrasive assault on the ears from the drill. I'm sure everyone will agree that the noise is unpleasant.

Now imagine listening to this drill for hours at a time, sometimes days. Get the picture? That is the effect of the UAV or drone on our lives.

The noise can be heard inside the house with the radio or TV on. In nice weather when everyone is outside it is especially irritating.

Frequently we are bombarded with noise. The sonic booms are bad enough but this assault of the drone is unnerving. Supposedly the noise level is at a rate that is tolerable - but have the people in charge been subjected to this noise for the same length of time that we have. I doubt it.

Our quality of life is important to us. We live in the rural area because it is (was) tranquil. It may be sparsely populated but even one person subjected to this assault is one too many.

1 For training purposes the addition of a better muffler would help the noise situation. Your personnel informed us that if it was added to the UAV the additional weight

would require more fuel. This added expense would limi the number of flights which would slow the training of the UAV.

COMMENTOR P-23

Training and testing are necessary for the survival of our military but surely not at the expense of the people they re protecting. If the Navy is unable or unwilling to chang to satisfy the people in this area then testing and training hould be done in a remote area (no people). We are not the enemy.

2 The safety of the people in this area is also a concern. hat happens if one of the trainees looses control of the UAV r the vehicle has a defect and crashes? We are at risk.

3 Sonic booms! Our son, who flew (F-14) from the Virginia each area, told us they were restricted to that type of flying ver the Atlantic Ocean. Why should the planes from the atuxent command be allowed a special exception? When my usband inquired he was informed that [redacted] sonic booms ere allowed over the Chesapeake Bay. We have five (5) sets of liding glass doors each of which has had thermal seals broken resulting in cloudy glass. Others in this area have indicated that this happens after a sonic boom. Perhaps if youre in the door repair business thats good but we are not.

With the increase in the subsonic and supersonic flight as well as the UAV the tranquility of this area will be further amaged. Besides people the animals are affected by these lanes. There must be other more remote areas (such as the Atlantic Ocean) where the Navy's training and testing ould be accomplished.

Since the June 17 meeting the jets have dramatically increased their flights. We wonder if this is in retaliation for complaints received from this area. **COMMENTOR P-23**

Respectfully yours,

Winnifred Carrigan
P.O. Box 478
Burgess, VA 22432-0478

From: "Franklin H. Grant" <fhgrant@crosslink.net>
To: TAMSVA.PO_VA(paxriver)
Date: 7/16/98 9:40pm
Subject: Increased flyovers

To whom, etc....My name is Franklin Grant and I live in Reedville, Va. Let me say up front that I am a supporter of a strong and well trained military. Having said that, I do object to sonic booms near my home. The first time I heard one (5 yrs ago) I almost fell off a 50' ladder where I was doing some renovation on my new (ca 1925) Reedville home. Since that time I have been jolted by booms on an average of once a week, causing cracks in my windows and plaster walls and ceilings and scaring the bejabbers out of my wife and I and our guests (we operated a Bed & Breakfast out of our home for 4 years). Coming from the Balto./D.C. area a little aircraft traffic doesn't bother us if your pilots could keep it subsonic over our otherwise quiet community. I must admit that since I voiced my complaints at the public hearing the boom situation has been much improved with distant booms being heard only on Wed. 7/15 and none at the previous level. If the Navy can maintain this status I will have no future complaints. Thank you.
fhgrant@crosslink.net

July 27, 1998

COMMENTOR P-26

To: Ms Sue Evans
c/o Office of Legal Counsel
Naval Air Warfare Center Aircraft Division
47031 Liljencrantz Road, Building 435, MS39
Patuxent River, MD. 20670-5440
(FAX 301-342-1840) ← ON 7/28/1998 11:30AM

From: Charles C. Fears Jr
PO Box 177 Burgess, VA 22432

Re: Proposed increase in flight and related operations in test areas in the Patuxent River Complex.

This letter is written as a follow-up to the remarks I made at the public hearing the Patuxent River Air Station personnel conducted in Northumberland County at the Northumberland County High School auditorium on June 17, 1998 as part of the process of drafting an Environmental Impact Statement for increased flight and related operations at the PAX River complex.

As I stated at this hearing I served in the Navy during the 1943-1946 period. I consider myself a friend of the Navy. I am well aware that the Navy has an important mission from the PAX River Base; and that this involves test flights and 'flyovers', which also must be performed within budget restraints

However, as a resident of the Northern Neck of Virgin I felt I should let the Navy know that many citizens are being definitely adversely affected by the noise and air pollution caused by these 'flyovers'; and in a number of cases homeowners are experiencing actual damage to their houses.

1 For the past 15 years I have lived at the most northeast corner of Virginia. The Smith Point Lighthouse would be just 5 miles directly east of my residence. Reedville is about one mile south, and Burgess is five miles west of my home. My house must be located on one of the direct flight paths directly south from the P.A.X. River complex. I often hear and see military jet planes passing above my house. I also at times see Navy helicopters, Navy Radar, and refueling aircraft directly overhead.

My house was built around 1950. I have 42 windows in this house — and most of these windows have 12 panes of glass. I have had numerous panes cracked by sonic booms during the period of my residency. The latest such occurrence was on July 17th around 1:15 PM. Earlier this year (around April 16th), after one of these "house shaking" sonic booms, the large picture window in my living room began to "cloud up". I am told that this was due to the seal being broken between the double glass in this window, and that the only way to correct this damage is to replace the window unit — an expense of at least 600^{00}.

A number of the over twenty speakers at the June 17th hearing spoke about similar damage to their homes; and also of the very considerable and often nearly continual noise from flyovers from jets and other naval aircraft, including drones. At times, it is difficult to carry on a conversation, even inside your home.

In the past, I have called PAX concerning specific incidents, and have been told that the best recourse was to write a letter to the Commanding Officer

COMMENTOR P-26

& therefore appreciated the opportunity to tell the Navy why these 'flyovers' have become more and more of a major concern to the citizens of the Northern Neck of Virginia; particular those living in the Reedville/Burgess area. There is not only a noise and air pollution

(2) problem here, but also safety is a major concern. As you know, not too long ago, a very tragic incident, involving one of your military jets, occured right here at Burgess. This plane crash narrowly missed a school, two banks, three churches, and a large hardware store. At the nearby Reedville/Fleeton area there are four churches, a bank, numerous boat yards and marinas, and a Menhaden industrial plant; as well as an ever increasing number of residences.

(3) I join other citizens living in the Reedville/Burgess area of Virginia in asking that the strongest consideration be given to not increasing, but actually somehow reducing the number of 'flyovers' in this area. Perhaps it might be feasible to conduct more of these "flyovers" over the Chesapeake Bay, and over Maryland waters.

Respectfully,
Charles C. Fears Jr
(804) 435-4695

COMMENT FORM

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS
July 22, 1998

I presented my thoughts on Drone flights over our house at the public meeting in Heathsville, VA. I would like to repeat and expand on those thoughts.

High flying jets traveling at speeds in excess of sound speed are a nuisance. Jets flying overhead at subsonic speeds but low are a nuisance. However, we know the supersonic jets are quickly gone. The low-flying jets are usually quickly gone but sometimes manage a few maneuvers overhead and extend their time and, consequently, there annoyance. The drones, however, seem to have a restricted flight pattern over the Great Wicomico River in the vicinity of the Route 200 bridge. They remain overhead all day and fly day after day after day. They slow down and speed up; they turn before they are at a lower sound level (not far away) and manage to maintain a constant modulated sound level in my neighborhood. This continuous sound, though not as loud as a jet, is more annoying. It lasts and lasts and lasts.

I understand from speaking with one of your officers (Navy equivalent of an Army Captain by the rank designation) that this year is different from usual and there are less drone flights. I had at first assumed that they were reduced due to some hope that increased jet flights would have less trouble with the public. I can only expect that next year will be normal in that there will be continuous drone flights overhead along the Great Wicomico River.

I have not heard any complaints about the drone noise from parts of Northumberland County other than the Wicomico River area. Perhaps the Navy would consider the possibility of spreading the wealth. There is east; there is west; there is north. I am sure
2 other parts of the county would not have great objection to, say, once-a-week flights overhead all day. That might make it tolerable in the Wicomico River area. Further, it has been my observation in my travels around the United States of America that it is a really grand and large country. Nowhere else have I heard drones overhead day after day after day. Certainly there are places in this country that I have not spent many days outdoors, but this does not mean there are not many places where such training could take place! Consider Washington, DC, there are good landmarks that would be good for training pilots of drones that are perhaps more relevant than a tree or bend in a small river. Consider the Navy base itself, are there not landmarks to use in training pilots appropriately? Surely, no one on the base would complain about the noise and the pilots-
3 in-training might have better feedback.

There is the question of property values. I did observe this house before purchase on various days of the week. I cannot be assured that potential buyers in the future will restrict their visitation to weekends when no drones are flying. I do not know when the next 'quiet' year will exist.

Finally, I was in the Army, compliments of my friends and neighbors, and one of the things that remains in my mind is morning police (picking up cigarette butts, etc.). We examined nests of red ants and of black ants and then proceeded to move a few of one into the nest area of the other. It resulted in war. I do believe that generating animosity between citizens of the USA is not a military goal. Please help!

I thank the US Navy for this chance to inject my thoughts,

Ralph C Brainard

Ralph C. Brainard, PhD
AT&T/Lucent Bell Labs, retired
132 Barrett Lane
Heathsville, VA 22473
Phone: 804 580 5519

From: Jerry Mazetis <"tezam@rivnet.net"@rivnet.net>
To: TAMSVA.PO_VA(paxriver)
Date: 6/26/98 2:43am
Subject: PUBLIC COMMENTS ON INCREASED FLIGHTS

My wife and I wish to submit the following statement into the public record regarding the proposed increase in test flights.

As a former military family, we understand the need for adequate
preparedness for our military personnel and machines. However, we
1 request that the "No Action" alternative for flight increases be
adopted. After more than 31 years of government service, we retired to
the Northern Neck to escape the noise in the Washington, D.C. area, and
we do not appreciate that our "Golden Years" are frequently interrupted
by very noisy (and sometimes dangerously low) flyovers. The drones over
2 our area in Heathsville (Presley Creek) are too frequent, too low, and
much too noisy. The drones are often low enough overhead not only to be
disturbing, but also to drown out any conversation. This is compounded
by the drones' additional attribute that they are relatively
slow-moving and, therefore, their noise is persistent and long in
duration. This characteristic of the drone flyover is akin to the
infamous Chinese Water Torture in which a brief encounter would be no
effect, but the continuous, unrelenting noise (i.e., long in duration)
makes a world of difference. All drone flights should be out over the
bay, and very high. This additional fuel and wear and tear to the drone
3 are cost-effective to tax payers when the gain from the "annoyance
benefit" is factored into the analysis. An additional gain to the
cost-benefit analysis would be from the finite reduction in risk to the
public due to accidents from land flyovers.

4 While we understand that pilots are instructed not to fly low enough to
bother us with noise from sonic booms, it is our observation that these
rules are not adhered to in a consistent manner. Today (25 June), we
heard a sonic boom at about 3:00-3:30 p.m. Accordingly, jets should also
conduct their flights over bay waters. This would be cost-effective for
the same reasons cited above for drones. We therefore request that
flights do not increase and that all flights be conducted over bay
waters and at a sufficient height not to disturb ground/sea level
members of the public.

Dr. & Mrs. G.R. Mazetis

June 29, 1998

Ms Sue Evans
% Office of Legal Counsel
Naval Air Warfare Center Aircraft Division
47031 Liljencrantz Road, Building 435, MS 39
Patuxent River, Maryland 20670-5440

Dear Ms. Evans:

Our family has lived in Maryland since the 1850's. My wife and I have lived on St. Leonard's Creek in Calvert County, Maryland for more than a quarter century. Many members of our family and myself served in the Navy, some career people. We are always pro Navy, and believe the Navy tries hard to be a good neighbor.

Our concern regards the recent proposed increase of 20 to 30 percent in the Navy mission activities at Pax River. In recent years, noise levels have increased at various times of the day and
2 night, sometimes after 11 PM, particularly from slow moving choppers. Also from leased radial engine float planes practicing touch and goes on St. Leonard's Creek for two days from 8 to 4PM
3 on both days. The choppers and the float planes are very annoying.

We understand and support the Navy requirement to be operationally ready to meet all world crisis, but loud noise and destroyed television signals do not help our neighborly relations. This
4 proposed increase in air traffic will only heighten our sense of frustration when experiencing up to 30% more noise and signal disruption.

I feel a toll free hot line directly into the proper level in the chain of command needs to be
5 established to provide feedback and to let the Navy know how they are doing as a good environmentally concerned neighbor.

Sincerely yours,

Edward F. Hainke

Edward F. Hainke
10755 Sawpit Cove Road
Lusby, Maryland 20657-2841
410-326-2888

Dear ________

Do you know that because St. Mary's Co is not in the metropolitan government area as Charles Co and Calvert Co are, that we in St. Mary's are not required to do air quality monitoring? Our region is in the path of polluted air masses from all parts of the country. With our propensities for huge stagnant & humid air masses to get stuck over our region, adding to this already existing problem with more jet fuel (extra flight hours) and exhaust seems incomprehensible! Exhaust is one of the leading causes of air born nitrates or acid rain. Nitrates is the heaviest contributor to an outbreak of problems in the Chesapeake Bay such as pfiesteria. Other health problems that are statistically higher in St. Mary's anyway, such as cancers should also give us pause. ①

Although there's no official study on this, cancer in St. Mary's has decreased in the [illegible] eight years just as the Chesapeake Bay's [illegible] [illegible]

On a personal level, family & friends can attest to the noise of earlier times. Our home has been in the flight path for fifty years, but the intensity of the

2 noise level and electronic interference

3 is now at times intolerable. More importantly, our children have had breathing difficulties at times. We also must clean our windows with an abrasive. We've been told this is from acid rain and pollution.

We are one family. Think of all the families in the Navy's path. There's the population that is much bigger now, so there's even more lives at stake than some years ago. The natural resources of clean [illegible] state also are in danger of direct physical [illegible] due to [illegible] as are [illegible] rivers, clean air & water and consequently a safer food chain are atleast as important to the safety of the population as extra testing of defense equipment in a time when we are suppose to be reaping peace dividends.

An interesting criticism of American defense that is made by a European military commentator, Philippe Grasset, publisher of a Brussels aerospace industry news-letter, and quoted by William Pfaff of the Los Angeles Times says that the United States is impoverishing its power by its commitment to technically advanced weaponry. He says the United States prepares for high-technology conventional wars unlikely to happen, at the cost of low-tech capabilities for the kind of operations more likely to be needed. It has an enormously sophisticated force "waiting for Godot" — or for the barbarians who never came. As Mr. Hassett further notes, reality takes its toll. A year or so ago, the U.S. Army's 1ST Armored Division spent three weeks trying to complete a flooded river crossing in Bosnia. Armored Divisions used to be good at winter river crossings, even opposed ones, with an enemy shooting at them. That is what armored divisions were for. Now we have the B-2, a weapon so expensive 2.2 - 2.5 billion per unit - one third the cost of an air-craft carrier) that commanders are loathe to even use it

Go To 5

The stealth technology developed in the 1970s and applied to the B-2-F-117A and today F-22 fighter program have since 1975 added some $400 billion to the cost of these systems and even today, when it is a mature technology, it continues to cost the Pentagon between $4 billion + $5 billion annually. Yet its operational value in today's conditions is open to serious question.

Our whole region is now dependent on these "iffy" issues. The Navy is having its way with us. I object to these extra flight hours and the whole dubious necessity of being held hostage by the side effects of these military operations here in All O'Mairj's Co.!

Thank you, Carolyn Egeli

COMMENT FORM

COMMENTOR P-45

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

Please print your comment. Feel free to attach an additional sheet if necessary.

2

IT APPEARS TO ME THAT THE US NAVY HAS NOT DONE ADEQUATE LONG-TERM PLANNING IN REGARD TO ITS FUTURE OPERATIONS. FIRST THE NAVY TALKED OF MOVING MOTHBALLED NAVAL VESSELS FROM THE RECENTLY CLOSED PHILADELPHIA NAVY YARD FOR STORAGE IN THE PATUXENT RIVER. THEN THEY CLOSE EXTENSIVE OFFICE FACILITIES IN NAWCAD-TRENTON AND CRYSTAL CITY, VA. ETC BUT MUST BUILD MAJOR NEW BUILDINGS AND HOUSING AT THE NAWCAD-PAX BASE TO ACCOMODATE PERSONNEL AND FAMILIES. WHILE MOVING STAFF AND FACILITIES TO PAX MAY BE GOOD FOR THE LOCAL ECONOMY THIER PROPOSAL OF MOVING MOTHBALLED SHIPS TO THE PATUXENT WAS RIDICULOUS AND FRUSTRATING TO LOCAL INHABITANTS. BOTH ACTIVITIES SHOWED POOR PLANNING ON THE PART OF THE NAVY AND ALONG WITH THE PRESENT PROPOSAL OF INCREASE FLIGHTS WILL COST THE TAXPAYERS MILLIONS

SECONDLY, WHILE POSSIBLE MAJOR WORLD POWER CONFLICTS HAVE BEEN REDUCED CONSIDERABLY WITH THE DISINTEGRATION OF THE USSR, AND DOD'S REDUCED MILITARY BUDGET REFLECTS THIS, THE REQUEST TO INCREASE OVERFLIGHTS AND TESTING DOES NOT. PARTICULARLY WITH EMPHASIS ON "MULTI SERVICE COOPERATIVE PROJECTS" AND MORE "CROSS SERVICE FACILITY UTILIZATION" STRESSED IN SECTION 7.3 OF YOUR DRAFT DOCUMENT, THE NAVY SHOULD BE DECREASING OVERFLIGHTS AND TESTING AT NAWCAD-PAX. IT IS RECOGNIZED THAT NEW TYPES OF WARFARE OF A REGIONAL OR LOCAL LEVEL CALL FOR THE DEVELOPMENT OF NEW TYPES OF WEAPONS. SOME OF THEM MAY BE MUCH MORE SOPHISTICATED AND REQUIRE MUCH TESTING AND EVALUATION, BUT SUCH ACTIVITIES MUST NOT BE OBJECTIONABLE, DANGEROUS OR NOISY TO THE INHABITANTS

Name:

1 LIVING NEARBY. IN OTHER WORDS IF AN INCREASE IN OVER-FLIGHTS AND BOMB TESTING IS ESSENTIAL, DO IT WHERE

Address:

POPULATION DENSITIES ARE LOW OR NON-EXISTENT: AT SAN CLEMENTE ISLAND, A TWENTY MILE LONG UNINHABITED ISLAND ALREADY LISTED AS A MILITARY RESERVATION 60 MILES OFF THE CALIFORNIA COAST, OR AT THE NAVAL WEAPONS CENTER OF THE MOHAVE DESERT RANGE B RESTRICTED AREA, OR AT THE HUGE U.S.M.C. TRAINING CENTER IN THE BULLION MOUNTAINS RESTRICTED AREA, OR THE 25 X 50 MILE LONG NAVAL WEAPONS CENTER IN CHINA LAKE,

Fold this form along the lines shown on the other side and mail to the address shown. This form may also be faxed to 301-342-1840.

COMMENT FORM **COMMENTOR P-45**

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

Please print your comment. Feel free to attach an additional sheet if necessary.

CALIFORNIA, OR THE SALTON SEA NAVAL TEST RANGE. BUT DO NOT INCREASE POLLUTION AND NOISE BY OVERFLIGHTS THAT AFFECT MANY FARMING COMMUNITIES IN DENSELY POPULATED SOUTHERN MARYLAND, THAT AFFECT THE CHESAPEAKE BAY, A MAJOR RECREATION AREA OF THIS NATION'S CAPITOL AND WHICH AFFECTS THE RETIREMENT HOMES OF MANY HUNDREDS OF INHABITANTS ALONG THE SHORES OF THE PATUXENT.

3 THIRDLY, THE NAVY CLAIMS THAT THE SOPHISTICATED TELEMETRY AND THEODOLITE MEASURING DEVICES THAT ARE STRUNG ALONG THE 20 MILES OF CHESAPEAKE SHORELINE SOUTH OF PAX ARE LINKED TO THE THREE TARGETS WITHIN THE TEST RANGE ARE NOT AVAILABLE ELSEWHERE. HOW IS THAT POSSIBLE SINCE THE COMPANIES THAT DEVELOPED AND MANUFACTURED THE PLANES, ROCKETS AND FUSING SYSTEMS ALL DID SO IN PLANTS THAT HAD ACCESS TO THE DESERT TEST RANGES. AND IF INDEED SOME UNIQUE TESTING DEVICES ARE ONLY AVAILABLE AT PAX — SHIP THEM OUT TO THE SPARSELY POPULATED AREAS. NAWCAD-PAX SHOULD CARRY OUT THE FUNCTIONS THAT WERE DONE AT NAWCAD-TRENTON N.J. and in CRYSTAL CITY, VA. BEFORE THE MOVES TO PAX.

4 FINALLY, THERE IS ALWAYS THE DANGER THAT ACCIDENTS CAN HAPPEN. AN AIRCRAFT COULD CRASH INTO THE LNG-LIQUID NITROGEN STORAGE FACILITY WHICH IS WITHIN THE TEST RANGE OR IT COULD CRASH INTO THE ATOMIC ENERGY PLANT AT SCIENTIST CLIFFS NOT TO MENTION HOMES OR VILLAGES NEAR THE FLIGHT PATHS OF NAWCAD-PAX. THE MORE FLIGHTS THERE ARE - THE HIGHER THE RISKS.

I AM NOT OPPOSED TO THE DEVELOPMENT OF THE REGION BUT I WOULD LIKE TO HELP DIRECT AND DETERMINE THE TYPE OF DEVELOPMENT THAT ADDS TO THE QUALITY OF LIFE NOT SUBTRACTING FROM IT. I PURCHASED LAND HERE IN ST. LEONARD, CALVERT COUNTY 30 YEARS AGO, NOW IN RETIREMENT LISTEN EVER MORE TO THE HELICOPTERS FLYING ABOVE MY HOUSE AND TO PLANES ON THEIR FLIGHT PATHS TO THE PAX BASE OR THE DISTANT SONIC BOOMS OF TEST FLIGHTS. I VOTE FOR THE NO ACTION ALTERNATIVE OF THE DRAFT DOCUMENT.

Name: WOLFRAM DREWES *

Address: P.O. BOX 505

ST LEONARD, MD. 20685

* I HAVE SERVED FOR SEVERAL YEARS IN THE USMC, STARTED IN THE NAVY'S V12 PROGRAM IN THE 40'S, HOLD A PH'D DEGREE IN THE SCIENCES + WORKED IN RESOURCE MANAGEMENT ALL MY LIFE. BELIEVE ME - I DO LIKE THE NAVY/USMC BUT ALSO THE QUALITY OF LIFE. THE TWO COULD GO AHEAD TOGETHER.

Fold this form along the lines shown on the other side and mail to the address shown. This form may also be faxed to 301-342-1840.

From: "Sue & Jack Burgess" <burgee@chesapeake.net>
To: TAMSVA.PO_VA(paxriver)
Date: 6/29/98 1:12pm
Subject: Comments on Proposed Increase in Flight Hours, NAS Pax River

1 □I wish to express my full support for the proposed increase in flight hours at NAS Patuxent River and associated Navy facilities. Indeed, my only reservation is that the proposed cap of 24,400 hours annually might not be enough to properly do the necessary work.

Naval aviation has brought the power of the United States to bear when and where dictated by national interests for more than 80 years. The consolidation of Navy aviation RDT&E at Patuxent River has increased the importance of those facilities to the continued maintenance of that great national asset, and requires increased flight operations. In addition to enhancing combat effectiveness, properly conducted testing and related activities help to assure the safety of the people involved, and therefore protect as well lives and the national investment through accident avoidance and mitigation. A third reason for increased operations and testing is that tax expenditures are protected because the products of U.S. and foreign vendors are rigorously evaluated, and improved, by the RDT&E process at the Navy's Patuxent River complex.

As for flight hours and operations, the Navy should be free to exercise its judgement as to what is needed to do the job right, and to operate accordingly.

Jack Burgess
11845 Blue Point Court
Lusby, MD 20657

ROBERT R. KANE 804-529-6124

"The Glebe's Reach"
592 Highland Point Road
Lottsburg, Virginia 22511
June 24, 1998

Ms. Sue Evans
Naval Air Warfare Center, Aircraft Division
c/o Office of Legal Counsel
47031 Liljencrantz Road, Bldg. 435, MS 39
Patuxent River, MD 20670-5440

Dear Ms. Evans:

The purpose of this letter is to provide comments regarding the Department of Navy, Environmental Impact Statement (EIS) on the subject of Patuxent River Complex Increased Operations.

For the record, I am opposed to Operational Workload Alternatives I, II and III, all of which would increase activities in the area. Accordingly, I support the "No Action Alternative".

The reason for my opposition to any increased activities is that my home is in Northumberland County, Virginia which is within the Patuxent River Complex. In the past, under the existing workload level, we have suffered from at least two major activities in this area.

1 The first is flights which result in sonic booms which shake our house on it's foundation. We have over $15,000 worth of Andersen thermopane windows and a number of them have leaked. While I cannot directly attribute their leaking to the sonic booms, since the leaks do not appear coincident to the booms, I suspect they are creating the leaks. I notice that the phenomenon of sonic booms is hardly addressed in the EIS.

2 The second is the "drone" which is forever buzzing over Northumberland County disturbing the peace and tranquillity of the area. I do not know the purpose of this drone, but the noise pollution it creates is irritating at best. I have heard many Northumberland County residents complain about it's incessant buzzing.

3 Finally, as a general comment, I believe that rural areas are being discriminated against in regards to these current and enhanced levels of operations. These proposals would never be put forward if the areas affected were urban areas, but our homes and the tranquillity of our environment are just as important to us as they are in suburbia, if not more so. Accordingly, I believe the Navy, rather than proposing to increase operational activities, should be looking for ways to eliminate these activities in this area which is becoming more and more populated. The increased noise pollution and safety risks call for such an effort.

I appreciate the opportunity to comment on the EIS and trust my comments will be given full consideration.

Sincerely,

Robert R. Kane

cc: The Honorable Herbert Bateman
The Honorable John Warner
The Honorable Charles Robb

COMMENT FORM **COMMENTOR P-48**

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

JUNE 17, 1998

Please print your comment. Feel free to attach an additional sheet if necessary.

1 THE ENVIRONMENTAL IMPACT HEARING AT NORTHUMBERLAND HIGH SCHOOL ADDRESSED SUB-SONIC NOISE BUT DID NOT ADDRESS SONIC BOOMS. SONIC BOOMS ARE CAUSING STRUCTURAL DAMAGE TO MY HOUSE AND MY NEIGHBORS HOUSES LOCATED ON THE VIRGINIA SIDE OF THE POTOMAC RIVER IN THE HARBOUR POINT DEVELOPMENT. THIS CAN BE LOCATED ON A VIRGINIA STATE MAP AT HULL NECK.

IN ONE DAY WE HAD THREE SONIC BOOMS. WE HAVE BEEN TOLD THAT THESE FLIGHTS SHOULD BE CONDUCTED IN AN AREA AND ALTITUDE THAT WE WOULD NOT BE AFFECTED BY SONIC BOOMS, THEREFORE THE BOOMS THAT WE ARE EXPERIENCING ARE CAUSED BY PLANES GOING SONIC OUTSIDE THEIR AUTHORIZED FLIGHT PATHS. FOR THE PAST FEW WEEKS THE PROBLEM HAS LESSEND CONSIDERABLY. WE DON'T KNOW IF THIS IS DUE TO DISCIPLINARY ~~A~~ ACTION AT PAX RIVER, OR A TEMPORARY CHANGE IN ADVANCE OF THE PUBLIC HEARING. IF THE SONIC BOOMS CONTINUE TO AFFECT OUR HOUSE, WE ARE DEFINETLY OPPOSED TO INCREASED FLIGHTS AT PAX RIVER.

AUDIBLE NOISE FROM SUB-SONIC FLIGHTS IS A NUISANCE BUT IT DOESN'T CAUSE STRUCTURAL DAMAGE & POSSIBLE HEART ATTACKS AS SONIC BOOMS CAN. AS AN EX-MARINE I APPRECIATE THE ROLE OF THE MILITARY BUT I OBJECT TO MY TAX DOLLARS BEING SPENT TO TRAIN NAVAL AVIATORS WHO DON'T FOLLOW THE RULES AND DAMAGE MY PROPERTY.

Name: DOUGLAS R MORRISETTE

Address: P.O BOX 596

BURGESS, VA 22432

804-580-5111

Fold this form along the lines shown on the other side and mail to the address shown. This form may also be faxed to 301-342-1840.

COMMENTOR P-49

COMMENT FORM

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

Please print your comment. Feel free to attach an additional sheet if necessary.

1 I VERY STRONGLY OBJECT TO ANY INCREASE IN FLIGHTS AT PAX RIVER NAVAL AIR STATION BECAUSE OF THE SONIC BOOMS THAT ARE CAUSING STRUCTURAL DAMAGE TO MY HOUSE, AND QUITE A BIT OF MENTAL ANGUISH TO IT'S OCCUPANTS.

EACH TIME I REPORT A SONIC BOOM, I AM TOLD THAT THE PLANE MUST HAVE BEEN LOWER THAN THE 31,000 FEET REQUIRED FOR SONIC FLIGHTS, OR THE BUCK IS PASSED TO SOMEONE "USING THEIR AIR SPACE ILLEGALLY" WHERE ARE THE AIR TRAFFIC CONTROLLERS?

IN LIGHT OF WHAT HAPPENED IN ITALY, I WOULD THINK THERE WOULD BE STRONG DISCIPLINARY ACTION AGAINST ANY AVIATOR FLYING OUTSIDE HIS AUTHORIZED ZONE, I ASSUME RULES ARE MADE FOR THE SAFETY OF THE AVIATOR AND THE PEOPLE ON THE GROUND.

IF AN AVIATOR CAN LAND ON AN AIRCRAFT CARRIER, HE CAN CERTAINLY STAY WITHIN HIS AUTHORIZED FLIGHT LIMITS. IT'S AMAZING THAT IN THE LAST FEW WEEKS PRIOR TO THE JUNE 17TH MEETING, THE SONIC BOOMS HAVE BEEN FEW + FAR BETWEEN WHICH JUST PROVES THE RULES + REGULATION CAN BE OBEYED.

Name: PHYLLIS R MORRISETTE

Address: P.O. BOX 596
BURGESS, VA. 22432-0596 — MAILING ADDRESS

142 BEACH POINT DRIVE
BURGESS, VA 22432 — RESIDENCE

Fold this form along the lines shown on the other side and mail to the address shown. This form may also be faxed to 301-342-1840.

To Sue Evans or Kelly Burdick,

My name is Karl Bryan and I work for the Navy. I moved down to Pax in 1993 and live on Hermanville Road near route 5. I was reading about the meeting concerning increased flight hours and would like to give my comments.

First, I like to say that I support the Navy work at Pax and support any changes needed to increase or strengthen our abilities. I live right in the middle of the out going and in coming air traffic along with being directly in the night approach path of the E-6. I think that any person who knows there is a military facility nearby must face the facts that the base was there long before them and that they had the choice to purchase a home in the area. I also support some aspects of wildlife preservation based on compromise solutions that benefit both parties. I agree that some of the noise can be quite annoying, like the low fly maneuvers of the 141, which squeaks like a pig and that a CH53 shakes you to the bones. I do not know if the base has operational procedures like the Airport, where the pilots are instructed to throttle
1 back power and climb high before full power. I do think that some of the active duty pilots are coming in too fast and maneuvering as if they were on the carrier.

I would suggest that if the Navy would like to quiet the concerns of the people, the following approaches might help;

2 1) Give them a copy of the operational procedures explaining how the aircraft can reduce disturbances.
2) Give them an example of aircraft and wildlife living together without problems. Example: In England there is an Air Force base that has Owls that live in the ground around the runways. Environmentalists
3 argued that the owls would disappear due to the base, but in fact the Owls not only prospered, they help keep bird strikes down.
4 3) Navy should seek to develop quieter engines or noise countermeasures (reverse noise propagation).
4) If people insist on pushing valuable facilities away, then maybe the Navy should seek to purchase surrounding land as buffer space and implement parks, wildlife preserves or agricultural reservations to help reach a useful solution that can practical and political resolve some problems.
5 5) Navy should seek to develop more efficient burning fuels or engines to nullify the emissions that some of the people have concerns about. For your information, when I brought my house and cleaned my deck with deck wash, I decided to spray some on the house siding. The house was placed in 1988 and
6 the color was dull tan, but after spraying I noticed the bright tan color which had been cover by a dark film. I suspect the dark firm is residual JP5 from the aircraft operating over time in and around my house.

Well I have said enough for now and hope that my comments will be of some use. Thank you for your time and consideration on this matter. If you have any questions for me, I can be reached at 301-757-4735 or 301-862-2396.

Karl R. Bryan

1214 Forrest Landing Road
Heathsville, Virginia 22473
26 June 1998

Ms. Sue Evans
Ms. Kelly Burdick
C/o Office of Legal Counsel
Naval Air Warfare Center Aircraft Division
47031 Liljencrantz Road, Building 435, MS39
Patuxent River, MD 20670-5440

Dear Ms. Evans and Ms. Burdick:

1 I'm concerned about the Navy's proposals to increase flights and related operations over the Chesapeake Test Range. I believe the environmental impact statement (EIS) has not adequately evaluated the potential effect of noise from these operations on the quality of life in Virginia's Northern Neck.

2 The EIS has determined that the Navy's alternatives will have no significant impact on noise levels. The materials distributed by the Navy at its hearing in Heathsville, Virginia do not show that any of the 20 specific noise measurement locations were on the Northern Neck. If noise measurements were not taken here, the EIS conclusions are based on incomplete data.

3 The EIS appears to have evaluated noise levels (volume) only. Volume is not the sole factor that warrants consideration. Duration and frequency of occurrence are also part of the context. Aircraft engine noise might be well below 65 decibels, but if we are exposed to it continuously for long enough periods, that is excessive noise. Whether sonic blasts exceed 65 decibels or not, if they occur frequently enough, we will regard them as excessive noise. The EIS is not measuring all the relevant factors.

The Navy needs more information before it can draw conclusions about the environmental impact of the alternatives. Noise must be measured in all affected areas, with sensors on the ground (in addition to computer models). All relevant factors must be measured, including duration and frequency. Furthermore, if the Navy cannot articulate standards for acceptable levels of duration and frequency, those standards must be developed and worked into the study before the EIS can be considered complete and accurate.

Sincerely yours,

Cindi Kaiser deCapiteau

COMMENTOR P-52

From: "ndrc" <ndrc@ezy.net>
To: TAMSVA.PO_VA(Cynthia)
Date: 7/2/98 6:26PM
Subject: Pax River

Henry Werner Meseke Immanuel
2250 Elliott Island Rd
Elliott Island, MD 21869
Home Phone 410 376 3643

July1, 1998

NAWCAD
Office of Counsel, Dan Laguaite
Building 45
47076 Liljencrantz Rd
Patuxent River, MD 20670

Dear Dan Laguaite,

I have to take exception to any future testing on the Chesapeake Bay and it's tributaries. Not only are there serious environmental problems which presently exist from the early 1940's, but no one with in the DOD and or the Navy has taken any initiative to make available to the public all the records of experimental or other tests, bombings, etc., which have been conducted on the land or in the water surrounding the Bay and its tributaries. I have been turned down numerous times even though I have made this reasonable request under the Freedom of Information Act (FOIA). This leads me to believe that the Navy is not being forthright but may also be hiding information from the public concerning the possible problems which may exist in the Bay due directly to their past experiments.

Take for instance that Bloodsworth Island and the restricted deep water bombing areas directly across the Bay from the Patuxent Naval Base have continuously been bombed since the 40"s, though they areas are potential hazardous waste sites it seems that the Navy does not care about it's potential problems, which are presently affecting the Bay. I was able to receive information stating the severe problems which may exist at the Bloodsworth Island site, and when I asked the EPA and Little Creek to produce the same information they said none existed though the documents where in the possession my attorney and myself.*

This leads to the fact that the Navy has not been forthright in helping to protect the Bay and all the surrounding inhabitants such as the residents and the other living creatures who may have been exposed to any past damaging bombings, explosions, etc. Since we are not being treated respectfully with receiving full disclosures we must assume the worst and that such problems which have existed in other parts of the Country might also exist and probably do exist right here on the Bay.

I also must condemn all training efforts, and or other DOD usage of the Bay and it surroundings due to the fact that as long as the DOD does not move toward a NON-LETHAL form of defense, in all such training, experiments, etc. that I consider these acts grievous to all that these defenses are meant for, including myself. The reasoning is that all that the DOD does is against my religious beliefs. It is an indisputable fact to me that Jesus desired to have all Christians love their neighbors, and that we are also to love our enemies. In Matthew of the New Testament Jesus tells us not only to love our enemies but to also turn the other cheek. Matt 5:38-48

I ask that the Navy change their attitudes toward all enemies to take into account that all people and societies have a right to live, though some societies and their leadership make aggressive mistakes and thereby a type of defense is a necessity. The defense of the future is one of which our enemies are protected and not killed. In this way we will not instill hate in our enemies hearts.

1 In conclusion I am opposed to any training expansion, due in part to the DOD's inability to open all past bombings, experiments, etc., on the Bay, knowing that any experiment might lead to an environmental or human disaster, such as the plane that crashed near Elliott Island.**

2 I also am asking that the DOD review all future training and review the possibilities which exist presently concerning NON-LETHAL weaponry.

I since I believe in Pacifism I must state that all defense as promoted by the present DOD is an unacceptable behavior, which has nothing to do with peace or love.

* EPA identification # 7170090016
NEESA #13-167PA (These reports were suppressed and or lost since 1988, by Little Creek and the EPA)

** To this date the DOD has not released any information concerning the cause or the content of that plane crash.

Sincerely,

Henry Werner Meseke Immanuel

COMMENT FORM

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

Please print your comment. Feel free to attach an additional sheet if necessary. July 10, 1998

Thank you again for returning my irate call concerning NOISE - NOISE - NOISE.

I took your advice and called yesterday (7/9/98) beginning at 4:35 P.M after a loud BANG AT 4:32 P.M. The line was continously busy, busy, busy.

Could there be but one of two reasons why the line stays busy???

2 1. After a boom, the phone is taken off the hook to cut down on the number of calls?

3 2. So many, many people are so tired of this noise that they are all trying to call and complain and, therefore, the line stays busy?

As stated previously, the booms seem to alrealy be on the increase and, therefore, the public is being ignored.

On Monday of this week, a Ms. A. C. Sharpe called and stated that a F-16 flying at 35,000 feet was the culprit of last Thursday's (7/2/98) very loud bang -- I guess another hot rod trying to have fun.

Sincerely, W H Cowardin

7-9-98

P.S. I tried to call you after the above mentioned bang and a recording stated that you were out.

Name: Mr. W. H. Cowardin

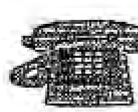
Address: 202 Sharps Creek Ln.

Reedville, Va. 22539

Telephone: (804) 453-7114

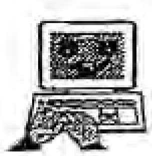
Comments may be mailed to (postmarked by July 6, 1998):

Ms. Sue Evans or Ms. Kelly Burdick
c/o Office of Legal Counsel
Naval Air Warfare Center Aircraft Division
47031 Lijencrantz Road, Building 435, MS 39
Patuxent River, MD 20670-5440



Or Fax to: 301-342-1840 (received by 5:00 pm on July 6, 1998)

Or Call Toll-Free: 1-888-276-5201 (by 5:00 pm on July 6, 1998)



Or E-mail via: http://www.tamsconsultants.com/paxriver/
(By 5:00 on July 6, 1998)

COMMENT FORM

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

Please print your comment. Feel free to attach an additional sheet if necessary. July 10, 1998

Dear Ms. Burdick,

The enclosed informative sheet is of little value to me and many of my friends as we are interested only in the last section under NOISE ISSUES.

The biggest concern is not how many more flights you want to have but how much less noise we could have in our area. Broken windows, cracked walls, cracked concrete are some of our concerns. With all the planned increase in performance which will increase government costs, is the Navy going to help out with our costs which we did not create?

If the desired planned increase in flights is such a good thing, why not spread the good tidings around and give some of this noise to other areas. I can suggest areas like WAshington, Alexandria, Bethesda , McLean and then you can be assured that Senators, Congressmen, etc., would shut you down real fast. The ocean is a big, big pond that can surely be used more often and release the Bay Area of some of this annoying unwanted noise.

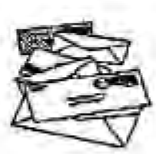
CONT. NEXT PAGE

Name: Mr. W. H. Cowardin

Address: 202 Sharps Creek Ln.

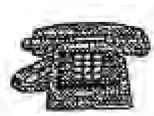
Reedville, Va. 22539

Telephone: (804) 453-7114



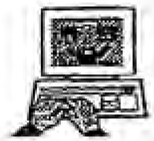
Comments may be mailed to (postmarked by July 6, 1998):

Ms. Sue Evans or Ms. Kelly Burdick
c/o Office of Legal Counsel
Naval Air Warfare Center Aircraft Division
47031 Liljencrantz Road, Building 435, MS 39
Patuxent River, MD 20670-5440



Or Fax to: 301-342-4840 (received by 5:00 pm on July 6, 1998)

Or Call Toll-Free: 1-888-276-5201 (by 5:00 pm on July 6, 1998)



Or E-mail via: http://www.tamsconsultants.com/paxriver/
(By 5:00 on July 6, 1998)

006231

LILIAN LUMBER COMPANY, INC.

Everything For The Builder

Home Center Store

P.O. BOX 55
BURGESS, VIRGINIA 22432

Main Office Phone: (804) 453-4511
Home Center Phone: (804) 453-4911

Customer's Order No. ______ Date 4-5-97 19__

Name W. H. Cowardin

Address Rt 1 Box 1936 202 Sharps Creek Ln.

Reedville Phone: 453-7114

SOLD BY	CASH	C.O.D.	CHARGE	ON ACCT.	MDSE. RETD.	PAID OUT	LAYAWAY

QUAN.	DESCRIPTION	PRICE	AMOUNT
	CALL BEFORE		
	DELIVERY		
1	2846 / DPH4246 / 2846		
	2846 - 388.70		
	DPH 4246 307.45		
2	SCREENS 39.48		
	MULL 55.86		
	INSIDE CASING 7.76		
	798.85		

Picture Window
Side Windows
one unit

696.15
31.32 tax
727.47

Past due accounts are charged a FINANCE CHARGE which is computed at a single (periodic rate) of 1 1/2% per month which is a 18% ANNUAL PERCENTAGE RATE applied to the previous balance after deducting current payments and/or credits. If legal action becomes necessary to collect past due accounts, the attorney fee in the amount of 25% will also apply.

All claims and returned goods MUST be accompanied by this bill.

Received By

TAX	35.94
TOTAL	834.79

GSCO-852-0
PRINTED IN U.S.A.

Thank You

Above window replaced because of previously broken window — due to Sonic Booms from Naval Aircraft

From: Mr. W. H. Cowardin
202 Sharps Creek Ln.
Reedville, Va. 22539

4

Your tables in relation to impact within the 65 dB DNL Contour really seem out of line. It seems that whoever conducted these tests had them turn out to favor the Navy. Would the same results have occurred had they been conducted by civilians for civilians?

The taxpayer ultimately pays for everything and I can assure you that the planned increase in flights and noise is one expense that the taxpayers of the Northern Neck don't desire to have on the increase.

MORE is not necessarily better!

Sincerely,

W. H. Cowardin

COMMENT FORM **COMMENTOR P-55**

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

Please print your comment. Feel free to attach an additional sheet if necessary.

PLANES FROM NAS PATUXENT RIVER FLYING AT SUPERSONIC SPEED HAVE BEEN A SERIOUS IRRITANT HERE IN OPHELIA VA FOR SEVERAL YEARS. IN ADDITION TO BEING AN IRRITANT AND AN ANNOYANCE PLANES FLYING AT SUPERSONIC SOUND HAVE CAUSED PHYSICAL PROBLEMS AS WELL AS PROPERTY DAMAGE!

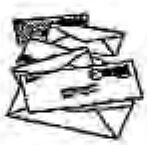
THE COMMENTS IN THIS LITERATURE UNDER "NOISE ISSUES" ARE ERRONEOUS AT BEST, AND ON THE VERGE OF LUDICROUS. TO SAY THAT THERE IS NO SIGNIFICANT NOISE IMPACT, WHEN WHOLE HOUSES VIBRATE, WINDOWS RATTLE AND BREAK, WALLS AND CEILINGS CRACK AND TILE CRACK IS TOTALLY FALSE!

2 SUPERSONIC FLIGHTS SHOULD BE DONE OVER THE OCEAN AND SHOULD NEVER OCCUR OVER RESIDENTIAL AREAS. THOSE PILOTS WHO CONTINUE TO "HOT DOG" IT OVER RESIDENTIAL AREAS SHOULD BE SEVERELY REPRIMANDED, AS SHOULD THEIR FLIGHT COMMANDERS.

DECREASE FLIGHTS OVER NORTHUMBERLAND - DO NOT INCREASE THE NUMBER OF FLIGHTS.

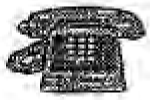
Name: Stephen Y. Mohyle

Address: PO BOX 207
OPHELIA, VA 22530
(804) 453-7535



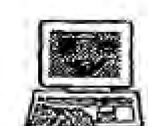
Comments may be mailed to (postmarked by July ~~6~~ 15, 1998):

Ms. Sue Evans or Ms. Kelly Burdick
c/o Office of Legal Counsel
Naval Air Warfare Center Aircraft Division
47031 Liljencrantz Road, Building 435, MS 39
Patuxent River, MD 20670-5440



Or Fax to: 301-342-1840 (received by 5:00 pm on July ~~6~~ 15, 1998)

Or Call Toll-Free: 1-888-276-5201 (by 5:00 pm on July ~~6~~ 15, 1998)



Or E-mail via: http://www.tamsconsultants.com/paxriver/
(By 5:00 on July ~~6~~ 15, 1998)

July 22. 1998

Kelly Burdick
NAS Patuxent River Public Affairs Office
47122 Liljecrantz Road
Bldg. 440, Suite A
Patuxent River, Maryland 20670

Dear Ms. Burdick:

Thank you for sending us the Draft Environmental Impact Study.

3 1. It appears that the Navy is more concerned with adverse effects on chickens than it is with the adverse effects on humans.

4 2. We would like to have copies of the following reports:

Integrated Management Plan for the Patuxent River Complex.

"Report on Public Scoping: ..." (Page 10-3 EIS). We were not aware that a meeting was held in Burgess 5/97.

Notices for the public meeting that were run in our local papers in June of this year. You mentioned to me that they were 1/2 page notices. However, the only one we can find is 2" x 4" notice in the Northumberland Echo.

DoD's Fiscal Year 1996-2001 FYDP report.

CVW-8 report to COMNAVAIRLANT

Eagan, McAllister & Associates, Inc. (1/98)

5 3. We understood that increased aerial activity would not commence until the comment deadline date of July 29, 1998. It has substantially increased over the past three weeks.

6 4. Update on sonic booms since our letter to you of 7/8/98

- **7/9 at 4:32 P.M.**
- **7/13 at 6:51 P.M.**
- **7/15 between 11 A.M. and 12:30 P.M.** (Our 12 year old grandson was visiting and thought

that a kitchen cabinet had fallen off the wall!)

- 7/15 at 1:10 P.M.

Hopefully the pilots are not emulating pilot Capt. Richard J. Ashby and navigator Capt. Joseph P. Schweitzer.

5. Lt. Com. Todd A. Wynkoop's response to at least 23 sonic booms since January was quite cavalier.

7 6. How often will our electricity be affected by the Navy's sensitive electronic testing?

8 7. How will we be compensated for decreased property value due to the increase in aerial testing?

9 8. Why Northumberland County, VA.? Is it because the Navy considers this area a low socioeconomic environment, and therefore can be taken advantage of? Why not limit the airspace to Maryland water and land?

Many of our neighbors and acquaintances are very concerned about the Navy's future plans, but they will not publicly say anything for fear of reprisal.

Yours truly,

Stephen Y. & Ruth N. Mohyla
P.O. Box 207, Ophelia, VA 22530
(804)453-7535

cc: Hon. Herbert H. Bateman, Member of Congress

June 26, 1998

Ms. Sue Evans
Naval Air Warfare Center
Aircraft Division
c/o Office of Legal Counsel
47031 Liljencrantz Road
Bldg. 435 MS 39
Patuxent River, Maryland 20670-5440

Dear Ms. Evans:

My husband and I were out of town and unable to attend the recent Open House at the Cambridge-South Dorchester High School. We are sorry we missed the opportunity to hear more detail about the Navy's proposed operational changes at Patuxent.

1 Based upon what we know about these changes, we would like to make a few comments. For the past seven (7) years my husband and I have operated a Bed & Breakfast in South Dorchester County. We have a 3500' grass airstrip on our property (18 NM South of Cambridge, Lat: 38-22-35N, Long:76-07-25W. We are on the aeronautical charts as Loblolly Landings.) We understood when we purchased this property that it lies directly under Patuxent Airspace. However, our aeronautical charts indicated that this airspace started at 3500'. On a regular basis your Naval flights overfly our airstrip at just above tree top level. We have been concerned about air safety, and warn anyone planning to fly into Loblolly to watch carefully for military aircraft. We have not contacted Patuxent about this matter in the past, as we do not currently own an airplane, incoming flight activity has been very low, and we are not actively marketing to the flying community.

"The Sportsman's Retreat"
2142 Liners Road • Church Creek, Maryland • 21622 • (410) 397-3033

2 Within the next two years this will change as we plan to expand our facility. At that time we will be purchasing an aircraft and begin marketing our Bed & Breakfast to the flying community. This will mean increased air traffic at Loblolly Landings. If Patuxent increases their annual flight hours as well, and naval pilots continue to fly under 500', we will have a potentially dangerous situation here.

3 Although we have no complaints at this point about the noise level of the military flights (aside from the house shaking periodically from a subsonic/supersonic flight) we know that some of our neighbors have complained to you. Could a potential solution to this problem in South Dorchester be to instruct your pilots to fly at higher altitudes, thus reducing some of the noise and also keep them within the designated 3500' airspace of Patuxent? We are very concerned about safety and hope that you will give this matter serious consideration.

Best Regards,

Marlene Slavin

Marlene Slavin
Co-Proprietor

Mr. & Mrs. Robert P. Kramer
174 Plantation Road
Callao, VA 22435

June 27, 1998

Kelly Burfick
Office of Legal Counsel
Naval Air Warfare Center
Aircraft Division
Building 435
Patuxent River, MD 20670

Dear Ms. Kelly,

We're writing to express our opinion and vehement opposition to the proposed increased flights over Northumberland county by Navy Aircraft.

We moved to the Northern Neck / Northumberland County from Northern New Jersey to escape just this kind of noise and air pollution. Now the Navy proposes to inflict this on us.

1 Obviously we question why the Navy cannot play their war games over the waters of the Chesapeake Bay or for that matter, the Atlantic Ocean which for them is only minutes away, without overflying the tranquil lands of the Northern Neck??

2 We oppose the possibility of Sonic Booms which have proven to damage homes by breaking window seals, damaging plaster walls and many other detrimentals affects on homes. 3 We oppose the noise pollution which we will be subject to by the unmanned drones.

Very truly yours,

Ruth & Robert Kramer

CC: Senator John W. Warner
Senator Charles S. Robb
Congressman Herbert H. Bateman
Board of Supervisors, Northumberland County

201 Carolina Drive
Heathsville, Va 22473
June 27, 1998

ATT: Kelly Burfick
Office of Legal Counsel
Naval Air Warfare Center
Aircraft Division

Subject: Drones

We have lived on the Northern Neck for twelve years--retired from the noise and traffic of Northern Virginia where we lived for twenty years. We never got used to the noise. We sought relief here on the Northern Neck. Now our peace and quiet has turned into a nightmare. Lawn mowers, boats, and an occasional airacraft doesn't bother us for we know that the noise is shortlived.

1 However, the monotonous drone of these unmanned aircraft is something else. A nerve wracking sound we just cannot get away from. The noise and aggravation grates on nerves we never knew we had.

Please leave us to what peace we have left in our retirement years.

Sincerely,

J F Kelly
Nelle Kelly
James F. and Nelle Kelly

copy to John Burton
Northumberland County
Administrator

722 Icehouse Cove Lane
Heathsville, VA. 22473
June 30, 1998

Ms Kelly Burdick
c/o Office of Legal Council
47031 Liljencrantz Road
Bldg. 435, MS 39
Naval Air Warfare Center Aircraft Division
Patuxent River, MD. 20670-5440

Dear Ms. Burdick:

This letter is to comment on the EIS for proposed increase of flights over Northumberland County. My comments are directed specifically at the operation of the Unmanned Aerial Vehicle.

1 I understand the need for some aerial activity from the various manned aircraft from PAX River over our county, and am willing to tolerate it because it is usually of short duration; they fly over and are gone. However, the unmanned drone is another matter. That aircraft, which often spends several hours a day circling overhead with a extremely annoying and persistently loud chainsaw -type noise, is already intolerable. I certainly do not want any increase in the amount of time that drone is operated over this county.

2 In fact, the current total flight time should be significantly reduced. It is not fair to the people of this county to have to listen to that penetrating noise day-after-day. If you can't do that, how about putting a muffler on it to bring the noise down to a more tolerable level.

Sincerely,

Roy Graybill

Roy Graybill

July 2, 1998

Dear Sir:

I most heartily regret that I was not able to attend one the recent hearings on the subject of flight increases at Patuxent Naval Air Station. I strongly disagree with the published articles on the subject which all seem to headline "little impact" or "minimal impact" and I would have so stated at such a hearing. To express my opinion via letter seems the alternative.

I live in Drum Point, almost directly across the river from NAS. As such, I apparently live directly in at least one of the flight paths from the base. To say that the noise from the fly-overs does not have an impact is in error. To say that the spent fuel (or whatever it is) does not have
1 an impact is also in error. It is clearly visible from the tail of the planes when they fly over. It is also highly visible in the form of soot and residue on my deck, windows, windowsills and certainly on my once-white deck furniture. There is no
2 industry (or traffic) in this immediate area that would normally create such fallout.

The noise makes it impossible to hold a conversation, talk on the phone or listen to the radio and/or TV while the planes circle overhead, and they often seem to circle for long periods of time.

To anticipate an increase of up to 25% in temperature, rainfall, food prices, the work week, or any category would most certainly have an impact, and this is no exception.

Some of my neighbors express the same concerns as I. Others, as I have learned by stating my opinions, are employed by NavAir, are military and have done practice runs there in the past, or have other economic interests in connection with the Base, and are reluctant to be critical.

I confess to a certain amount of the "not-in-my-backyard" thinking. I also confess to being a bit less adamant since having long talks on the subject with my son who is stationed at Fallon Navl Air Station in Nevada. We have discussed the purpose of some of the flights, the testing, the high-tech and expensive equipment that exists at Pax River and not, for instance, at Fallon NAS. I had suggested that all (or a lot) of this could be done there in a much less developed area. He could not, however, answer why many/most of the flights appear to be at tree-top level.

3 Thus, I guess that I have the basic question. If all of this flying has to be done in this area, and the number of flights needs to be increased, why can they not be done at a higher level and, rather than circling endlessly over this populated area, can't it be patterned more out over the water?

I doubt that I will strongly influence the Navy in their plans and expansion of Patuxent Naval Air Station, but as comments have been solicited, have felt compelled to foward mine.

I appreciate your consideration.

Sincerely yours,

Islay Kesecker

(Ms.) Islay Kesecker
580 Beech Drive
Lusby, MD 20657

2 July '98

Dear Ms. Evans:

(1) For the record: Not everyone here on Northern Neck is upset over the flights of the Navy drones.

I know for a fact that some of the people here who have complained feel obligated to complain about any and everything. It is what makes them get up in the morning — something to complain about.

The drone overflights

are at worst a
momentary distraction,
not the least disturbing
to this old sailor.

Keep up the good work!

Sincerely,

A H Giles
CAPT, USCG (RET)

[illegible]
Burgess, VA 22432
Chesapeake Bay Foundation

2 JUL 98

COMMENTOR P-69

Dear Mr. [illegible]

I missed your local public hearing on the increase of flight operations at Patuxent, but having talked over this situation with my neighbors, I've decided to write.

There is a general consensus that there would be only one possible complaint. The occasional breaking of the sound barrier, although a shock to one's systems, is not it!

1 I live near the bridge over the Great Wicomico River. It seems to be a target of the drone aircraft that are _frequently_ flown in our area. _The drone drones_. That is the problem. The drone has been known to drone on for hours & hours, day after day. The noise is not unlike the jet boats (PWCs) that receive similar complaints. If the drones had a muffler there would be no complaint.

2 I read where Ski-Doo has muffled their jet boats this year. I think if the Navy gave the go ahead to one of its innovative drone mechanics that the _training drones_ could be quieted. If this is not practical, maybe some more targets could be found. I know that if the target was the admiral's house, the admiral's wife would have a resolution in no time!

Yours truly,

David L. Robinson

6140 Tompkins Drive
McLean, VA 22101
July 5, 1998

Office of Legal Council
Naval Air Warfare Center Aircraft Division
47031 Liljincrantz Rd.
BLDG. 435, MS 39
Patuxent River, MD 20670-5440

Subject: Navy Environmental Impact Statement for Northumberland, VA.

Dear Ms. Sue Evans or Ms. Kelly Burdick:

1 I own property in Burgess, VA, and plan to retire there in the near future. I have found the noise, especially from the "UAV" planes to be very distressing and irritating. The noise goes on for long periods, and is unpleasant, distracting, and beyond a tolerable level.

I am a veteran, and have always supported our armed forces and our need for national defense. However, this noise, and the length of time we are subjected to it, is unreasonable. Instead of increasing the flights, the number and duration of the flights should be decreased. When I travel to other parts of the Northern Neck area, I don't seem to hear any of the noise. Is the Burgess area being targeted in particular? If you need more flight time, then the flight paths should be varied over a much larger pattern, or different parts of the region, (example; over open water in the chesapeake bay where there are no homes.)

I thank you for your attention to this matter, and hope the Navy will take steps to ensure they can continue their aircraft testing program, but without undue hardship to any one group of civilian population.

Sincerely,

Willard E. Roberts

Willard E. Roberts

CC: Senator Charles Robb, U.S. Senate
Senator John Warner, U.S. Senate

July 7, 1998

To: Naval Air Warfare Center

I am writing in response to the Navy's proposed increase in test flights over Northumberland County.I am against any increase in test flights, due to the noise from the Navy jets.

1 I have tinnitus, (ringing in the ears) which this past winter I spent 2,000 dollars in a new treatment called Tinnitus Retraining Therapy. After five monthsI was doing better, the ringing had decreased. All it took was one excessively loud sonic boom, and all that training was wiped out, and my ears were worse than they ever were. Now I don't go outside without hearing protection, except on weekends, or late in the day.Whoever was flying that jet, was too low, because it sounded like somebody dropped a bomb at my feet. A lot of other people heard it too. I have lived here all my life and the sonic booms seem to be getting louder and more frequent.

I work in the water,(crabbing) and I have moved from where I usually crab, because I don't want to go up into your test area.At times I lose up to 100 dollars a day because of the noise.

It is my opinion that if your pilots can't follow instructions and stay high enough, so the noise and sonic booms are bearable, you should do it somewhere over the wateror in the ocean where it won't hurt anybody.

I didn't go to the meeting that you had in Heathsville, because I thought that I might be the only one there complaining. As it turns out, there are a lot of people complaining.If you are affecting the quality of so many people's lives, you should redraw your lines, so that you can minimize the effect. I am thinking about moving away from this area. I guess it will depend on what happens to your proposal.

Please send me a map of the test area with altitudes, so that I will know where to move.

Sincerely,

Louis N. Haynie

Louis N. Haynie

2087 Fleeton Road

Reedville, Va. 22539

COMMENT FORM

COMMENTOR P-72

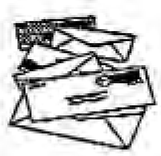
EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

Please print your comment. Feel free to attach an additional sheet if necessary.

1 No More flights over Northumberland County.
Too Many Sonic Booms —
Too many hot rod flyers —
Someone has to control these idiots?
I will fight any increase in flights!!

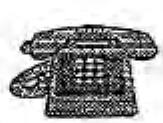
Name: ______________________

Address: ______________________



Comments may be mailed to (postmarked by July ~~6~~ 15, 1998):

Ms. Sue Evans or Ms. Kelly Burdick
c/o Office of Legal Counsel
Naval Air Warfare Center Aircraft Division
47031 Liljencrantz Road, Building 435, MS 39
Patuxent River, MD 20670-5440



Or Fax to: 301-342-1840 (received by 5:00 pm on July ~~6~~ 15, 1998)

Or Call Toll-Free: 1-888-276-5201 (by 5:00 pm on July ~~6~~ 15, 1998)

Or E-mail via: http://www.tamsconsultants.com/paxriver/
(By 5:00 on July ~~6~~ 15, 1998)

July 14, 1998

Ms. Sue Evans
c/o Office of Legal Counsel
47031 Liljencrantz Rd. Bldg. 435
MS 39 Naval Air Warfare CenterAircraft Division
Patuxent River, Maryland 20670-5440

Dear Ms. Evans:

Unfortunately, my wife and I were unable to attend the June 17 public meeting relative to the Navy's Environmental Impact Statement related to a proposed increase in flights over our geographical area. We would, however, like to provide our comments for your consideration.

1 We live on Betts Mill Creek, which is just off the Great Wicomico River, near the Highway 200 Bridge over the River. We are concerned and disturbed by the current level of flights over our area. The sonic booms we experience shake our entire house. We are concerned about the long-term effects of these sonic booms on our home, which is built on pilings. We don't see why you cannot demand that pilots assure that their sonic booms do not affect residential areas. I also would like to know who we should contact when we do experience these sonic booms -- if current regulations are written to preclude sonic booms over areas such as ours, then you need to enforce them; if they do not, then you need to revise the regulations to so provide.

2 The biggest and most frequent aggravation is the drone, which flies for hours directly over our home. Everything that others have said during the public meeting about this drone is true, and it is unnerving, to say the least. We definitely do not want additional drone time, and strongly suggest that you fly the drones somewhere over the Bay, and not over residential areas.

Thank you for your consideration, and we look forward to your reply.

Sincerely,

Paul M. Carren Lucille E. Carren

Paul M. Carren Lucille E. Carren

P.O. Box 366 722 Lampkintown Road
Burgess, Virginia 22432-0366

From: Lou Dietrich <dietrich@crosslink.net>
To: TAMSVA.PO_VA(paxriver)
Date: 7/15/98 1:05pm
Subject: sonic booms in Northumberland, Virginia navy aircraft test area

Name: Lloyd and Mary Lou Dietrich, 150 Tuckahoe Drive, Kilmarnock,VA 22482. Geographical location: Boundary of Nortumberland and Lancaster counties, Virginia on Indian Creek, 1 mile from downtown Kilmarnock.

1 Our family experience with sonic booms: We experience approximately 3 to 5 sonic booms per month which presumably, we have recently learned, are caused by Navy aircraft pursuing testing protocols in its nearby test range. (Dumb us, we used to think that developers were dynamiting large tree stumps in residential development areas.) We have been on the receiving end of these booms since l986 when our house was constructed by one of Kilmarnock's three leading home building contractors. On each occurrence the house noticeably shakes and most noticeable of all our interior French doors -- three pairs -- shiver, shake and chatter for three or four seconds indicating that a substantial overhead force is impacting on the exterior structure of our residence. Our residence has four skylights, three of which leak rain water from time to time, and one of the three is showing structural damage including dry rot. This being the case, we assume that dry rot is in the rafters behind the dry wall.

2 Recommendations: We suggest: (1) that the authorities install monitoring sensors at relevant sites to detect the frequency and severity of sonic booms in the test area, especially in the southern region of Northumberland County; (2) that routine polling/interviews be conducted to determine the cumulative impact of repeated sonic booms. (Perhaps one or two sonic booms cause little or no structural damage but

3 it would seem reasonable to hypothesize that repeated booms would have a wearing and damaging effect); (3) that there should be no increase in aircraft activity in the Northumberland County area until the local effects of the current activity are empirically established.

4 Questions: (1) Is there a data base available that has been developed correlating the frequency and severity of sonic booms in the local area or in other naval aircraft testing areas? (2) What procedures are

5 available to residents pursuing claims for alleged structural residential damage?

CC: TAMSNYO.SMTP("sp%am6@mr.nawcad.navy.mil","evans")

From: "Jerry E. Timberlake, Sr" <jet@rivnet.net>
To: TAMSVA.PO_VA(paxriver)
Date: 7/17/98 6:50am
Subject: Disturbed by Noise of Planes/Drones

1 Please be advised that as a property owner and taxpayer I am advising that the continual humming of the drone aircraft is very annoying and disruptive to me and my family in regards to being able to enjoy our home/yard. These things continue for hours with their constant noise disrupting sleep/naps/outside activities. Also in addition the low
2 flying activities/habits of the jet aircraft who at times barely skim the treetops and break sound barriers are downright dangerous and cause pictures to fall from walls, nick-nacks to fall and break not to mention the scare they give you with their un-expected antics. I am voicing this objection to the continued flights of both type aircraft in this sensitive area but know that the dept of the navy and federal gov. will do what it wants to anyway,

Respectfully Submitted
J.E. Timberlake, Sr.
Rivers bend Estates, Inc.

COMMENT FORM

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

Please print your comment. Feel free to attach an additional sheet if necessary.

1 We have been experiencing sonic booms which shake our house & could cause damage to the structure as well as furnishings hung on the walls.

Although we have no objection to increased operations if they contribute to our national defense we feel they should be conducted at subsonic speeds/or taken over open waters to avoid the aforementioned sonic booms.

We are located on the western shore of the Potomac, across from Point Lookout, MD, between Hack Creek & Cobitt Creek

Name: Robert & Joan FLORE

Address: PO Box 657
Burgess, VA 22432

Fold this form along the lines shown on the other side and mail to the address shown. This form may also be faxed to 301-342-1840.

COMMENT FORM

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

Please print your comment. Feel free to attach an additional sheet if necessary.

1 I DO NOT BELIEVE YOU HAVE THE TAX PAYING PROPERTY OWNERS INTEREST IN MIND WHEN YOU CONTINUE TO INCREASE THE NOISE LEVELS OVER THE NORTHUMBERLAND COUNTY AREAS.

MANY HOME OWNERS IN THIS COUNTY DID NOT ATTEND THE HEATHSVILLE MEETING DUE TO LACK OF PROPER ADVANCED INFO.

I CAN ASSURE YOU THAT MANY MANY HOME OWNERS ARE QUITE UPSET OVER THE UNNECESSARY VERY LOUD SONIC BLASTS THAT DESTROY OUR PROPERTY. EVERY HOME THAT I KNOW OF HAS CRACKED SEAMS IN THEIR DRY WALL & CEILINGS. IF OTHER AREAS THAT HAVE MILITARY AIRCRAFT FLYING OVER HEAD AND BREAKING THE SOUND BARRIER ARE ALSO CAUSING AS MUCH DAMAGE AS I KNOW OF IN THE VA. AREA I LIVE IN THEN I CAN ASSURE YOU THE MILITARY IS BUILDING ILL WILL INSTEAD OF GOOD WILL

I WOULD RATHER BELIEVE THAT YOU WOULD PREFER TO BUILD GOOD WILL.

Name: NAME WITHHELD ON PURPOSE

Address:

Comments may be mailed to (postmarked by July 6, 1998):

Ms. Sue Evans or Ms. Kelly Burdick
c/o Office of Legal Counsel
Naval Air Warfare Center Aircraft Division
47031 Liljencrantz Road, Building 435, MS 39
Patuxent River, MD 20670-5440

Or Fax to: 301-342-4840 (received by 5:00 pm on July 6, 1998)

Or Call Toll-Free: 1-888-276-5201 (by 5:00 pm on July 6, 1998)

Or E-mail via: http://www.tamsconsultants.com/paxriver/
(By 5:00 on July 6, 1998)

From: "Pete F. Litteral" <pjlit@crosslink.net>
To: TAMSVA.PO_VA(paxriver)
Date: 7/22/98 1:41pm
Subject: Opposed.

07/22/98

Ms. Sue Evans or Ms. Kelly Burdick
c/o Office of Legal Counsel
47031 Liljencrantz Road, Building 435
Patuxent River, MD 20670-5440

Ms. Evans and Ms. Burdick,

1 We endure enough disturbances the way it is here in Northumberland County, Virginia with the noises of the aircraft. Any increased activity was just be adding fuel to the fire. Do you folks know about the increased population in the county?

Enough already.

Regards,

Fleming & Joyce Litteral
270 Oak Lane
Reedville, Va 22539

Toll free 1-888-276-5201 before 5pm 7-29-98

COMMENT FORM **COMMENTOR P-79**

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

Please print your comment. Feel free to attach an additional sheet if necessary.

Sir,

1 I'm writing to protest increased DRONE or Jet Flights over the Northern Neck of Virginia. I'm sure that these flights must take place as I'm sure that Maryland has some urban populated areas also.

The DRONE is the most irritating piece of machinery I ever heard, last when good Jets break the sound Barrier and break the seals in our windows, that is uncalled for in my opinion. I have had dishes fall off the shelves. I haven't heard of anyone offering to pay any damage that you boys have caused.

We are very much against any increase ~~for~~ in your Flights of ~~any~~ any Type.

Sincerely,
Alvie Bushman

Name: Alvie W. Bushman
Address: P.O. Box 536
Burgess, VA 22432

Fold this form along the lines shown on the other side and mail to the address shown. This form may also be faxed to 301-342-1840.

COMMENTOR P-83

586 Fox Point Rd
Reedville, Va 22539
July 26, 1998

Ms. Kelly Burdick.
Office of Legal Counsel
Naval Air Warfare Center
47031 Liliencrantz Rd
Building 435 MS 39
Patuxent River MD 20670-5440

Dear Ms. Burdick.

Concerned citizens of Reedville and Northumberland County in general strongly object to the increased flight activity in the Chesapeake Test Range.

In fact we object to the fly overs at all since the Navy has plenty of room over the ocean in which to practice their "hot dogin" etc. The noise alone due to the sonic booms and such let alone the possibility of a plane crashing into one's home is grounds enough for objection. Oceana, Va requires the planes take a certain path to the ocean to reduce the noise and eliminate the possibility of crashing into homes killing people.

COMMENTOR P-83

Why can't Patuxent and Base do the same. This certainly does nothing to enhance the P.R. with the Navy. In fact we see no reason why the Patuxent air station should remain open in these days of Budget cutting when we have such a large base in Tidewater Virginia which could easily cover the territory with ease and at less expense, and I am asking Rep. Herbert Bateman to recommend the closing of this base at the next Base closing they have to save money and eliminate a nuisance to the surrounding communities, which the Navy has no interest in. It would be different if we were at war or had a serious enemy to attack us as we thought in the Cold War era and were asked to sacrifice but we don't. The taxpayers have to foot the bill which seems unnecessary at this time.

Furthermore many of the residents

COMMENTOR P-83

in Northumberland county are retirees who purchased their homes to live out their lives in peace and quiet without the noise of many planes ~~break~~ the sound barrier and possibility of a plane landing in their living room. We built this country and deserve a rest. The younger generation should respect this and make life better for all young and old and not live just for themselves. This goes for Clinton too.

So in summary, send the planes out over the ocean and all will be happy

Yours Truly
Joe K. Powell

cc: Herbert Bateman
Rep. 1st Dist of Va

From: "Tom & Elaine Price" <eprice@rivnet.net>
To: TAMSVA.PO_VA(paxriver)
Date: 7/27/98 12:22pm
Subject: ESI

Dear Ms. Evans/Ms. Burdick-
Our comments on the ESI for Paxriver-

(1) We believe that the noise impact over the area in which we live(Smith Point area) is a MAJOR concern.The noise from tests are so frightening that it causes the heart to pound and our dog to run for cover,shaking.The windows shake,the walls shake-our neighbors have had windows actually break from the sonic boom noise.I feel that the noise levels we are experiencing are well above the 65 decibels .I would like to know where the community noise level studies were done and when? Certainly they were not conducted on the dates and at the times which I have recorded and which I include for your information.Certainly these noise affect a population much greater than the 806 reported in you brochure.Which hospitals and nursing homes were studied? Which 318 dwellings were studied?The access issue is another area

(2) of life affected by these tests-While a not insurmountable obstacle it is a consideration while enjoying the sailing on the Chesapeake Bay-We have to be ever alert of the restricted areas of the Bay particularly in the middle bay area around Tangier and Solomon's Island.An increase in the activities in the restricted areas to about 34 hours a month is more of an intrusion on the Bay waters.We also question the impact to the water quality when

(3) anything not natually occurring and in natural quantities are added to the bays waters that we are so desperately trying to clean up-or are we?? We understand the need for military testing and readiness for our safety but wish to express our great concern that the studies done to justify the testing are inadequate-only bandaid attempts to quell the publics discomfort and concerns.Thank you for hearing our concerns.

Thomas and Elaine Price

Following is a partial list if the noise disturbances over our home in the past 7 months:

January
5 10:44 AM
3:55 PM
13 2:32PM
20 4:08 PM
21 1:30 PM
1:45 PM
5:45 PM
6:00 PM

February
2 10:55 AM
18 8:55 AM
26 12:40 PM

March
3 2:45 PM
3:00PM
4 8:25 AM & 5:16 PM & 5:23PM

16 10:50 AM
18 10:55 AM
23 11:02 AM
25 9:53 AM

April
10 10:52 AM
16 5:18 PM
21 11:06 AM
24 4:59 PM
27 3:47 PM
29 11:04 AM

May- Out of state traveling

June
2 4:02 PM
4 3:15 Pm
8 11:47 AM
17 11:04 AM

July
2 3:41 PM
9 4:32 PM
13 6:51 PM
14 11:39 AM
15 Between 10 AM & 12:30 PM
1:10 PM
24 10:19 AM & 10:19:30 AM

fax to 301 342-1840

Mrs. John H. Blyer
1148 Brammer Drive
Heathsville, Virginia 22473-241
Phone: 804-453-5329

COMMENTOR P-85

July 28, 1998

Ms. Sue Evans
c/o Office of Legal Counsel
Naval Air Warfare Center
Air Craft Division
47031 Lelzimcrantz Road
Building 435, MS 39
Patuxent River, Md 20670-5440

Dear Ms. Evans;

1 This is my request regarding the flight activity in the Potomac River; Please change the direction of flight over my house which has to date (since 7-15-89) has *Caused so much damage from the sonic booms. House is located diagonally across River to Hull Neck, (Va. side), at times I feared the planes were going to strike the house. I can see the Coast Guard Station from my kitchen window. House is the two story Brick at end of Brammer Drive at the Channel leading into the Potomac, thence to the Chesapeake Bay channel and middle Grounds. To date sound has broken 2 of 3 double paned insulated sliding doors (@4'6'8). Caused dishes to bounce and rattle in Cabinets, caused vibrations to raise nails up from wood Rafters and Roof - in addition to the fright from the unexpected sound and house shaking. This house was custom built - Walls are 11½" thick from outside in, built 16" on Center.

Please consider my request and stop the flights over my house. Will I receive an answer in the future? Thank you for seriously considering this. Yours truly,

(Mrs.) John H. Blyer

COMMENT FORM

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

Please print your comment. Feel free to attach an additional sheet if necessary.

DEAR SIR:,
I DON'T KNOW THE PURPOSE OF THE
FLIGHTS OVER MY AREA BUT SUPPOSE PILOTS
1 LEARN SOMETHING BY THESE MILITARY
EXERCISES. HOWEVER, I CAN'T BELIEVE (CAUSIN
FLYING SO LOW OVER MY HOUSE AMY SLIDING
GLASS DOORS TO RATTLE IS NEEDED.
MAY BE THEY ARE EMULATING THE PILOT
WHO CUT THE SKY-LIFT CABLE IN ITALY.
PLEASE, DON'T MAKE MY PROPERTY
UNTENABLE OR LOWERED IN VALUE BY
INCREASED FLIGHTS.

SINCERELY
Helena H. Dunkle

Name: HELENA H. DUNKLE,

Address: P.O. BOX 205,
BURGESS,
VIRGINIA - 22432

Fold this form along the lines shown on the other side and mail to the address shown. This form may also be faxed to 301-342-1840.

THOMAS F CORCORAN
8411 UPPER HILL RD.
WESTOVER, MD. 21871

Ms. Sue Evans
c/o Office of Legal Counsel
Naval Air Warfare Center Aircraft Division
47031 Liljencrantz Road, Building 435, MS 39
Patuxent River, MD 20670-5440

Re:Increased flights and related operations in the Patuxent River Complex.

Dear Ms. Evans et all:

1 As a concerned individual, I strongly object to the noise that is caused by the aircraft that is flying in the vicinity of Sommerset County. Here is the reason why ! At 11:20 AM on this day of July 28 1998 an aircraft broke the sound barrier causing a sonic boom. Again my wife and I were startled by the double explosion sound . This as you know, is caused when an aircraft equals the speed of sound at about a rate of 1088 feet per second. At this rate of speed, it would take about four and one half minutes to travel fifty miles, which would be well over the Atlantic ocean.

There is no reason for any aircraft to be flying over or near any residential area at.a high rate of speed.

I have brought to your attention in the past this noise pollution problem . One of your comments was about your air space. Use your air space but do not pollute my air space with unnecessary noise.

Sincerly

Thomas F Corcoran

cc: Sen. Barbarb A. Milulski

CORRECTION
DATE SHOULD BE
28TH TFC

July 28, 1998
Patuxent Naval Air Station
Patuxent River MD

REF Environmental Impact Statement

The U.S. Navy drone flying over the quiet communities of Virginias' Northern Neck should not be overlooked as an impact on the environment.

1 Peace and quiet are just as desirable as, for instance, water quality. Sonic booms and the maddening buzz of pilotless aircraft should be disallowed as negative impacts on the residential environment.

Loyal and Doris Lundegaard
806 Pine Crest Drive
Heathsville VA 22473

COMMENTOR P-89

From: Ed Appleby <eappleby@rivnet.net>
To: www.tamsconsultants.com/paxriver/ <www.tamsconsultants.com/paxriver/>
Date: Thursday, July 23, 1998 11:06 AM
Subject: INCREASED NAVAL FLIGHT TRAINING OVER NORTHUMBERLAND CO.

1

I SAY NO TO INCREASED FLIGHT TRAINING OVER NORTHUMBERLAND CO. THERE ARE APPROXI MATELY 10,000 CITIZENS IN THIS COUNTY OF MEN, WOMEN AND CHILDREN. THIS AREA IS ENVIRONMENTALLY UNIQUE IN ALL AMERICA WITH IT'S HUNDREDS OF INLETS, MARHES AND AQUATIC WILDLIFE. IT SHOULD REALLY BE A NATIONAL PARK RATHER THAN A TRAINING RANGE FOR MILITARY AIRCRAFT. I HAVE FLOWN LIGHT AIRCRAFT HERE FOR 20
YEARS. A FEW YEARS AGO THE AIRFORCE INVITED ALL OF THE LIGHT PLANE PILOTS DOWN TO LANGLEY FIELD FOR BREAKFAST AND A BRIEFING ON AIR CONTROL OUT OF NORFOLK WHICH IS THE CONTROL CENTER FOR ALL MILITARY, COMMERCIAL AND CIVILIAN TRAFFIC IN
THAT AREA. THE THING THAT IMPRESSED ME WAS THAT THEY CONDUCT AERIAL COMBAT
TRAINING 50 MILES OUT OVER THE ATLANTIC. THEY RECORD THE RESULTS ON EQUIPMENT
IN A POD UNDER THE WING. WE WERE PRIVILEDGED TO SEE A DOG FIGHT THAT HAD OCCURRED THE PREVIOUS DAY. MY QUESTION IS, IF IT WORKS FOR THE AIRFORCE, WHY DOESN'T THE NAVY DO IT'S TRAINING OVER THE ATLANTIC OCEAN? THERE IS MORE THAN
ENOUGH SPACE OUT THERE TO ACCOMODATE PATUXTENT'S FLIGHT TRAINING. THE PRESENT LEVEL COULD BE REDUCED BY SENDING IT OVER THE OCEAN LIKE THE AIRFORCE.
WHEN I AM OUTSIDE ON MY PORTABLE PHONE I HAVE TO INTERRUPT MY CONVERSATION UNTIL THE NOISE DISSIPATES. THE NOISE IS OPPRESIVE, OMINUS AND DEPRESSING. AFTER
YOU HAVE BEEN STARTLED BY A SONIC BOOM YOU FIND YOURSELF CRINGING WHEN YOU HEAR THE NEXT RUMBLE. I LIVE NEXT

TO A POND AND I HAVE SEEN BIRDS TAKE FLIGHT AND

DOGS FRIGHTENED DURING LOW LEVEL OPERATIONS. NO ONE'S BEING UNPATRIOTIC. IT'S
NOT EITHER HASSEL NORTHUMBERLAND OR HARM THE NAVY'S DEFENSE. DO LIKE THE AIRFORCE, GO OUT 50 MILES OR

WHATEVER OVER THE ATLANTIC AND TRAIN. THIS IS A PEACEFUL, SLEEPY, HARDWORKING, TAXPAYING COMMUNITY.

THANK YOU,

W.E APPLEBY

EX;USN

July 20, 1998

COMMENTOR P-90

MS Sue Evans
c/o Office of Legal Council
Naval Air Warfare Center Aircraft Division
47031 Liljincrantz Road
Bldg. 435, MS 39
Patuxent River, MD 20670

Dear Ms Evans:

1 We are adamantly opposed to the proposed increase in manned or unmanned aircraft over Northumberland County, Virginia. The present number of flights cause enough havoc and distress without considering further increases. In fact, the present number of noisy flights and sonic booms should decrease, for the following reasons:

1. They cause my 95 year old mother to become very nervous and upset for several minutes until we can calm her down;

2. They cause the china and crystal in our dining room china cabinet to shake and rattle;

3. They shake our heavy Anderson patio door and Anderson windows;

4. They have caused a separation in our kitchen ceiling.

A number of years ago, my husband wrote a letter of complaint to the Department of the Navy and they had the commander of the Patuxent Naval Air Station work with my husband over a 2 year period until they worked out by trial and error a designated corridor or area where the jets could maneuver out over the Bay where their booms caused less disturbance. The commander at that time considered atmospheric pressures, proper altitudes, turning radius and proper speeds to cooperate with us in order to decrease the terrific annoyance to our community.

This was most successful for several years until that cooperative commander was reassigned elsewhere. The new base commander has seen fit to ignore all the constructive efforts of his predecessor in maintaining good public relations.

Therefore, we are much opposed to the 3 phases of proposed increases in flights.

Thank you for your consideration in this matter.

Sincerely,

Anita O. Lindsay
(Mrs.) Anita O. Lindsay

Donald James Lindsay
Donald James Lindsay
284 Bridgeman Drive
Heathsville, VA 22473
(804) 453-7915

Toll-free 1-888-276-5201 before 5pm on 7-29-98

COMMENT FORM

COMMENTOR P-91

EIS FOR PATUXENT RIVER COMPLEX INCREASED FLIGHTS AND RELATED OPERATIONS

Please print your comment. Feel free to attach an additional sheet if necessary.

1 THIS "DRONE" SITUATION IS OUT OF HAND. AS I WRITE THIS FAX THE NOISE OVER MY HOUSE IS UNSETTLING. (JULY 27, 1998 11:00 AM)

THERE MUST BE A BETTER WAY TO CONDUCT THE TESTING YOU NEED TO ACCOMPLISH.

I SPENT 32 YEARS WORKING FOR THE GOVERNMENT IN A STRESS FILLED OCCUPATION AMONGST THE TRAFFIC INFERNO IN WASHINGTON, D.C.

I PURCHASED A HOME IN RURAL BURGESS TO GET AWAY FROM ALL THE NOISE THAT WAS MY CONSTANT COMPANION FOR 32 YEARS

YOU ARE DOING YOUR BEST TO DISTURB THE SOLITUDE THAT THIS AREA PRESENTS.

SO PLEASE SEE IF YOU CAN'T FIND ANOTHER SOLUTION TO THIS AGGRAVATING NOISE. HAVE SOME CONSIDERATION FOR THOSE OF US "WHO HAVE ALREADY SERVED OUR COUNTRY"

Name: STAN GROMELSKI

Address: PO BOX 448
BURGESS, VA 22432

Fold this form along the lines shown on the other side and mail to the address shown. This form may also be faxed to 301-342-1840.

90 Overlook Lane
P.O. Box 809
Burgess
Virginia 22432
July 25 98

Dear Ms Evans/Burdick

I am writing, a little belatedly, in response to requests for comment on the proposed increase in air activity at Patuxent Naval Air Station.

1 I would like to first establish my background which may differ from the majority of other respondents. I have had a love affair with anything that flies, whether it be covered with feathers, fabric or metal for the past 65 years, and being a retired defense engineer appreciate the necessity for much of what goes on. The sound of a jet or military piston engine will always be something of a thrill, though I can do without the sonic booms. These seem entirely unnecessary since at Mach 0.8 the ocean is only ten minutes away. But I developed an instant hatred at first hearing for that dreadful drone that seems to fly incessantly over my house. Its anaemic propulsion system which gives no confidence that the wretched thing will stay in the air, has an intolerance level higher than a chainsaw or even a jet ski. partly because it never seems to go away, though we do sometimes get a lunch break, presumably for refuelling

We have heard only rumours of its intended purpose, but if there is any truth in these then one wonders why it need fly at all other than to prove its aerodynamics, and most of the development could be done in a hangar. However if all the rumours concerning its use are wrong and it is really intended to drive the enemy out of his/her mind, then you have a winner.

I have read the report issued by the Navy and understand the principles of the deciBel (the name of our sailboat was Dessie Belle !), and the DNL probably works very well on some souces of noise, it does not necessarily cope where there is a random variation in pitch and high harmonic content. I have heard several comparisons, but I would compare the noise more to a mosquito (not the De Havilland variety which made a magnificent noise) but the bug, at which any of the staff at Patuxent would get irritated - but bugs can be swatted!

The Northern Neck is a delightful place to live. History, nice climate, nice people, and I truly believe they have more than paid their dues in putting up with this gross intrusion into the peace and solitude. Surely there is plenty of desert where the environmental impact would be minimal, but if you really must fly this thing around here at least put a Rolls Royce Merlin in it!

It is interesting to note that there appears to have been a significant reduction in UAV operations recently. I trust this is coincidental, and has nothing to do with this hearing?

Yours sincerely

J. N. Dingley & neighbors