Final

ENVIRONMENTAL ASSESSMENT

Atlantic Test Ranges Expansion of Unmanned Systems Operations

September 2015

Environmental Assessment
Atlantic Test Ranges
Expansion of Unmanned Systems Operations

Prepared for:

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Acronyms and Abbreviations

ac	acre
µg/m^3	micrograms per cubic meter
AAFL	Advanced Airship Flying Laboratory
AGL	above ground level
AICUZ	Air Installation Compatible Use Zone
APE	area of potential effect
ARPA	Archaeological Resources Protection Act
ASBS	Area of Special Biological Significance
ASW	anti-submarine warfare
ATC	air traffic control
ATR	Atlantic Test Ranges
BAMS	Broad Area Maritime Surveillance
BASH	Bird/Animal Aircraft Strike Hazard
BIR	Bloodsworth Island Range
BLOS	beyond line-of-sight
BMP	best management practice(s)
CAA	Clean Air Act
CDNL	C-weighted average day-night sound level
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
CO_2	carbon dioxide
CO_{2e}	carbon dioxide equivalent
COA	Certificate of Authorization
COTS	Commercial off-the-shelf
CRRC	Combat Rubber Raiding Craft
CRM	Cultural Resources Manager
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
dB	decibel
dBA	A-weighted decibel
DCMP	Delaware Coastal Management Program
DDE	Delaware Department of Environment
DNL	Day-Night Average Noise Level
DNREC	Department of Natural Resources & Environmental Control
DoD	Department of Defense
DOE	Determination of Eligibility
DoN	Department of the Navy
EA	Environmental Assessment
EFH	essential fish habitat
EIS	Environmental Impact Statement
E-O	electro-optical
EO	Executive Order
EOD	explosive ordnance disposal
ESA	Endangered Species Act
EW	electronic warfare
FAA	Federal Aviation Administration
FACT	fast attack craft target
FEIS	Final Environmental Impact Statement
FOT&E	Follow-on Test & Evaluation
FONSI	Finding of No Significant Impact
GHG	greenhouse gases
GSE	ground support equipment
HAPC	Habitat Area of Particular Concern
HPM	high-power microwave
HSMST	high speed maneuvering surface target
ICRMP	Integrated Cultural Resource Management Plan
INRMP	Integrated Natural Resource Management Plan
IR	infrared
ISR	intelligence, surveillance, and reconnaissance
JLENS	Joint Land Attack Elevated Netted Sensor
JSF	Joint Strike Fighter
km	kilometer
L_{dnmr}	onset-rate adjusted day-night sound level
LADAR	laser radar
LCS	Littoral Combat Ship
LIDAR	light detection and ranging
LNG	liquid natural gas
LOS	line-of-sight
LRF/D	laser range finder/designator
LTA	lighter-than-air
MBTA	Migratory Bird Treaty Act
MCM	mine countermeasures
MDE	Maryland Department of Environment
MDNR	Maryland Department of Natural Resources
MHT	Maryland Historical Trust
mi	mile
MIO	maritime interdiction/intercept operations
MMPA	Marine Mammal Protection Act
MRA	Marine Resources Assessment
MS	maritime security
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSL	mean sea level
MST	mobile ship target
MUDO	Maritime Unmanned Development and Operations
MWAQC	Metropolitan Washington Air Quality Committee
MWNAA	Metropolitan Washington Nonattainment Area
NAA	non-attainment area
NAAQS	National Ambient Air Quality Standards
NAS	Naval Air Station
NASMOD	Naval Aviation Simulation Model
NAVAIR	Naval Air Systems Command
NAVFAC	Naval Facilities Engineering Command
NAVSEA	Naval Sea Systems Command
NAWCAD	Naval Air Warfare Center Aircraft Division
NEPA	National Environmental Policy Act
NHPA	National Historical Preservation Act
NMFA	National Marine Fisheries Service
NO_X	nitrogen oxides
NOAA	U.S. National Oceanic and Atmospheric Administration
NRC	Navy Recreation Center
NRHP	National Register of Historic Places
NWR	National Wildlife Refuge
O_3	ozone
OEA	Overseas Environmental Assessment
OECD	Organization for Economic Cooperation and Development
OPNAVINST	Naval Operations Instruction
$PM_{2.5}$	particulate matter less than or equal to 2.5 microns in diameter
PM_{10}	particulate matter less than or equal to 10 microns in diameter
ppm	parts per million
ppt	parts per thousand
psf	pounds per square foot
RAICUZ	Range Air Installation Compatible Use Zone
RDAT&E	research, development, acquisition, test, and evaluation
RIB	rigid inflatable boat
RONA	Record of Non-Applicability

Acronyms and Abbreviations cont'd

SAV	submerged aquatic vegetation
SEL	Sound Exposure Level
SHPO	State Historic Preservation Office
SIGINT	signal intelligence
SIP	State Implementation Plan
SOF	special operations forces
SO_2	sulfur dioxide
SO_X	oxides of sulfur
SOP	standard operating procedure
SSV	semi-submersible vehicle
STUAS	small tactical unmanned aircraft system
SUA	special use airspace
SUW	surface warfare
TARS	Tethered Aerostat Radar System
tpy	tons per year
UAS	unmanned aircraft system
UASTD	Unmanned Aircraft System Test Directorate
UCAS	Unmanned Combat Air System
UCLASS	Unmanned Carrier-Launched Airborne Surveillance and Strike
UGS	unmanned ground system
UMS	unmanned maritime system
U.S.	United States
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USV	unmanned surface vehicle
UUV	unmanned underwater vehicle
UXO	unexploded ordnance
VDEQ	Virginia Department of Environmental Quality
VOC	volatile organic compound
VTOL	vertical take-off and landing
WMA	wildlife management area

ENVIRONMENTAL ASSESSMENT

Lead Agency for the EA: U.S. Department of the Navy

Title of Proposed Action: Atlantic Test Ranges Expansion of Unmanned Systems Operations, Naval Air Station Patuxent River, Maryland

Designation: Environmental Assessment

Abstract

Naval Air Station (NAS) Patuxent River is located on 6,705 ac (2,713 ha) in St. Mary's County, Maryland, on a peninsula between the Patuxent River to the north, and the Chesapeake Bay to the east and south, approximately 65 mi (105 km) southeast of Washington, DC. The station is host to over 50 tenant commands including the Naval Air Warfare Center Aircraft Division (NAWCAD). NAWCAD is one of two product centers within the Naval Air Systems Command (NAVAIR), which is responsible for development, acquisition, and life-cycle management for Navy aviation systems. NAWCAD is the Navy's primary research, development, acquisition, test and evaluation (RDAT&E), engineering, and Fleet support activity for Navy and Marine Corps air vehicle systems and is responsible for the scheduling and conduct of operations within the Atlantic Test Ranges (ATR) Inner Range. This Environmental Assessment (EA) has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] 4321, as amended); regulations implemented by the Council on Environmental Quality (Title 40 Code of Federal Regulations [CFR] Parts 1500-1508); Navy Procedures for Implementing NEPA (32 CFR Part 775), and Chief of Naval Operations Instruction 5090.1C CH-1, *Environmental Readiness Program Manual*. The NEPA process ensures that environmental impacts of proposed major federal actions are considered in the decision making process. Potential environmental impacts have been analyzed for all relevant or otherwise required issue areas, with separate sections on air quality; noise; biological resources; cultural resources; airspace, land, and water use; marine sediments and water quality; and public health and safety. No impacts are associated with other environmental resources or issues. No significant environmental impacts within the ATR Inner Range have been identified for Alternative 1 – the No-Action Alternative or Alternative 2 – the Preferred Alternative.

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EXECUTIVE SUMMARY

PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to support Department of Defense (DoD) requirements for research, development, acquisition, test, and evaluation (RDAT&E); training; and operations of unmanned air, ground, and maritime systems vital to the national defense in the Atlantic Test Ranges (ATR) Inner Range.

The need for the Proposed Action is to test and train with unmanned systems to ensure their technical readiness as well as the readiness of their operators.

To meet the purpose and need, there are requirements for operationally realistic engagements in air, land, and maritime environments. In addition to restricted airspace, the infrastructure needed to meet this requirement includes the following:

- Maritime and land test ranges with environmental, range safety, explosive safety, laser safety, flight clearances, and frequency clearances
- Line-of-sight (LOS) and beyond line-of-sight (BLOS) capability to provide range surveillance of operating area and ability to relay data and communications
- LOS and BLOS time, space, and position information instrumentation, telemetry, and other associated RDAT&E instrumentation
- A system to predict the hazard pattern associated with the release of weapons and special sensors to measure the environment

The ATR Inner Range provides the combination of accessible environments and infrastructure, as well as separation from potential conflicts with other military or public uses, to readily accommodate the necessary air, land, and maritime testing and training of unmanned systems.

ALTERNATIVES

Two alternatives focused on means to achieve the purpose and need will be considered. The two alternatives identified in this EA include:

- Alternative 1, the No-Action Alternative, includes unmanned aircraft systems (UAS) and unmanned maritime systems (UMS) operations, conducted in the ATR Inner Range at the current baseline levels. These baseline numbers were derived from best available data sources including actual flight hours and subject matter expert interviews.
- Alternative 2, the Preferred Alternative, includes expansion of unmanned systems RDAT&E and training operations in the ATR Inner Range. This action includes multiple types of UAS, unmanned ground systems (UGS), and UMS either separately or as part of complex multi-system groups. Testing of unmanned systems would support the development of new generation unmanned platforms and their associated sensors and payloads. Operations may range from a single vehicle, to multiple vehicles, to integration testing between air, ground, and maritime platforms.

The No-Action Alternative satisfies the current needs of NAWCAD's RDAT&E unmanned systems mission. However, the No-Action Alternative does not support NAWCAD's RDAT&E mission to expand testing and development of unmanned systems. Therefore, this alternative would not adequately meet the requirements of the Proposed Action.

ENVIRONMENTAL CONSEQUENCES

Resources analyzed in this Environmental Assessment (EA) include: air quality; noise; biological resources; cultural resources; airspace, land, and water use; marine sediments and water quality; and public health and safety. The environmental consequences associated with implementation of the No-Action Alternative and the Preferred Alternative are presented in Table ES-1. As shown in Table ES-1, implementation of either alternative (Alternative 1 – the No-Action Alternative or Alternative 2 – the Preferred Alternative) would result in no significant impacts to any resource area within the ATR Inner Range.

Table ES-1 Environmental Consequences of Alternatives

Resource Area	Alternative 1 No-Action Alternative	Alternative 2 Preferred Alternative
Air Quality	o	o
Noise	o	o
Biological Resources	o	o
Cultural Resources	o	o
Airspace, Land and Water Use	o	o
Marine Sediments and Water Quality	o	o
Public Health and Safety	o	o

Notes: o = No significant impact

■ = Potentially significant impact to the environment

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CHAPTER 1 PURPOSE AND NEED

1.1 INTRODUCTION

Naval Air Station (NAS) Patuxent River is located on 6,705 ac (2,713 ha) in St. Mary's County, Maryland, on a peninsula between the Patuxent River to the north, and the Chesapeake Bay to the east and south, approximately 65 mi (105 km) southeast of Washington, DC. The station is host to over 50 tenant commands including the Naval Air Warfare Center Aircraft Division (NAWCAD). NAWCAD is one of two product centers within the Naval Air Systems Command (NAVAIR), which is responsible for development, acquisition, and life-cycle management for Navy aviation systems. NAWCAD is the Navy's primary research, development, acquisition, test and evaluation (RDAT&E), engineering, and Fleet support activity for Navy and Marine Corps air vehicle systems and is responsible for the scheduling and conduct of operations within the Atlantic Test Ranges (ATR).

The Navy proposes to expand unmanned systems RDAT&E and training operations in the ATR, including unmanned aircraft systems (UAS), unmanned ground systems (UGS), and unmanned maritime systems (UMS). Specifically, the Proposed Action would be conducted within the ATR Inner Range, which includes approximately 1,800 square nautical miles (2,352 sq mi, 6,092 sq km) of restricted airspace, underlying surface waters, and land test areas at NAS Patuxent River, Webster Field Annex, and Bloodsworth Island Range (BIR) (Figure 1-1).

Figure 1-1 Atlantic Test Ranges Inner Range

This Environmental Assessment (EA) addresses the potential environmental impacts of the proposed expansion in unmanned systems operations and has been prepared in compliance with the following:

- National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] 4321, as amended)
- Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations [CFR] 1500-1508, 1 July 1986)
- Department of the Navy Procedures for Implementing NEPA (32 CFR 775, 23 February 2004)
- Chief of Naval Operations Instruction (OPNAVINST) 5090.1C CH-1, *Environmental Readiness Program Manual*, 18 July 2011

The EA was prepared using a systematic, interdisciplinary assessment process, designed to provide decision makers with an organized analysis of the environmental consequences of implementing the Proposed Action. The organization of this EA begins with a brief history of unmanned systems in the ATR and the Purpose and Need for the Proposed Action in Chapter 1. A description of the Proposed Action and Alternatives considered by the Navy is provided in Chapter 2. Chapter 3 describes the affected environment and environmental consequences associated with the implementation of the Proposed Action and No-Action Alternatives. Chapter 4 describes cumulative impacts under NEPA, and Chapter 5 provides other NEPA considerations. Chapter 6 lists references cited, and Chapter 7 provides a list of preparers and contributors. Appendix A provides supporting details to further the information presented in this EA. Appendix B provides the calculations supporting the air quality analysis as well as a Record of Non-Applicability (RONA). Appendix C provides interagency correspondence.

1.2 HISTORY OF UNMANNED SYSTEMS IN THE ATLANTIC TEST RANGES

NAS Patuxent River was commissioned in 1942. Since that time, ATR test and training events have primarily focused on manned aircraft and associated support systems. UAS platforms began to appear at ATR as early as 1960 with the first free flight of an unmanned QH-50 Gyrodyne Drone Anti-Submarine Helicopter. In the late 1980s, the Fleet Composite Squadron Six (VC-6) Detachment at Webster Field Annex was established to train ground crew members on the RQ-2 Pioneer.

Test and development operations were less frequent, although several small UAS were tested to demonstrate technology and integrate sensor systems. In 1998, the Maritime Unmanned Development and Operations (MUDO) Integrated Product Team evolved to oversee increased demand for small UAS testing, and the presence of unmanned systems at ATR has continued to increase ever since.

For example, the first flight tests for the rotary-wing MQ-8 Fire Scout began at Webster Field Annex in 2001 and operational missions for the full-scale RQ-4 Global Hawk Maritime Demonstrator commenced at NAS Patuxent River in 2004. VC-6 trained with the RQ-2 Pioneer through 2007 and the Maryland and other Army National Guard units currently train at Webster Field Annex with the RQ-7 Shadow.

In 2010, per the *Naval Air Warfare Center (NAWC) Operating Plan* (Fiscal Year 2010/2011), the UAS Test Directorate (UASTD) was established at Webster Field Annex to support increasing demand for UAS developmental testing. All MUDO and Fire Scout testing has now been absorbed by the UASTD. Current UASTD platforms include the MQ-8 Fire Scout, Shadow, RQ-11 Raven, Aerostar, Aerolight, Aerosky, RQ-1A Small Tactical Unmanned Aircraft System (STUAS), and RQ-16A T-Hawk.

Current and future activities at NAS Patuxent River include larger systems, such as the X-47 Unmanned Combat Air System (UCAS) demonstrator, MQ-4 Broad Area Maritime Surveillance (BAMS)/Triton, and Unmanned Carrier-Launched Airborne Surveillance and Strike (UCLASS [platform to be determined]) system, as well as a broad range of sensor and payload integration efforts on existing platforms under development. A future Marine Corps Group 4 UAS may be tested at Webster Field Annex.

The environmental impacts of manned and unmanned flight activities at ATR are addressed in the *Final Environmental Impact Statement (FEIS) for Increased Flight and Related Operations in the Patuxent River Complex* (December 1998). This EA extends the previous analysis contained in the FEIS and includes the potential impacts of new technologies associated with expanding UAS, UGS, and UMS operations in the Inner Range.

1.3 PURPOSE AND NEED

1.3.1 Purpose

The purpose of the Proposed Action is to support Department of Defense (DoD) requirements for RDAT&E, training, and operations of unmanned air, ground, and maritime systems vital to the national defense in the ATR Inner Range.

1.3.2 Need

The need for the Proposed Action is to test and train with unmanned systems to ensure their technical readiness as well as the readiness of their operators.

In order to meet the purpose and need there are requirements for operationally realistic engagements in air, land, and maritime environments. In addition to restricted airspace, the infrastructure needed to meet this requirement includes the following:

- Maritime and land test ranges with environmental, range safety, explosive safety, laser safety, flight clearances, and frequency clearances
- Line-of-sight (LOS) and beyond line-of-sight (BLOS) capability to provide range surveillance of operating area and ability to relay data and communications
- LOS and BLOS time, space, and position information instrumentation, telemetry, and other associated RDAT&E instrumentation
- A system to predict the hazard pattern associated with the release of weapons and special sensors to measure the environment

The ATR Inner Range provides the combination of accessible environments and infrastructure, as well as separation from potential conflicts with other military or public uses, to readily accommodate the necessary air, land, and maritime testing and training of unmanned systems.

1.3.3 Scope

In accordance with the *CEQ Regulations for Implementing the Procedural Provisions of NEPA* (Title 40 CFR 1500-1508, 1 July 1986), material relevant to a proposed action may be incorporated by reference with the intent of reducing the size of the document. Therefore, the following documents are incorporated by reference in this EA because the actions addressed are applicable to the Proposed Action further described in Chapter 2:

- *DOD Unmanned Systems Integrated Roadmap FY2011-2036,* 2011
- *Environmental Assessment/Overseas Environmental Assessment (EA/OEA) for the Global Hawk Maritime Demonstration Program,* May 2007
- *EA/OEA for Navy MQ-4C Triton [Broad Area Maritime Surveillance (BAMS) Unmanned Aircraft System] Developmental Test Program,* December 2012
- *EA/OEA for the Navy Unmanned Combat Air System CV Demonstration (UCAS-D) Program,* November 2010
- *Final Environmental Assessment for Operations at the Bloodsworth Island Range, Maryland,* February 2006
- *Final Environmental Impact Statement for Increased Flight and Related Operations in the Patuxent River Complex, Patuxent River, MD,* December 1998

This EA analyzes the potential impacts to the full range of environmental resource areas resulting from the expansion of unmanned systems RDAT&E and training activities in the ATR Inner Range. Specifically, the EA contains an evaluation of the following resource areas:

- Air quality
- Airspace and land use
- Biological resources
- Cultural resources
- Maritime sediments and water quality
- Noise
- Public health and safety

Areas of primary concern are the potential impacts the Proposed Action could have on air quality, biological resources, noise, and public health and safety. Consequently, these resource areas have received the greatest emphasis in the evaluations presented in this document. Other resource areas are also addressed and evaluated, but to a lesser degree than the primary resource areas identified. For each of the other resource areas, the level of evaluation and depth of discussion are proportionate to the relative degree of importance attributed to each issue in the decision process.

The Proposed Action requires no new permanent construction and only temporary increases of personnel during RDAT&E and training events. Considering the nature of the Proposed Action, there would be negligible and insignificant impacts to the following resource areas:

- Topography, Geology, and Soils. The Proposed Action involves no new construction or modification of landforms/topography. As such, no analysis is needed to assess impacts to local topography, geology, and soils resources.
- Onshore Water Quality. Operations with unmanned systems would be very similar to existing manned systems activities analyzed in the 1998 FEIS. All NAWCAD activities would conform to the installation Stormwater Pollution Prevention Plan and associated best management practices which include eliminating discharges of sediment and other pollutants that could affect water quality.
- Socioeconomics. The Proposed Action would temporarily bring new personnel to Saint Mary's County to support the proposed unmanned systems testing and training activities. These individuals can be accommodated without impacts to socioeconomic indicators such as population, employment, income, housing, or schools. As this EA only assesses impacts associated with expanded unmanned systems operations, any new facilities or construction would

be covered by its own NEPA analysis. For these same reasons, there would be no impact on minority or economically disadvantaged segments of the population, and hence no impacts related to environmental justice (Executive Order [EO] 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*). Economic aspects of recreation, traffic, and fisheries are considered under Airspace, Land, and Water Use.

- Infrastructure and Utilities. No new infrastructure is needed to support the Proposed Action. Proposed activities would require relatively small increases of water use and have negligible effects on other users of station infrastructure and utilities. Existing roads, facilities, and infrastructure would be used, and no modifications to existing roads or facilities (temporary lodging, meals, recreation, sanitation, etc.) are needed to accommodate the Proposed Action and associated personnel.

The above resource areas will not be discussed further in this EA.

1.4 DECISIONS TO BE MADE

As a result of the analysis in this EA, the Navy will determine if an environmental impact statement (EIS) is required. An EIS must be prepared if significant impacts on the human or natural environment are anticipated as a result of the proposed project. If the Navy determines that an EIS is not necessary, either the No-Action Alternative or the Proposed Action described in this EA may be selected for implementation and documented through a Finding of No Significant Impact (FONSI)

CHAPTER 2 PROPOSED ACTION AND ALTERNATIVES

This chapter provides an in-depth discussion of the Proposed Action (the Preferred Alternative) and the No-Action Alternative. Alternatives considered but not carried forward are also described.

2.1 PROPOSED ACTION

The Proposed Action is to expand unmanned systems RDAT&E and training operations in the ATR Inner Range. This action includes multiple types of UAS, UGS, and UMS either separately or as part of complex multi-system groups. Testing of unmanned systems would support the development of new generation unmanned platforms and their associated sensors and payloads. Operations may range from a single vehicle, to multiple vehicles, to integration testing between air, ground, and maritime platforms. The following subsections describe the operational parameters related to the Proposed Action.

2.1.1 Description of Unmanned Systems

An unmanned system is a powered vehicle that does not carry a human operator, can be operated autonomously or remotely, can be expendable or recoverable, and can carry a variety of cargo, sensors, payloads, and other types of mission hardware. Unmanned systems have been deployed in a wide variety of scenarios to meet military functions. They are better suited over manned systems to perform missions as they eliminate the limiting human factor, including human error and fatigue. The use of unmanned systems allows missions to be conducted more effectively with reduced risk by decreasing both personnel workload and exposure to direct enemy contact.

In addition to replacing humans, unmanned systems provide advantages such as increased endurance, achievement of higher G-forces, and smaller sizes and signatures. Lower risk and higher confidence in mission success are two strong motivators for the continued expansion of unmanned systems.

2.1.2 Test Operations

Air platform RDAT&E (i.e., testing) is the primary mission of NAWCAD. In general, test operations involving UAS would be similar to those currently being performed by manned aircraft. Operations involving UGS and UMS would primarily focus on integration and interoperability testing with UAS or manned aircraft and surface craft. UGS and UMS may also be used for feasibility testing of new concepts, technology demonstration, and joint service/agency tests. There are also requirements for integrated testing between manned and unmanned systems to support manned/unmanned teaming initiatives. A more detailed description of the types of unmanned systems tests that would be conducted in the Inner Range is provided in the following subsections, 2.1.2.1 through 2.1.2.5.

2.1.2.1 Aero-Mechanical Flight Tests

Aero-mechanical flight tests expose the unmanned vehicle to the full operational limits of altitude, speed, load factor (g), gross weight, environmental conditions, and operational situations. Tests include aeromechanics (flying qualities and performance, aero propulsion); air vehicle sub systems (landing gear, hydraulics and fuel, fire detection/protection, environmental control); and structural loads (dynamic and static, flutter, launch and recovery, rotor systems).

This category of testing also includes production acceptance tests and preparation of unmanned aircraft for Fleet deployment. These activities are often accomplished at the ATR because many of the companies that produce unmanned systems are not located within active restricted airspace.

2.1.2.2 Carrier/Shipboard Suitability Tests

Carrier/shipboard suitability tests include field and ship-based testing to determine the performance and compatibility of unmanned conventional and vertical/short take off and landing aircraft and aircraft systems in the shipboard operating environment and from unimproved temporary airfields. Tests focus on the major aircraft design considerations that are driven by the requirement to operate on a ship and the unique adverse operating environment such as ship motion, air wake, confined operating area, corrosive hazards, acoustic and electromagnetic hazards, ground crew safety, and other challenges of naval aviation. This category also includes the evaluation of automated carrier and shipboard landing systems, precision approach landing systems, and other landing aids.

2.1.2.3 Air Vehicle Stores Compatibility Tests

Air vehicle stores compatibility tests involve a wide range of weapons such as missiles, free-fall weapons, guns, rockets, electromagnetic systems, fuel tanks, countermeasures, and other weapons-related subsystems that may be integrated into unmanned systems. Tests are performed to evaluate stores separation characteristics, weapons delivery accuracy, and the proper integration of weapons/stores with the airframe. Only inert (no live warheads) weapons are released in the ATR Inner Range.

2.1.2.4 Air Vehicle Survivability Tests

Air vehicle survivability tests include a broad range of flight and static ground testing to measure infrared (IR) and radar signatures. These tests are designed to document the vulnerability of aircraft to detection and targeting by enemy weapon systems. Tests articles may include full scale aircraft, aircraft models, or the various subsystems that are installed on the aircraft. Air vehicle survivability tests may include whole body radar cross section, inverse synthetic aperture radar, jet engine modulation, rotor blade modulation, wide band imaging, Doppler signature, and IR signature measurement.

2.1.2.5 Mission Systems Tests

Mission systems tests cover a very broad area of testing to evaluate the performance and interoperability of the multitude of sensor information, mission-planning data, weapons control, and other subsystem information associated with the unmanned vehicle. Tests focus on communication, navigation, armament control, sensors, electromagnetic effects, mission computers, information warfare, electronic warfare, laser designators, laser rangefinders, laser communication, interoperability between unmanned platforms, manned and unmanned systems teaming, and autonomy testing.

Electronic warfare test events evaluate unmanned electronic combat systems against a wide variety of threat simulations, surrogates, and actual systems that represent real world threat scenarios. Tests focus on electronic countermeasures, radar warning receivers, radar cross section, anti-radiation missile seeker/avionics, electronic warfare tactic development, and exploitation of foreign technology. Test equipment may involve hardware that ranges from experimental pre-production equipment, to fully developed systems that are installed in aircraft.

Integration and interoperability tests are conducted to ensure a collaborative operational environment when different types of unmanned systems are deployed to achieve a common mission and operate in synergy to execute assigned tasks. Operations focus on the interoperability between system controls, automation, communications, data products, and data links. Unmanned systems must demonstrate interoperability among platforms built by different manufacturers and operated by the U.S. military services, foreign allies, and other U.S. agencies.

Teaming between manned and unmanned systems is conducted to develop and demonstrate their ability to cooperatively execute and achieve common mission objectives such as intelligence, surveillance, and reconnaissance (ISR); strike; and antisubmarine warfare. Future manned-unmanned teaming would consist of multiple types of unmanned systems used collaboratively with manned platforms to collect, process, exploit, and disseminate data. This integrated use of manned and unmanned platforms leads to more effective mission execution and reduced risk to human pilots.

Autonomy testing is conducted to assess the ability of an unmanned system to operate effectively with limited or no human intervention. Fully autonomous systems are self-directed in that they do not require outside control, but rather are governed by embedded logic that directs their behavior. Autonomy can allow operations beyond the reach of human control. Autonomous unmanned systems would be tested to evaluate the full range of behaviors that might emerge in simulated and real world environments. The level of autonomy for future unmanned systems testing would range from human delegated, to human supervised, to fully autonomous.

2.1.3 Training Operations

UAS training operations are scheduled when airspace is available and on a non-interference basis with testing activities. Opportunities to train with unmanned systems are made available to Navy and other DoD units to improve operator skills in platform operation, navigation, sensor operation, launch and recovery, laser range finding, laser target designating, laser communication, and other mission tasks. Training operations are similar to test operations but are less complex and less expansive in scope.

The entire range support infrastructure is available to support training events; however, unmanned systems training typically use only a small fraction of that infrastructure.

2.1.4 Unmanned Systems Classifications

The following subsections, 2.1.4.1 through 2.1.4.4, provide the current classifications for UAS, UGS, and UMS. To provide a basis of analysis, surrogate platforms have been chosen to represent each unmanned system category. The example unmanned systems platforms used for analysis in this EA are provided in Appendix A.

2.1.4.1 Unmanned Aircraft Systems

Table 2-1 provides categories commonly accepted for the grouping of UAS. These categories are based on the attributes of weight, operating altitude, and speed. These attributes allow categorization without respect to UAS mission, propulsion type, or payload.

UAS may be air- or ground-launched using conventional (i.e., launched under their own power) or unconventional means (i.e., requires assisted take off). UAS groups 3 through 5 typically use established

airfields and runways for take-off and landing. UAS groups 1 and 2 are typically launched on-range or use unconventional take-off systems such as catapults, slingshots, or by hand. In addition, UAS may be launched from platforms such as aircraft, surface and subsurface vessels and platforms, vehicles, or tethering towers. Recovery methods may include conventional landing, vertical/short takeoff and landing, net, wire, arresting gear, dirt strip, or intentional crash. Some group 4 and 5 UAS flights may require chase aircraft. Examples of the types of UAS platforms that would be tested in the Inner Range are included in Table A-1 of Appendix A.

Table 2-1 UAS Groups

<table>
<tr><th>UAS Group</th><th>Maximum Gross Takeoff Weight (lbs)</th><th>Normal Operating Altitude (ft)</th><th>Speed</th></tr>
<tr><td>Group 1</td><td>0-20</td><td>< 1,200 AGL</td><td>< 100 knots</td></tr>
<tr><td>Group 2</td><td>21-55</td><td>< 3,500 AGL</td><td rowspan="2">< 250 knots</td></tr>
<tr><td>Group 3</td><td>< 1,320</td><td rowspan="2">< 18,000 MSL</td></tr>
<tr><td>Group 4</td><td rowspan="2">> 1,320</td><td rowspan="2">Any Airspeed</td></tr>
<tr><td>Group 5</td><td>> 18,000 MSL</td></tr>
</table>

Source: Joint Unmanned Aircraft Systems Center of Excellence (JUAS COE) CONOPS, Joint Concept of Operations for Unmanned Aircraft Systems, Version 1.5.
*AGL = Above Ground Level
*MSL = Mean Sea Level

Although they are not classified as UAS, aerial targets are occasionally used as test platforms in the ATR Inner Range and are therefore included in this EA. Aerial targets, including the BQM-34 and BQM-74, are similar in size to a Group 4 UAS but their purpose is to serve as a target that simulates an air threat such as a sea skimming missile or adversary aircraft. They are operated by a pilot situated in a ground station and are recovered by shutting down the engine and deploying a parachute for a water recovery. Aerial targets operating in the Inner Range are typically launched from the Strike Launch Compound but may also be launched from an aircraft or ship.

2.1.4.2 Lighter-than-Air UAS

Airships and aerostats are a subset of UAS platforms that have been historically used for military surveillance and anti-submarine warfare. Unlike fixed-wing aircraft or helicopters, aerostats and airships are lighter-than-air (LTA); typically using helium to stay aloft. The classifications provided in Table 2-1 therefore do not apply. Airships use engines to fly whereas aerostats are tethered to the ground by a cable that also provides power.

This class of UAS would occasionally require routine use of range assets located at the ATR for system performance and interoperability testing. LTA UAS may be aloft for extended periods of time for testing that includes ISR, communications, navigation, electronic warfare, weapons, and interoperability with other ground, surface, air, subsurface vehicles and control stations. Examples of the types of LTA UAS platforms that would be tested in the Inner Range are included in Table A-2 of Appendix A.

2.1.4.3 Unmanned Ground Systems

UGS are robotic platforms that are used as an extension of human capability. These robots are capable of operating indoors or outdoors and over a wide variety of terrain. UGS include both wheeled and tracked vehicles and are commonly used to complete tasks by functioning in place of humans. UGS are generally

defined based on size (i.e., transportability) and mode of operation. The four types of UGS based on size are shown in Table 2-2.

UGS modes of operation and examples of the types of UGS platforms that would be tested in the Inner Range are included in Tables A-3 and A-4 of Appendix A respectively.

Table 2-2 Types of UGS

UGS Type	Description
Soldier Transportable	Systems small enough to be transported by a single person
Vehicle Transportable	Systems too heavy to be transported by a person, or too slow to keep up with formation
Self Transportable	Systems too heavy to be transported by a person, but fast enough to keep up with formation
Appliqué	Systems that are optionally manned due to a "kit' applied to the system allowing it to operate without a driver in the seat

Sources: Army 2011 and Army 2012.

2.1.4.4 Unmanned Maritime Systems

UMS can be defined as unmanned vehicles that displace water at rest and include unmanned surface vehicles (USVs) and unmanned underwater vehicles (UUVs). The operation of UMS within the Inner Range may involve the use of towed arrays and high frequency acoustic source sensors. These sensors include those of low source level, narrow bandwidth, downward-directed transmission, short pulse lengths, frequencies above known hearing ranges of marine mammals and sea turtles, or some combination of these factors.

Table A-10 in Appendix A provides a summary of representative underwater acoustic sources considered in this EA. These acoustic sources would be similar to the systems not quantitatively analyzed in the Final Atlantic Fleet Active Sonar Training EIS/OEIS (Navy 2008) and include systems identical to commercial off-the-shelf (COTS) systems and military countermeasure devices. The sources analyzed in this EA are those of low source level, narrow bandwidth, downward-directed transmission, short pulse lengths, frequencies above known hearing ranges of marine mammals and sea turtles (>200 kHz), or some combination of these factors. Since active acoustic sources operating at 200 kHz or higher attenuate rapidly and are at or outside the upper frequency limit of even the ultrasonic species of marine mammals, modeling of these higher frequency acoustic sources would not be warranted. Other acoustic sources considered in this EA include pingers and fathometers, which are required equipment for safe operation of Navy vessels that are routinely used within the waters of the ATR Inner Range.

Unmanned Surface Vehicles

USV operate with near-continuous contact with the surface of the water, including conventional hull crafts, hydrofoils, and semi-submersibles. Common surface platforms that may support unmanned systems tests in the Inner Range include rigid inflatable boats, Stiletto, Riverines (30-40 feet [9.1-12.2 m]), and larger platforms such as the NAWC-38 (192 feet [59 m]) to simulate a Littoral Combat Ship (LCS). Surface targets (such as High Speed Maneuvering Surface Target [HSMST]) may also be considered USV. Table 2-3 describes the three standard vehicle classes and one non-standard vehicle class of USV. Examples of the types of USV platforms that would be tested in the Inner Range are included in Table A-5 of Appendix A.

Table 2-3 USV Vehicle Classes

Vehicle Class	Description
Harbor Class	Based on the Navy Standard (see Naval Ships' Technical Manual Chapter 583) seven-meter Rigid Inflatable Boat (RIB) focused on the Maritime Security (MS) Mission, with a robust ISR capability and a mix of lethal and non-lethal armament. The Harbor Class USV can be supported by the majority of our Fleet, since it would use the standard seven-meter interfaces.
Snorkeler Class	A roughly seven-meter semi-submersible vehicle (SSV) which supports Mine Countermeasures (MCM) towing (search) missions, Anti-Submarine Warfare (ASW) (Maritime Shield) and is also capable of supporting special missions that can take advantage of its relatively stealthy profile.
Fleet Class	A purpose-built USV, consistent with the handling equipment and weight limitations of the current 11-meter RIB. Variants of the Fleet Class would support MCM Sweep, Protected Passage ASW, and "high-end" Surface Warfare (SUW) missions.
X- Class	Small, non-standard class of systems capable of supporting Special Operations Forces (SOF) requirements and Maritime Interdiction/Intercept Operations (MIO) missions. It provides a "low-end" ISR capability to support manned operations and is launched from small manned craft such as the 11-meter RIB or the Combat Rubber Raiding Craft (CRRC).

Sources: Navy 1998a, Navy 2007b.

Unmanned Underwater Vehicles

UUV operate without necessary contact with the surface but may need to be near the surface for communications purposes. UUV fall into four general vehicle classes, as shown in Table 2-4.

Table 2-4 UUV Classes

Vehicle Class	Diameter (in)	Displacement (lb)	Endurance High Energy Mode* (hrs)	Endurance Low Energy Mode* (hrs)	Payload (ft^3)
Man-Portable	3 – 9	<100	<10	10 – 20	< 0.25
Light Weight	12.75	~500	10 – 20	20 – 40	1 – 3
Heavy Weight	21	< 3,000	20 – 50	40 – 80	4 – 6
Large	> 36	> 3,000	100 – 300	> 400	15 – 30 and External Stores

* *Note*: "High energy mode" applies to the operational mode in which power is used for propulsion and sensors are fully operational. During "low energy mode," the power is used for propulsion only.
Source: Navy 2004.

Due to the size and depth of the Chesapeake Bay, UUV operated in the Inner Range would typically be from the Man-Portable and Light Weight classes that do not normally exceed 12 ft (3.7 m) in length. Examples of the types of UUV platforms that would be tested in the Inner Range are included in Table A-6 of Appendix A.

2.1.5 Test and Training Location

All UAS, UGS, and UMS operations described in this EA would occur in the Inner Range; except at locations excluded for purposes of ATR Range Safety, NAS Air Operations Procedures (per the Range Safety and Air Operations Manuals), and environmental sensitivity. The Inner Range includes:

- NAS Patuxent River - Flight and ground test facilities, airfield and runways, and associated infrastructure
- Webster Field Annex - Flight and ground test facilities, airfield and runways, and associated infrastructure
- Restricted airspace and underlying surface areas including the aerial and surface firing range; targets, impact areas, and aim points; and the BIR

2.1.6 Test and Training Scenarios

The goal of testing with unmanned systems is to ensure that the systems perform to their full design intent. When training, the goal is to ensure personnel have the necessary skills to operate the systems. Figures 2-1 through 2-5 demonstrate example scenarios that provide a conceptual overview of how the test operations described in Section 2.1.2 would be accomplished within the Inner Range. Figure 2-6 provides a conceptual overview of how the training operations described in Section 2.1.3 would be accomplished within the Inner Range. The unmanned systems presented in the scenario figures are not an all inclusive representation of the systems that would be used in test and training scenarios.

2.1.7 Important Considerations for Operational Parameters

The following operational parameters addressed in subsections 2.1.7.1 through 2.1.7.5 are associated with the Proposed Action. Some, but not all of these parameters, are depicted in the test and training scenarios in Figures 2-1 through 2-6.

2.1.7.1 Expendable Payloads

Objects intentionally released from an unmanned platform must be carefully considered for environmental and safety impacts. Examples of expendable payloads include military ordnance, gun ammunition, defensive countermeasures, and other items such as experimental shapes, empty fuel tanks, and trailing antennas. Table A-7 of Appendix A provides a list of the representative types of expendable payloads that would be used in unmanned systems operations in the Inner Range.

Operations involving expendable payloads would primarily support vehicle testing, weapons integration/separation testing, or military training events. UAS would be tested with similar expendable payloads that have been routinely tested on manned aircraft. Only inert ordnance (not containing live warheads) would be expended in the Inner Range, however, rockets and missiles may contain propellant.

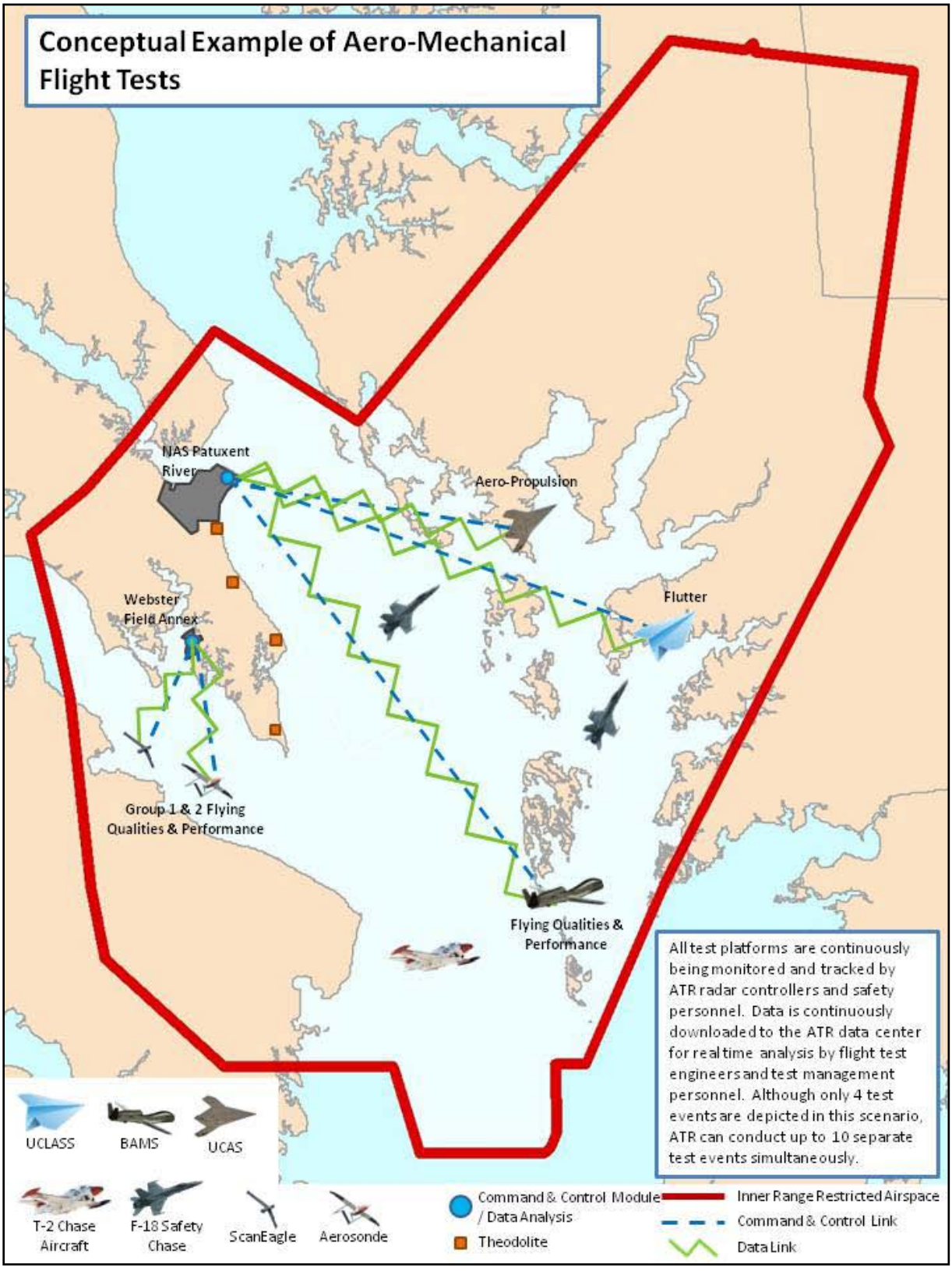

Figure 2-1 Aero-Mechanical Flight Test Scenario

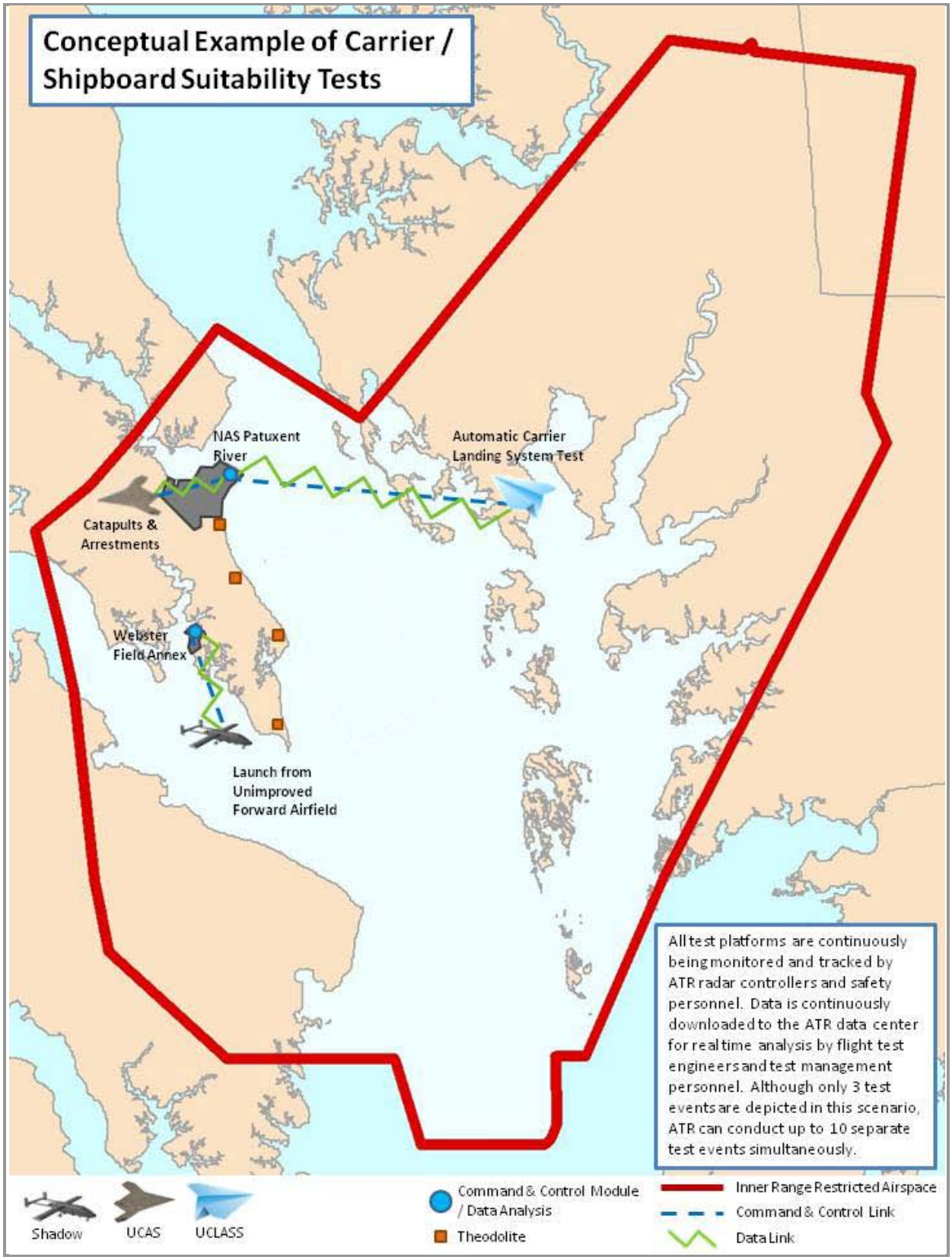

Figure 2-2 Carrier/Shipboard Suitability Test Scenario

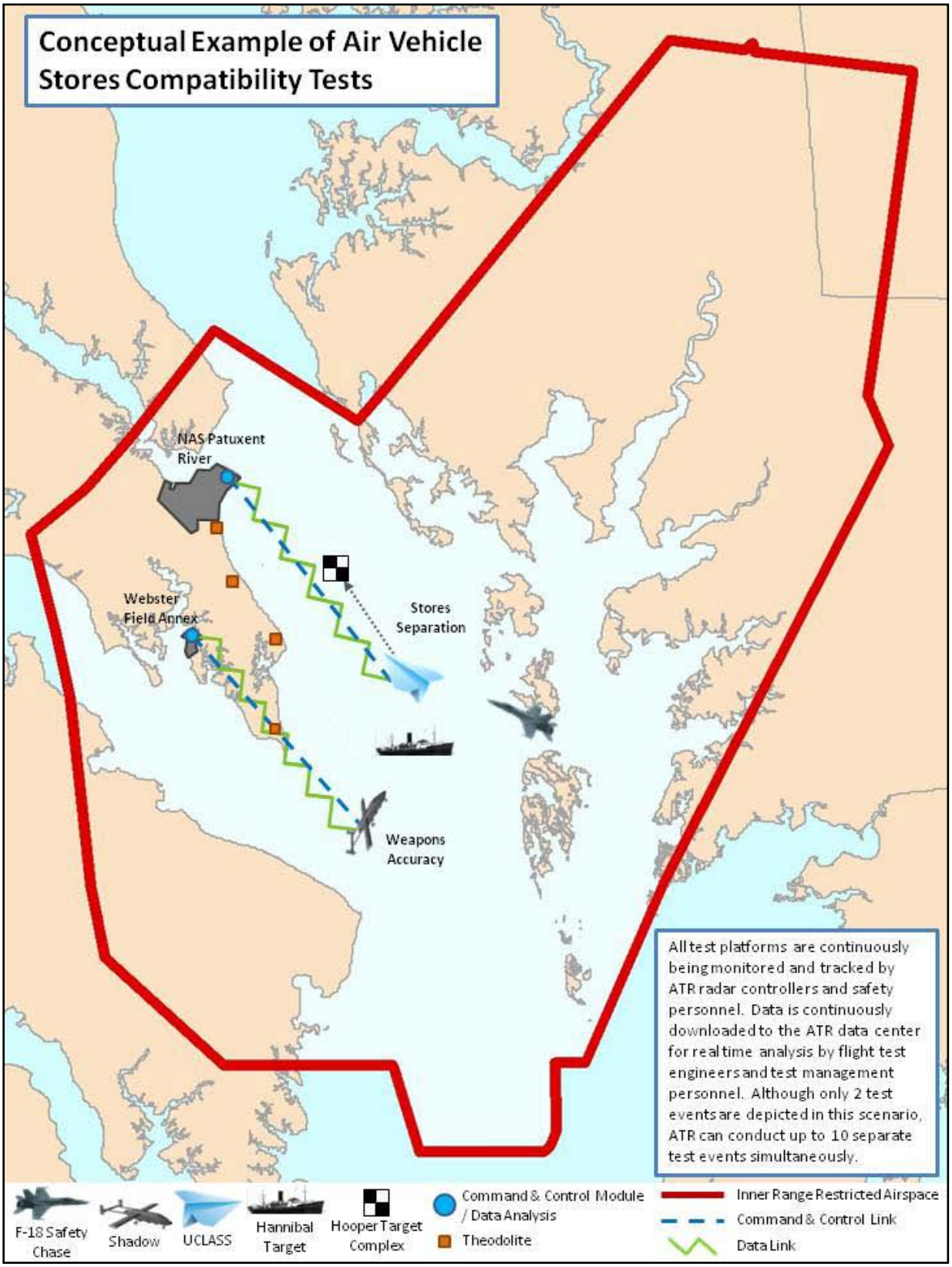

Figure 2-3 Air Vehicle Stores Compatibility Test Scenario

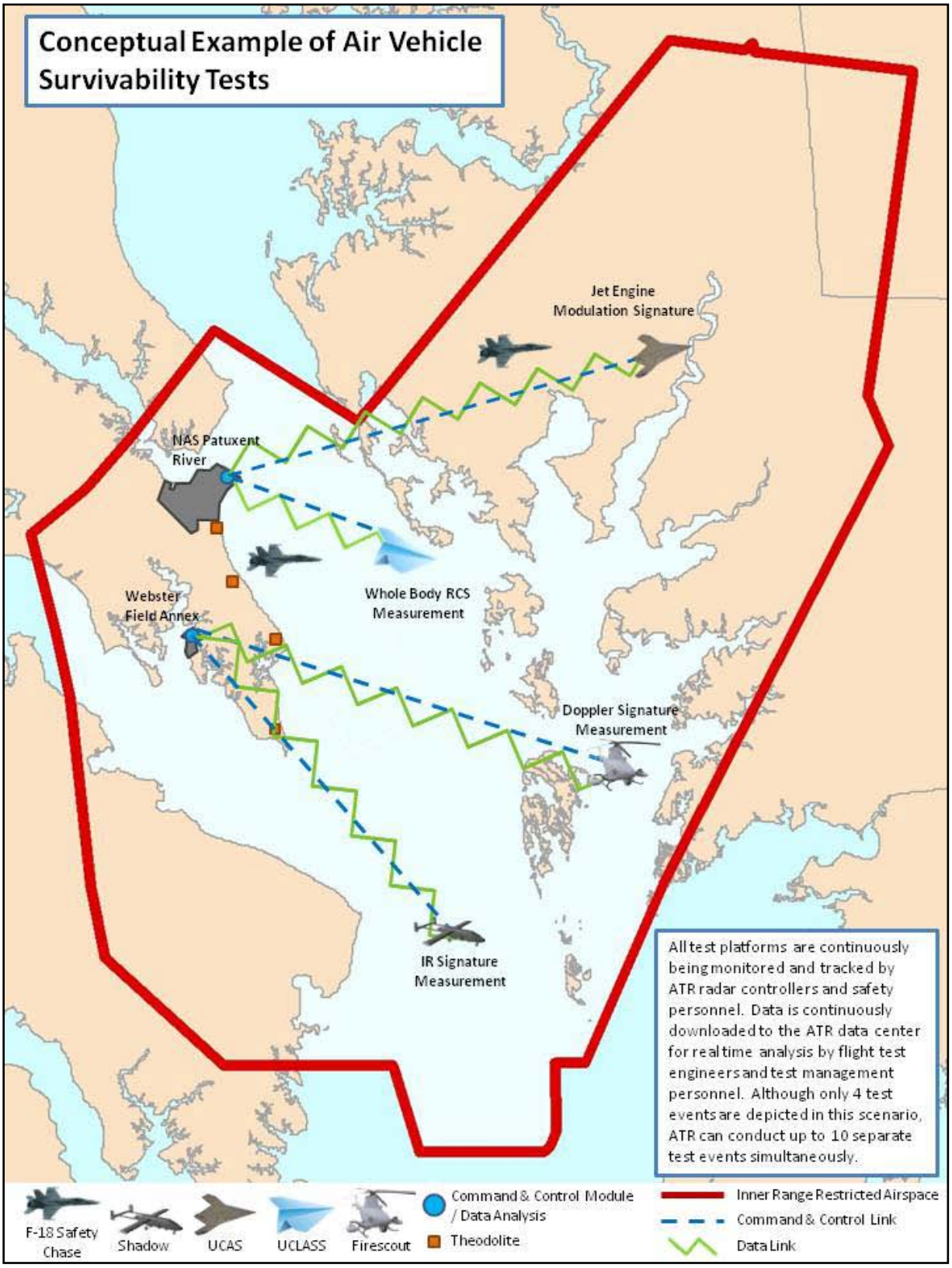

Figure 2-4 Air Vehicle Survivability Test Scenario

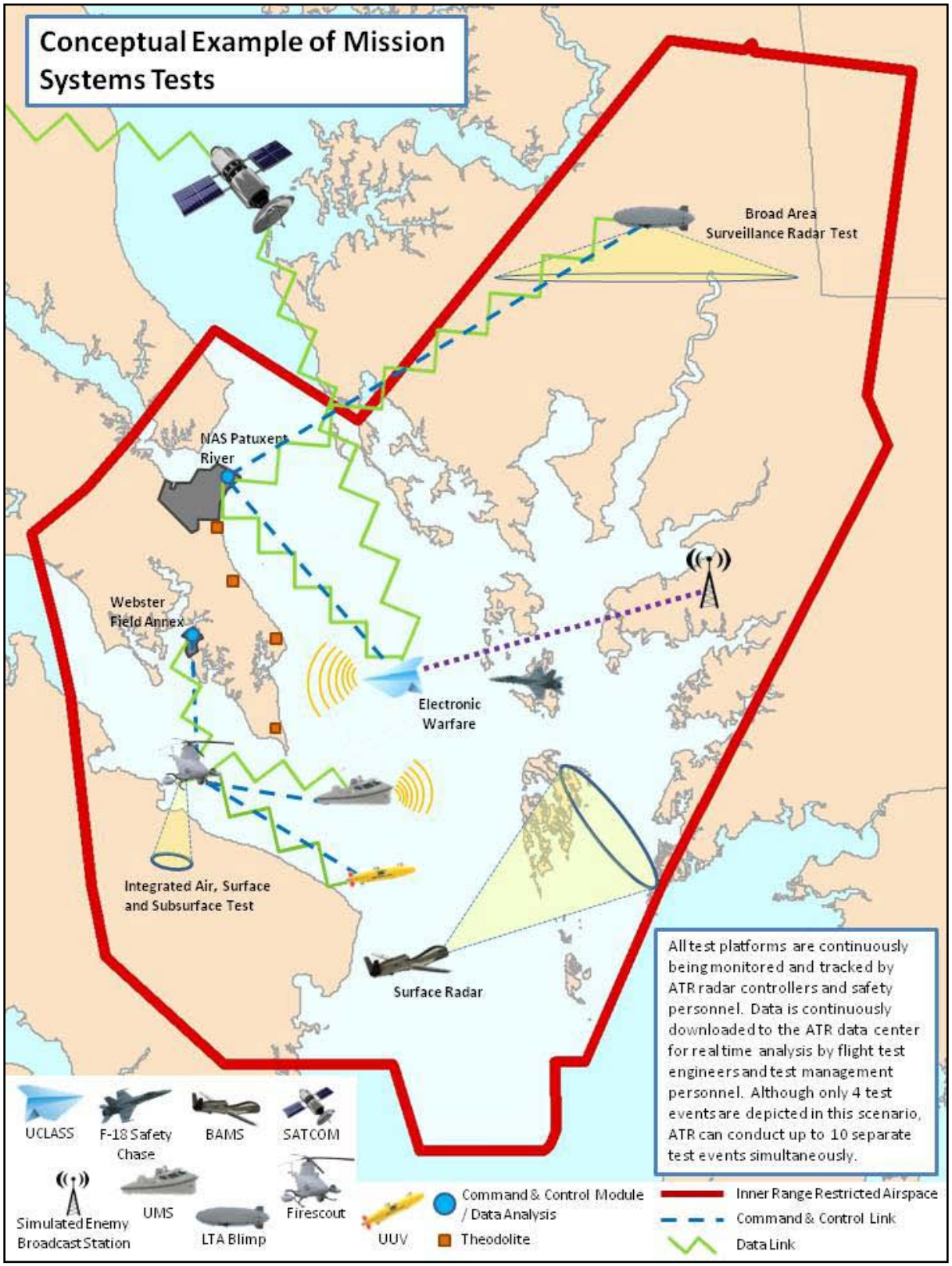

Figure 2-5 Mission Systems Test Scenario

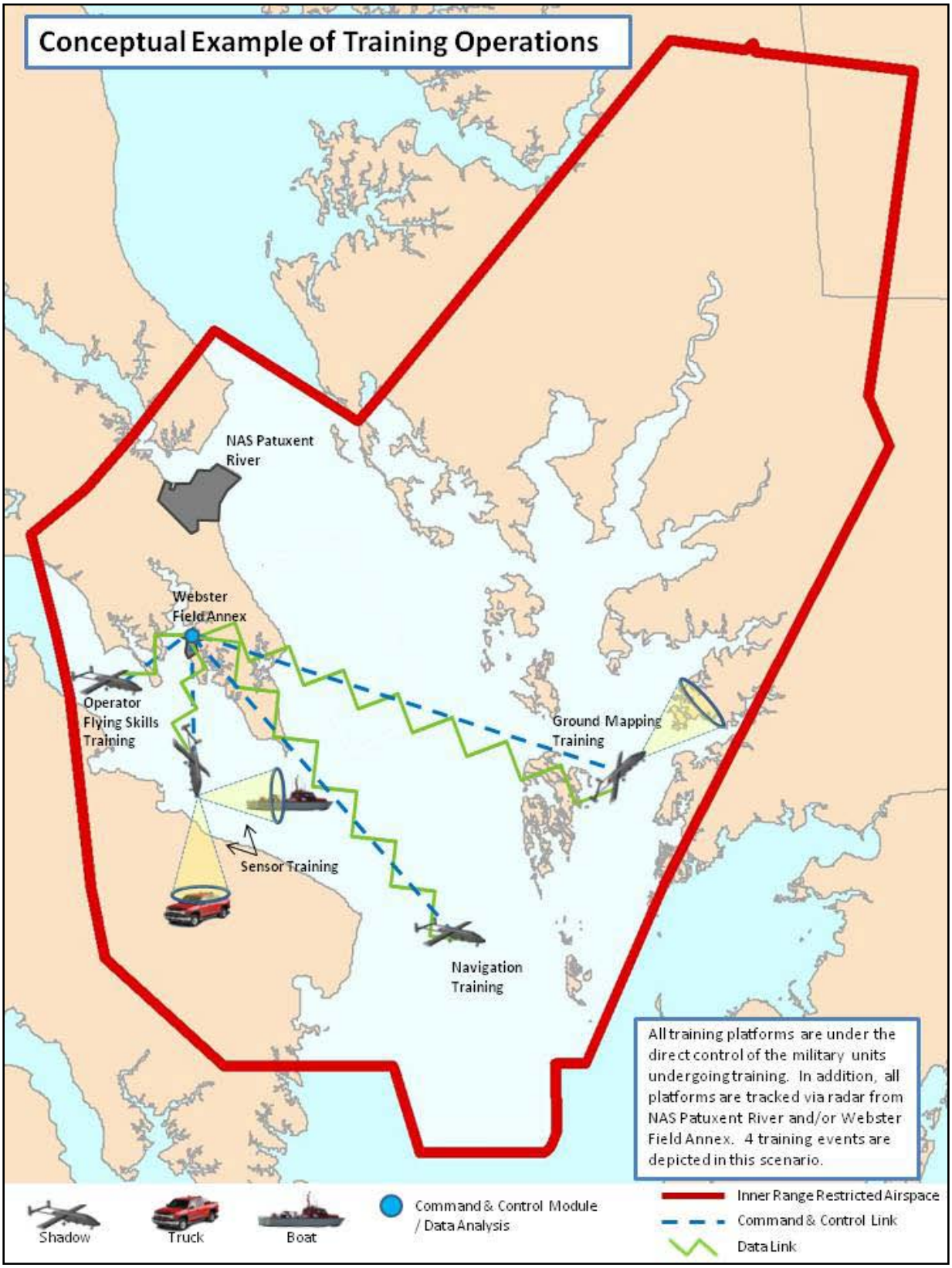

Figure 2-6 Training Scenario

2.1.7.2 Sensors and Electromagnetic Emissions

Sensors may be a permanent part of an unmanned platform or temporarily installed to support a particular test or training event. They are broadly classified as passive or active. Passive sensors do not emit electromagnetic energy and therefore have minimal impact on the environment. Examples of passive sensors include electro-optical (E-O) and Infrared (IR) cameras, real-time video, and certain bi-static radar receivers.

Active sensors emit electromagnetic energy that may potentially interfere with other electronic systems in the regional area. The use of active sensors must be closely controlled and managed to avoid affecting other civilian and military electronic systems. Examples of active systems include radar, communication transmitters, and data links. Table A-8 of Appendix A provides a representative list of the types of sensors that would be operated on unmanned systems. Low power lasers also fall into this category and include laser radars, laser range finders/designators, or similar applications. The classes of lasers that may be utilized in the ATR are provided in Table A-9 of Appendix A.

Other systems that emit electromagnetic energy include high power microwaves (HPMs). HPM testing on unmanned systems would primarily be conducted to evaluate their vulnerability to foreign HPM weapons. These HPM tests would occur in Electromagnetic Environmental Effects ground test facilities such as the Electromagnetic Pulse Site and Naval Electromagnetic Radiation Facility.

2.1.7.3 Targets

A suite of fixed and mobile targets are required to support weapons separation test and training events as well as radar and E-O/IR testing. Fixed targets available in the Inner Range include two visual structures in the surface impact area, four aim points at specified latitude/longitude, and two shallow impact areas typically used when an expendable object must be recovered. All of these fixed targets have the potential to accumulate expendable debris that would potentially impact the environment.

Mobile targets include maritime platforms that can maneuver to provide more complex test scenarios and aerial targets including target drones. In some cases, manned and unmanned systems may serve as the target themselves (e.g., counter-UAS testing). The use of mobile targets could potentially harm biological resources such as submerged aquatic vegetation (SAV) grasses, endangered/threatened species, and cultural resources. Table A-11 of Appendix A provides a list of the types of targets that would be used to support unmanned systems operations.

2.1.7.4 Ground support

Ground activities required to support unmanned systems operations include launch and recovery, maintenance and repair activities, ground taxi, pre-flight and post flight inspections, lubrication and hydraulic servicing, and other routine activities associated with manned platforms. Table A-12 of Appendix A provides a more complete description of ground support activities associated with unmanned systems.

2.1.7.5 Facilities

The Inner Range contains a broad range of ground facilities such as hangars, launch and recovery systems, fabrication shops, laboratories, simulators, runways, launch sites, command and control, and a

full spectrum of communication and data acquisition to support the test and training of manned systems. These facilities would also be used for unmanned systems test and training similar to how they are used for manned systems. Table A-13 of Appendix A provides a list of facilities that provide support to unmanned systems operations.

2.2 NO-ACTION ALTERNATIVE (BASELINE ALTERNATIVE)

Under the No-Action Alternative, UAS, UGS and UMS operations would be conducted in the ATR Inner Range at the current baseline levels shown in Table 2-5 for UAS and Table 2-6 for UGS and UMS. Baseline numbers were derived from best available data sources including actual flight hours and subject matter expert interviews.

The No-Action Alternative satisfies the current needs of NACWAD's RDAT&E unmanned systems mission. However, the No-Action Alternative does not support NAWCAD's RDAT&E mission to expand testing and development of unmanned systems. Therefore, this alternative would not adequately meet the requirements of the Proposed Action.

The No-Action Alternative in this EA provides the environmental baseline data (the "as is" condition) for existing environmental parameters from which to assess and compare the potential impacts of the Preferred Alternative.

2.3 PREFERRED ALTERNATIVE (PROPOSED ACTION)

The Preferred Alternative includes expansion of unmanned systems RDAT&E and training operations in the ATR Inner Range. This action includes multiple types of UAS, UGS, and UMS either separately or as part of complex multi-system groups. Testing of unmanned systems would support the development of new generation unmanned platforms and their associated sensors and payloads. Operations may range from a single vehicle, to multiple vehicles, to integration testing between air, ground, and maritime platforms.

Under this alternative, the ATR Inner Range would support the expansion of UAS, UGS, and UMS operations.

2.3.1 UAS Expansion

Based on input from UAS subject matter experts and data contained in the DoD Unmanned Systems Integrated Roadmap FY2011-2036 (DoD 2011), the Preferred Alternative would increase UAS flight hours from baseline numbers as indicated in Table 2-5 to support the anticipated increase in unmanned systems RDAT&E and training.

Table 2-5 Annual UAS Tempo

UAS Group	Flight Hours	
	No-Action Alternative (Baseline)	Preferred Alternative
1	156	384
2	100	252
3	303	751
4	428	1,056
5	426*	1,024*
LTA (Airship)	60	150

* These UAS do not spend all of their flight time within the restricted airspace. NAWCAD estimates that:
1. BAMS/Triton UAS flights would spend 1.5 hours in Inner Range per sortie or approximately 8% of each sortie.
2. UCLASS would fly in the Inner Range approximately 90% of the time.

2.3.2 UGS and UMS Expansion

There is currently an average of 20 UMS and 0 UGS operations per year at the ATR Inner Range. Based on input from subject matter experts and data contained in the *DoD Unmanned Systems Integrated Roadmap (FY2011-2036)*, NAWCAD estimates that combined UGS and UMS operations would increase to approximately 200 events per year as shown in Table 2-6. The rational for this increase is based on the documented need for more developmental test and training among integrated unmanned air, ground, and maritime systems to ensure an improved collaborative operational environment.

Table 2-6 UGS and UMS Tempo

Unmanned System Type	Test Events	
	No-Action Alternative (Baseline)	Preferred Alternative
UMS	20	160
UGS	0	40

2.4 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD

2.4.1 Unmanned System Expansion and Launch/Recovery of UAS at Bishops Head

For this alternative, the Navy property at Bishops Head, Maryland would be expanded through the purchase of adjoining public property to allow the establishment of a launch and recovery area for Group 1 and 2 unmanned air systems. It was determined that this was not a feasible option at this time because the restricted airspace above Bishops Head does not extend to the surface as required for unmanned air systems flight operations. NAWCAD is exploring the option of moving the northern boundary of R-4002 (which extends from the surface to 20,000 ft above ground level [AGL]) northward to include the existing Navy property at Bishops Head. Obtaining Federal Aviation Administration (FAA) approval to change established restricted areas is a lengthy and uncertain process that is not guaranteed to succeed; therefore,

this alternative was not carried forward for analysis. This alternative may be addressed in a future EA if the Navy decides to pursue the Bishops Head property purchase and R-4002 boundary move.

2.4.2 Operations outside the Inner Range

For this alternative, the Navy would conduct the full range of unmanned systems test and training in the Inner Range and expand into other nearby regional test ranges such as Fort A.P. Hill, Naval Surface Warfare Center Dahlgren Division, National Aeronautics and Space Administration Wallops, and Aberdeen Proving Ground. Connecting restricted airspace across these ranges would support requirements for longer duration flight-testing and offer expanded range capability. This approach would require extensive coordination with the FAA to ensure that appropriate documentation, such as a Certificate of Authorization (COA) for each type of UAS flown outside of Inner Range restricted areas, are in place prior to operating UAS outside of the Inner Range. Since the process for obtaining a COA is complex and uncertain concerning approval, this alternative was not carried forward for further analysis.

The alternatives considered but not carried forward do not meet NAWCAD operational requirements for test and training with unmanned systems in terms of tempo, types of operations, and variety of platforms. These alternatives do not satisfy the future operational requirements and tempo projected in the *DOD Unmanned Systems Integrated Roadmap FY2011-2036* (DoD 2011). No other reasonable alternatives were found to meet the NAWCAD mission needs and at the same time reflect the anticipated growth in unmanned systems development that is reflected in the DoD roadmap.

CHAPTER 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter includes a description of the existing environmental conditions within the ATR Inner Range, which includes approximately 2,352 sq mi (6,092 sq km) of restricted airspace, underlying surface waters, and land test areas at NAS Patuxent River, Webster Field Annex, and the BIR. Information presented in this chapter serves as baseline data to identify and evaluate any potential impacts that could result from the Proposed Action or the No-Action Alternative.

Unless otherwise specified, the resources description generally applies to all project sites within the ATR. Background and site-specific information presented for each resource section has been focused to describe only those resource components addressed in the analysis of potential impacts.

3.1 AIR QUALITY

3.1.1 Affected Environment

3.1.1.1 Definition of Resource

Estimated emissions from a proposed federal action are typically compared with the relevant national and state standards to assess the potential for increases in pollutant concentrations. Impacts would occur if the Proposed Action would directly or indirectly produce emissions that would be the primary cause of, or would significantly contribute to, a violation of state or federal ambient air quality standards.

Air quality in a given location is defined by pollutant concentrations in the atmosphere and is generally expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). One aspect of significance is a pollutant's concentration in comparison to a national and/or state ambient air quality standard. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare with a reasonable margin of safety. The national standards, established by the United States Environmental Protection Agency (USEPA), are termed the National Ambient Air Quality Standards (NAAQS). In addition to the NAAQS, the USEPA allows the individual states to establish ambient air quality standards that are more stringent than the NAAQS. The Maryland Department of Environment (MDE) and the Virginia Department of Environmental Quality (VDEQ) have adopted the USEPA's NAAQS, without any exceptions. The Delaware Department of Environment (DDE) has adopted the USEPA's NAAQS for the six criteria pollutants, with criteria for suspended solids, hydrocarbons, and hydrogen sulfide established by Title 7 Delaware Code, Chapter 60. Table 3-1 provides a summary of the NAAQS and the Delaware state standards.

Areas that violate ambient air quality standards are designated as nonattainment areas. Nonattainment designations for ozone (O_3) and carbon monoxide (CO) include subcategories indicating the severity of the air quality problem (e.g., the classifications range from *basic* to *severe* for O_3). Areas that comply with federal air quality standards are designated as attainment areas. Areas that have been re-designated from nonattainment to attainment are designated as maintenance areas. Areas that lack monitoring data to demonstrate attainment or nonattainment status are designated as unclassified and are considered to be in attainment for regulatory purposes.

Table 3-1 NAAQS and Delaware Ambient Air Quality Standards

POLLUTANT	AVERAGING TIME	NAAQS[1]	
		Primary	Secondary
Ozone (O_3)	8 hours	0.075 ppm (147 µg/m^3)	Same as primary standard
	1 hour	†	
Carbon Monoxide (CO)	8 hours	9 ppm (10 mg/m^3)	†
	1 hour	35 ppm (40 mg/m^3)	
Nitrogen Dioxide (NO_2)	Annual arithmetic mean	0.053 ppm (100 µg/m^3)	Same as primary standard
	1 hour	0.100 ppm (188 µg/m^3)	†
Sulfur Dioxide (SO_2)	Annual arithmetic mean	0.03 ppm (80 µg/m^3)	†
	24 hours	0.14 ppm (365 µg/m^3)	†
	3 hours	†	0.5 ppm (1,300 µg/m^3)
	1 hour	0.075 ppm (196 µg/m^3)	†
PM_{10}	Annual arithmetic mean	†	Same as primary standard
	24 hours	150 µg/m^3	
$PM_{2.5}$	Annual arithmetic mean	15 µg/m^3	Same as primary standard
	24 hours	35 µg/m^3	
Sulfates	24 hours	†	†
Lead (Pb)	30-day average	†	†
	Calendar quarter	1.5 µg/m^3	Same as primary standard
Hydrogen Sulfide (H_2S)	1 hour	†	†
Vinyl Chloride (chloroethene)	24 hours	†	†
Additional Delaware Standards			
Suspended Particles	24 hours	75 µg/m^3	Same as primary standard
	Annual NTE	260 µg/m^3	Same as primary standard
Hydrocarbons	3-hour average	160 µg/m^3 (0.24 ppm)	Same as primary standard
Hydrogen Sulfide (H_2S)	1-hour maximum	0.06 ppm	Same as primary standard
	3-minute maximum	0.03 ppm	Same as primary standard

Notes: [1] NAAQS are not to be exceeded more than once per year except for annual standards.
ppm = parts per million; µg/m^3 = micrograms per cubic meter; mg/m^3 = milligram per cubic meter;
NTE = not to exceed; † = no standard established

Sources: USEPA 2012a; 26 COMAR 1104; 9 VAC 5-30-10; and Title 7 Delaware Code Chapter 60

The air pollutants that are considered in this EA include volatile organic compounds (VOCs), O_3, CO, nitrogen oxides (NO_X), and particulate matter less than or equal to 10 microns in diameter (PM_{10}). Emissions are often characterized as being "primary" or "secondary" pollutants. Primary pollutants are those emitted directly into the atmosphere such as CO, SO_2, and PM_{10}. Secondary pollutants are those formed through chemical reactions in the atmosphere such as O_3 and NO_2. SO_2 and NO_2 are commonly referred to and reported as generic oxides of sulfur (SO_X) and NO_X, respectively, as SO_2 and NO_2 constitute the majority of their respective oxides. Although VOCs (also referred to as hydrocarbons or

reactive organic gases) and NO_X (other than nitrogen dioxide) have no established ambient standards, they are important as precursors to O_3 formation.

3.1.1.2 Regulatory Setting

The General Conformity Rule, as established in Section 176(c) of the Clean Air Act (CAA) (as amended), requires federal agencies to ensure that actions undertaken in nonattainment or maintenance areas are consistent with the CAA and with federally enforceable air quality management plans. The General Conformity Rule applies to federal actions occurring in nonattainment or maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds. The emission thresholds that trigger requirements for a conformity analysis are called *de minimis* levels. *De minimis* levels (in tons per year [tpy]) vary by pollutant and are also subject to the severity of the nonattainment status.

The General Conformity Rule establishes a process that is intended to demonstrate that a proposed federal action would not: 1) cause or contribute to new violations of federal air quality standards; 2) increase the frequency or severity of existing violations of federal air quality standards; and 3) delay the timely attainment of federal air quality standards. Compliance is presumed if the net increase in direct and indirect emissions from a federal action would be less than the relevant *de minimis* level for the region in which the action is proposed. However, if the increase in emissions for a nonattainment pollutant exceeds *de minimis* levels, a formal conformity determination process must be implemented. For the purposes of this air quality analysis, project emissions would be potentially significant if they exceed federal *de minimis* levels. If emissions exceed their respective *de minimis* levels, further analysis of the emissions and their consequences would be performed to assess whether there is a likelihood of a significant impact to air quality.

State and Local Requirements

The CAA requires each state to develop, adopt, and implement a State Implementation Plan (SIP) to achieve, maintain, and enforce federal air quality standards throughout the state. SIP documents are developed on a pollutant-by-pollutant basis whenever one or more air quality standards are being violated.

3.1.1.3 Existing Conditions

Climate and Meteorology

The climate of the area surrounding the ATR Inner Range is categorized as humid subtropical, moderated by nearby water bodies. The region generally receives more than 40 in (101 cm) of precipitation per year including 15 in (38 cm) of snow. The prevailing winds for NAS Patuxent River are northwesterly from October to April and southerly from May through September. The average temperature is 58°F (14°C), with January being the coldest month and July the warmest month (World Climate 2012).

Attainment Status and *de minimis* Thresholds

NAS Patuxent River and Webster Field Annex are located in St. Mary's County, which is in the Maryland Tri-County Region of St. Mary’s, Calvert, and Charles Counties. Calvert and Charles Counties are included in the Metropolitan Washington Nonattainment Area (MWNAA). Table 3-2 lists the attainment

status of the Tri-County Region. A plan for achieving attainment for the 8-hour ozone (O_3) NAAQS for the MWNAA was prepared by the Metropolitan Washington Air Quality Committee (MWAQC) in 2007. The MWAQC was established by the governors of Maryland and Virginia and the mayor of the District of Columbia to prepare a regionally coordinated air quality plan to comply with the requirements of the CAA Amendments of 1990. Recommendations in the MWAQC plan are forwarded to the state environmental agencies for consideration in their air quality attainment planning. In turn, each state submits a SIP revision to the USEPA for review and approval.

Table 3-2 NAS Patuxent River Area Attainment Status

Criteria Pollutant	St. Mary's County	Calvert County	Charles County
CO	Attainment	Attainment	Attainment
Pb	Attainment	Attainment	Attainment
NO_2	Attainment	Attainment	Attainment
O_3	Attainment	Moderate Nonattainment	Moderate Nonattainment
PM_{10}	Attainment	Attainment	Attainment
$PM_{2.5}$	Attainment	Attainment	Nonattainment
SO_2	Attainment	Attainment	Attainment

Source: USEPA 2012b.

The ATR Inner Range also covers portions of Caroline, Dorchester, Wicomico, and Somerset counties in Maryland; portions of Accomack, Westmoreland, Northumberland, and Lancaster counties in Virginia; and portions of Sussex County, Delaware. The Virginia counties of Accomack, Westmoreland, Northumberland, and Lancaster are in attainment for all NAAQS. The Maryland counties of Dorchester, Wicomico, and Somerset are all in attainment for all NAAQS. Portions of Caroline County, Maryland are in nonattainment for the 2008 8-hour ozone NAAQS. Sussex County, Delaware is included in the Philadelphia-Wilmington-Atlantic City moderate Nonattainment Area (NAA) for the 8-hour O_3 NAAQS, but is in attainment for all other criteria pollutant standards. In addition to the NAAQS, Delaware has also established primary and secondary standards for suspended particulates, HCs, and hydrogen sulfide. The standards for PM_{10} and $PM_{2.5}$ are more stringent than the standard for suspended particulates (75 $\mu g/m^3$ over 24 hours and 260 $\mu g/m^3$ not to be exceeded more than once per year). It is not expected that measurable quantities of hydrogen sulfide would be emitted as a result of the Proposed Action.

The General Conformity Rule requires potential emissions from the Proposed Action to be determined on an annual basis and compared to the annual *de minimis* levels from those pollutants (or precursors) for which the area is classified as nonattainment. The General Conformity Rule is not applicable to attainment areas. No analysis is necessary for portions of the Proposed Action that occur at NAS Patuxent River since St. Mary's County is in attainment for all the NAAQS criteria pollutants. However, because neighboring counties (Calvert and Charles counties) are in nonattainment for one or more criteria pollutants, it was decided that the impacts would be analyzed as if all of the emissions associated with the proposed activities at NAS Patuxent River would occur within the MWNAA. The MWNAA is in an O_3 transport region, thus the applicable O_3 *de minimis* thresholds are 50 tpy for VOCs and 100 tpy for NO_X.. The *de minimis* value for $PM_{2.5}$ is assumed to be the same *de minimis* threshold for PM_{10} (100 tpy).

3.1.1.4 Greenhouse Gases

Greenhouse gases (GHGs) are pollutants of concern for air quality and climate change. GHGs include water vapor, carbon dioxide (CO_2), methane, NO_X, O_3, and several chlorofluorocarbons. Water vapor is a

naturally occurring GHG and accounts for the largest percentage of the greenhouse effect. Next to water vapor, CO_2 is the second-most abundant GHG and is typically produced from human related activities. The largest source of CO_2 emissions globally is the combustion of fossil fuels such as coal, oil, and gas in power plants, automobiles, industrial facilities, and other sources. Additionally, a number of specialized industrial production processes and product uses such as mineral production, metal production and the use of petroleum-based products can also lead to CO_2 emissions.

Although regulatory agencies are taking actions to address GHG effects, there are currently no state or federal standards or regulations limiting CO_2 emissions and concentrations in the ambient air. In response to the *FY2008 Consolidated Appropriations Act* (H.R. 2764; Public Law 110–161), the USEPA issued the *Final Mandatory Reporting of Greenhouse Gases Rule* (GHG Reporting Rule), which became effective on December 29, 2009. The GHG Reporting Rule requires annual reporting of GHG emissions to USEPA from large sources and suppliers in the United States, including suppliers of fossil fuels or industrial GHG; manufacturers of vehicles and engines; and facilities that emit greater than 25,000 metric tons per year (27,558 tpy) each of CO_2 and other GHGs. The intent of the rule is to collect accurate and timely emissions data to inform future policy decisions and programs to reduce emissions, as well as fight against the effects of climate change.

In a draft guidance document, the CEQ proposes that federal agencies consider, in scoping their NEPA analyses, whether analysis of the direct and indirect GHG emissions from their proposed actions may provide meaningful information to decision makers and the public. Specifically, if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tpy or more of CO_2-equivalent (CO_{2e}) GHG emissions, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public. The term CO_{2e} is defined as a measure used to compare the emissions from various GHG based upon their global warming potential. For example, the global warming potential for methane over 100 years is 21. This means that emissions of one metric ton of methane is equivalent to emissions of 21 metric tons of CO_2, in terms of global warming potential (Organization for Economic Cooperation and Development [OECD] 2005)

For long-term actions that have annual direct emissions of less than 25,000 metric tons of CO_{2e}, CEQ encourages federal agencies to consider whether the action's long-term emissions should receive similar analysis. Furthermore, CEQ does not propose this as an indicator of a threshold of significant effects, but rather as an indicator of a minimum level of GHG emissions that may warrant some description in the appropriate NEPA analysis for agency actions involving direct emissions of GHGs (CEQ 2010).

Federal agencies are, on a national scale, addressing emissions of GHGs by reductions mandated in federal laws and Executive Orders (EOs), most recently, EO 13514. Several states have promulgated laws as a means to reduce statewide levels of GHG emissions. In particular, the State of Maryland established the Maryland Climate Change Commission in 2009 and sponsored the Greenhouse Gas Reduction Act. To support this act, the state developed a plan to reduce GHG emissions in Maryland by 25 percent by 2020.

In an effort to reduce energy consumption, reduce dependence on petroleum, and increase the use of renewable energy resources in accordance with the goals set by EO 13123 and the Energy Policy Act of 2005, the Navy has implemented a number of renewable energy projects. The types of projects currently in operation within the Navy include thermal and photovoltaic solar systems, geothermal power plants,

wind generators, and biomass and methane fuel systems. Today the Navy produces 12 percent of its total annual energy needs through renewable sources (Navy 2013).

GHG emissions for an action can be inventoried, based on methods prescribed by state and federal agencies. However, the specific contributions of a particular project to global or regional climate change generally cannot be identified based on existing scientific knowledge because individual projects typically have a negligible effect. Also, climate processes are understood at only a general level.

3.1.2 Environmental Consequences

3.1.2.1 Approach to Analysis

Criteria pollutant emissions resulting from proposed testing and training activities at NAS Patuxent River, at Webster Field Annex, and on the ATR have been evaluated for the Proposed Action. Air quality impacts would be significant if emissions associated with the Proposed Action would: 1) increase ambient air pollution concentrations above the NAAQS; 2) contribute to an existing violation of the NAAQS; 3) interfere with, or delay timely attainment of the NAAQS; or 4) impair visibility within federally-mandated Prevention of Significant Deterioration Class I areas. Additionally, a conformity analysis would be required before initiating any action that may lead to nonconformance with a SIP, an exceedence of *de minimis* criteria pollutant thresholds, or contribution to a violation of the NAAQS.

3.1.2.2 Alternative 1 – The No-Action Alternative (Baseline Alternative)

Impacts

Estimated emissions associated with the Baseline Alternative were calculated and are provided in Table 3-3. The emissions analysis assumed that there would be no increase in personal vehicle traffic on NAS Patuxent River or at Webster Field Annex. It was also assumed that ground support equipment (GSE) usage would not increase over existing levels at NAS Patuxent River or at Webster Field Annex.

Engine emissions attributable to the flight operations during climb out and approach below 3,000 ft (914 m) AGL were considered in this analysis for all UAS flights. Chase aircraft would be used in support of the Baseline Alternative. It is estimated that four helicopter sorties and eight F/A-18 sorties would be conducted annually in support of Fire Scout and UCLASS operations, respectively. All chase aircraft operations would be based at NAS Patuxent River.

It is assumed that all UMS operations would involve surface vessels.

Table 3-3 Baseline Alternative Annual Emissions

Component	Pollutant (tpy)					
	VOC	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**CO_2**
Unmanned Aircraft Systems	0.379	0.504	0.289	0.0568	0.0563	184.0
Chase Aircraft	0.225	0.164	0.630	0.0102	0.164	80.0
Unmanned Maritime Systems	0.00886	0.190	2.64	--	0.0008	22.2
Total	**0.613**	**0.858**	**3.56**	**0.0670**	**0.221**	**286.2**
de minimis threshold	50	100	NA	NA	100	
Exceeds de minimis threshold?	No	No	No	No	No	

Conformity Applicability Analysis

The estimated emissions associated with the Baseline Alternative would be below *de minimis* threshold levels for conformity for the MWNAA. Therefore, the Baseline Alternative would conform to the State of Maryland SIPs for the 8-hour O_3 NAAQS and the $PM_{2.5}$ NAAQS (MDE 2012, MWAQC 2008) and would not trigger a conformity determination under Section 176(c) of the CAA.

Greenhouse Gases

Implementation of the Baseline Alternative would lead to emissions of approximately 261.5 metric tons (288.3 tons) of CO_{2e}. Appendix B presents estimates of GHG emissions generated by the actions associated with the Proposed Action. These data show that the CO_{2e} emissions associated with the Baseline Alternative would amount to approximately 3.83×10^{-8} of the total CO_{2e} emissions generated by the U.S. (6,821.8 million metric tons) (USEPA 2012c). Emissions under the Baseline Alternative are also below the 25,000 metric tons of CO_{2e} level proposed in the draft NEPA guidance provided by the CEQ.

Mitigation Measures

Implementation of the Baseline Alternative would not result in significant air quality impacts; therefore, no mitigation measures are proposed or required.

3.1.2.3 Alternative 2 – The Preferred Alternative (Proposed Action)

Impacts

Estimated emissions associated with the Proposed Action were calculated and are provided in Table 3-4. The emissions analysis assumed that there would be no increase in personal vehicle traffic on NAS Patuxent River or at Webster Field Annex.

Engine emissions attributable to the flight operations during climb out and approach below 3,000 ft (914 m) AGL were considered in this analysis for all UAS flights. Chase aircraft would be used in support of the Proposed Action. It is estimated that 10 helicopter sorties and 20 F/A-18 sorties would be conducted annually in support of Fire Scout and UCLASS operations, respectively. All chase aircraft operations would be based at NAS Patuxent River. It is assumed that all UGS operated on the ATR Inner Range would be battery operated, and would thus have no criteria pollutant emissions.

It is assumed that UMS activity would include 120 surface vehicle operations and 40 underwater vehicle operations.

Table 3-4 Proposed Action Annual Emissions

Component	Pollutant (tons/year)					
	VOC	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**CO_2**
Unmanned Aircraft Systems	0.948	1.20	0.710	0.118	0.130	439.0
Chase Aircraft	0.563	0.410	1.57	0.0255	0.409	200.0
Unmanned Maritime Systems	0.505	1.30	13.1	--	0.0082	132.0
Manned Vessels	0.330	0.928	7.86	--	0.0066	88.6
Total	**2.35**	**3.84**	**23.2**	**0.144**	**0.554**	**859.6**
de minimis threshold	50	100	NA	NA	100	
Exceeds de minimis threshold?	No	No	No	No	No	

Conformity Applicability Analysis

The estimated emissions associated with the Proposed Action would be below *de minimis* threshold levels for conformity for the MWNAA. Therefore, the Proposed Action would conform to the State of Maryland SIPs for the 8-hour O_3 NAAQS and the $PM_{2.5}$ NAAQS (MDE 2012, MWAQC 2008) and would not trigger a conformity determination under Section 176(c) of the CAA. A Record of Non-Applicability (RONA) has been prepared by the U.S. Navy and is provided as Appendix B.

Greenhouse Gases

Implementation of the Proposed Action would lead to emissions of approximately 784.4 metric tons (864.7 tons) of CO_{2e}. Appendix B presents estimates of GHG emissions generated by the actions associated with the Proposed Action. These data show that the CO_{2e} emissions associated with the Proposed Action would amount to approximately 1.15×10^{-7} of the total CO_{2e} emissions generated by the U.S (6,821.8 million metric tons) (USEPA 2011). Emissions under the Preferred Alternative are also below the 25,000 metric tons of CO_{2e} level proposed in the draft NEPA guidance provided by the CEQ.

Mitigation Measures

Implementation of the Proposed Action would not result in significant air quality impacts; therefore, no mitigation measures are proposed or required.

3.2 NOISE

3.2.1 Affected Environment

3.2.1.1 Definition of Resource

Noise is defined as unwanted sound that interferes with normal human activities or otherwise diminishes the quality of the environment. Noise is usually the largest and most pervasive environmental problem associated with aircraft operations. Although many other sources of noise are present in the project areas, aircraft noise is readily identifiable. The potential impacts of the Proposed Action in changing the levels of aircraft noise affecting communities must be considered.

There are a wide range of responses to noise depending on the type of noise and the characteristics of the sound source, as well as the sensitivity and expectations of the receptor, the time of day, and the distance between the noise source and the receptor (e.g., a person or animal). Noise from aircraft operations at military bases are usually viewed in terms of Day-Night Average Noise Level (DNL), which accounts for the infrequent nature of flights as well as penalizing nighttime operations (those operations that occur after 10 pm and before 7 am) due to their higher level of community annoyance. There are 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 (CDNL).

In some cases, the DNL or Community Noise Equivalent Level (CNEL) of a given area cannot be used, and another metric, Sound Exposure Level (SEL) is used to show the noise effects of single overflights from different aircraft types on populations in the vicinity of proposed actions. Sound Exposure Level measures the cumulative noise effects of single flights, compressed into a one-second noise exposure event. This is useful for comparing how various aircraft would affect local noise environments. Table 3-5 provides example noise sources and their potential effects on human receptors.

3.2.1.2 Regulatory Setting

Noise standards and guidelines have been established at the federal, state, and local government levels to protect people from potential hearing damage as well as other impacts (e.g. annoyance) that can disrupt activities or alter quality of life. DoD lands are required to comply with federal noise standards and guidelines, such as those set by the Noise Control Act of 1972, as amended (42 U.S.C. §§ 4901 *et seq.*). The Act provides a framework for the coordination of federal noise control research, establishes noise emission standards, and provides information to the public. Although the DoD is not subject to state and local noise ordinances, these ordinances are considered when determining the significance of a noise impact in order to avoid or minimize impacts to surrounding land uses, including sensitive receptors.

3.2.1.3 Existing Conditions

In support of the 1998 FEIS, 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 run-ups by aircraft on the ground. Using the operations data supporting FEIS, the NOISEMAP computer model was used to calculate and plot the 60 decibel (dB) through 85 dB DNL contours for the average day (Navy 1998b). The results of this analysis included:

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

- The estimated off-base population within the 60 dB contour is 3,138; and
- The 85+ dB DNL contour area did not extend beyond the NAS Patuxent River property line.

Table 3-5 Example Noise Sources and Their Effects on Human Receptors

Example Noise Sources	Sound Level (dBA)	Decibel Effect
Jet take-off at 25 meters	150	Eardrum rupture
Aircraft carrier deck	140	
Military jet take-off from aircraft carrier with afterburner at 20 meters	130	
Thunderclap, chain saw, oxygen torch	120	32 times as loud as 70 dB, painful
Steel mill, auto horn at 1 meter, turbofan aircraft take-off at 70 meters, riveting machine, live rock music	110	16 times as loud as 70 dB, average human pain threshold
Jet take-off at 305 meters, outboard motor, power lawnmower, motorcycle, farm tractor, jackhammer, Boeing 707 or DC-8 aircraft at one nautical mile, Bell J-2A helicopter at 35 meters	100	Eight times as loud as 70 dB, serious damage possible after eight-hour exposure
Boeing 737 or DC-9 at one nautical mile, motorcycle at 8 meters, newspaper press	90	Four times as loud as 70 dB, likely damage after eight-hour exposure
Garbage disposal, dishwasher, freight train at 15 meters, car wash at 7 meters, diesel truck (40 mph at 15 meters), diesel train (45 mph at 35 meters)	80	Twice as loud as 70 dB, possible damage after eight hours of exposure
Passenger car (65 mph at 8 meters), freeway 15 meters from pavement edge, vacuum cleaner	70	Arbitrary base of comparison, upper 70's are annoyingly loud to some receptors
Conversation in restaurant, background music, air conditioning unit at 35 meters	60	Half as loud as 70 dB, fairly quiet
Quiet suburb, conversation at home, large electrical transformers at 35 meters	50	One-fourth as loud as 70 dB
Library, bird calls, lowest limit of urban sound	40	One-eighth as loud as 70 dB
Quiet rural area	30	One-sixteenth as loud as 70 dB, very quiet
Whisper, rustling leaves	20	
Breathing	10	Barely audible
Minimum threshold of hearing	0	

Source: FICON 1992.

Existing noise levels at Webster Field Annex were also modeled in the 1998 FEIS, with the following results:

- The total area within the 60 dB DNL contour is 51 ac (21 ha)
- The estimated off-base population within the 60 dB contour is 6; and
- The 70+ dB DNL contour area does not extend beyond the Webster Field Annex property line.

In 2009, the Navy conducted studies supporting an Air Installation Compatible Use Zone (AICUZ) report for NAS Patuxent River and a Range Air Installation Compatible Use Zone (RAICUZ) report for the ATR Inner Range (NAVFAC 2009b, 2009c). The AICUZ analyzed noise impacts for the Navy's current aircraft fleet mix including performance aircraft such as F/A-18C/D, F/A-18E/F, and F-35. Upgrades to the NOISEMAP software incorporates better noise-source definition and improved propagation algorithms that account for the effects of topography and water. The total area within the 60 dB DNL

contour was found to be 3,608 ac (1,460 ha), representing an increase of 1,211 ac (490 ha). No information regarding affected population was provided (NAVFAC 2009b).

The 1998 FEIS conducted noise analysis of subsonic and supersonic operations in the airspace of the ATR Inner Range and at the target areas, utilizing the Naval Aviation Simulation Model (NASMOD) software package. The basic unit of analysis for the NASMOD study (and by extension, the noise analysis) was a flight operation. Multiple operational activities were rolled into each single flight operation. For example, an airfield touch-and-go consisted of two operations -- an arrival (touch) and a departure (go). Flights in the ATR Inner Range were similarly subdivided into their component operations. The NASMOD study also identified the Inner Range airspace, or combinations thereof, where flight operations were to be conducted.

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 log of supersonic flight operations within the ATR Inner Range 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. The Inner Range supersonic flight corridor is over open waters of the Chesapeake Bay and unpopulated areas. The study concluded that impact at ground level would be 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 ATR Inner Range, the one exhibiting the largest overpressure would be created by an F-14 flying at 20,000 ft (6,000 m) at Mach 1.4. This would create an overpressure of 3.15 pounds per square foot (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 (Navy 1998b).

The PCBoom software package was utilized in the 2009 RAICUZ to calculate and plot the 40 dB and 45 dB CDNL contours for supersonic operations within the ATR Inner Range. Based on the resulting contours for planned aircraft activity, areas within and outside the target boundary would be subject to minimal impacts from supersonic operations within the ATR Inner Range. Based on the data provided, an average number of five sonic booms per month would be generated within the ATR Inner Range.

3.2.2 Environmental Consequences

3.2.2.1 Approach to Analysis

The 1998 FEIS thoroughly analyzed noise impacts to the ATR Inner Range, which would result from implementation of the FEIS Proposed Action (Navy 1998b). The analysis for this EA characterizes the magnitude of impact associated with the Baseline Alternative and the Proposed Action by comparing the increase in activity proposed in the FEIS, and its associated noise impact, with the increase in activity proposed in Chapter 2 of this EA. Impacts of noise to wildlife is discussed in Section 3.3, *Biological Resources*.

Noise sources at the ATR Inner Range are transitory and widely dispersed. Airborne noise introduced by surface vessels is negligible compared to noise introduced by aircraft; as such, airborne noise levels are addressed with respect to aircraft only.

3.2.2.2 Alternative 1 – The No-Action Alternative (Baseline Alternative)

Impacts

Small Aerial Vehicles

Under the Baseline Alternative, there would be 130 small (Groups 1, 2, & 3) UAS (Puma, Pointer, ScanEagle, STUAS, Aerolight, and Shadow) sorties conducted annually originating from Webster Field Annex and remote sites (See Table 3-6). Nearly all of these sorties would be conducted in near-shore areas, away from the NAS Patuxent River airstrip and administrative facilities.

Small UAS are generally used for low-altitude surveillance and reconnaissance, and as such, detection avoidance is critical to achieving mission objectives. Continuing research and development programs strive to decrease UAS internal combustion engine exhaust noise via innovative muffler design (GTRI 2009). Investigators are also working to reduce the noise generated by UAS propeller operations (NWUAV 2012). Small UAS operations associated with the Baseline Alternative would not yield harmful noise levels to receptors outside the test groups performing the RDAT&E operations. For UAS launch and recovery operations that may exceed 85 dBA, crews would be required to wear hearing protection, as prescribed by DODI 6055.12, OPNAVINST 5100.23, and current stand operating procedures (SOPs).

Large Aerial Vehicles

The Baseline Alternative would involve 150 large (Groups 4 & 5) UAS (Fire Scout, Grey Eagle, BAMS/Triton, and UCLASS) sorties. As shown in Table 3-6, the 150 large UAS operations at NAS Patuxent River would total 854 flight hours, representing approximately 3.5 percent of the total 24,400 annual flight hours conducted at NAS Patuxent River (Navy 1998b). Large UAS flights from NAS Patuxent River and Webster Field Annex would represent roughly one takeoff and landing every two work days. Furthermore, the large UAS would generally pose lower SEL numbers than other aircraft operating at NAS Patuxent River (See Table 3-7). The flight operations associated with the Baseline Alternative would not contribute measurably to existing cumulative CNEL noise levels and would be difficult to distinguish from other operating aircraft.

For the reasons described above, implementation of the Baseline Alternative would not yield significant noise impacts to human receptors.

Table 3-6 Assumed Annual UAS Flight Tempos – Baseline Alternative

UAS	Number of Sorties	Hours/Sortie	Total Hours
Puma	39	2	78
Pointer	39	2	78
Group 1 Total	78		156
ScanEagle	6	10	60
STUAS	5	8	40
Group 2 Total	11		100
Aerolight	16	8	128
Shadow	25	7	175
Group 3 Total	41		303
Fire Scout	38	6	228
Grey Eagle	10	10	200
Group 4 Total	48		428
BAMS/Triton	60	1.5	90
UCLASS	42	8	336
Group 5 Total	102		426

Table 3-7 Representative SEL Values for Manned and Unmanned Aircraft

Aircraft (engine type)	SEL Values (dBA) at Distances (feet) [1]			
	500	1,000	2,000	5,000
F-18	122.9	116.9	110.5	100.5
C-130	95.6	90.5	84.9	76.4
E-2	97.5	92.9	88.0	80.9
F-35	125.0	118.1	110.5	100.5
Shadow [2]	81.4	74.6	66.9	54.0
Fire Scout [3]	90.5	85.8	80.6	72.5
BAMS/Triton [4]	92.1	87.1	81.4	72.6
UCLASS [5]	117.3	112.0	104.6	95.0

Notes:

1. SEL values calculated using SELCalc2, Flyover Noise Calculator, with default settings.
2. Values provided in Stryker Brigade Combat Team EIS (Army 2008).
3. SEL values calculated using Bell 206 (OH-58 configuration) as a surrogate aircraft.
4. SEL values calculated using Cessna 500 as a surrogate (same assumption as EA/OEA for the Triton/BAMS UAS DT Program [Navy 2012]).
5. SEL values calculated using F-15 (P220) as a surrogate (same engine used for both aircraft).

Mitigation Measures

Implementation of the Baseline Alternative would not result in significant noise impacts; therefore, no mitigation measures are proposed or required.

3.2.2.3 Alternative 2 – The Preferred Alternative (Proposed Action)

Impacts

Small Aerial Vehicles

Under the Proposed Action, there would be 321 small (Groups 1, 2, & 3) UAS (Puma, Pointer, ScanEagle, STUAS, Aerolight, and Shadow) sorties conducted annually originating from Webster Field Annex and remote sites (See Table 3-8).

Table 3-8 Assumed Annual UAS Flight Tempos – Proposed Action

Aerial Vehicle	Number of Sorties	Hours/Sortie	Total Hours
Puma	96	2	192
Pointer	96	2	192
Group 1 Total	192		384
ScanEagle	18	10	180
STUAS	9	8	72
Group 2 Total	27		252
Aerolight	37	8	296
Shadow	65	7	455
Group 3 Total	102		751
Fire Scout	96	6	576
Grey Eagle	24	20	480
Group 4 Total	120		1,056
BAMS/Triton	128	1.5	192
UCLASS	104	8	832
Group 5 Total	232		1,024

Nearly all of these sorties would be conducted in near-shore areas, away from the NAS Point Patuxent River airstrip and administrative facilities.

Large Aerial Vehicles

The Proposed Action would involve 352 large (Groups 4 & 5) UAS (Fire Scout, Grey Eagle, BAMS/Triton, and UCLASS) sorties. As shown in Table 3-8, the 352 large UAS operations at NAS Patuxent River would total 2,080 flight hours, representing approximately 8.5 percent of the total 24,400 annual flight hours conducted at NAS Patuxent River (Navy 1998b). Large UAS flights from NAS Patuxent River and Webster Field Annex would represent roughly 1.5 takeoffs and landings every work day. Furthermore, the large UAS would generally pose lower SEL numbers than other aircraft operating at the ATR Inner Range (See Table 3-7). The flight operations associated with the Proposed Action would not contribute measurably to existing cumulative CNEL noise levels and would be difficult to distinguish from other operating aircraft.

For the reasons described above, implementation of the Proposed Action would not yield significant noise impacts to human receptors.

Mitigation Measures

Implementation of the Proposed Action would not result in significant noise impacts; therefore, no mitigation measures are proposed or required.

3.3 BIOLOGICAL RESOURCES

3.3.1 Affected Environment

3.3.1.1 Definition of Resource

Biological resources include plants and animals and the habitats in which they occur. For this analysis, terrestrial and marine biological resources are considered in separate subsections, with some overlap in the coverage of transitional habitats and the associated species of coastal wetlands, tidal flats and beaches. Terrestrial biological resources discussed include vegetation communities, wildlife, and special status species. Marine biological resources discussed include marine habitats, fish and fisheries, marine birds, marine mammals, and special status species. Where appropriate, marine biological resources are further categorized by the habitat type in which they occur (rock versus sand). Special topics such as essential fish habitat (EFH), special aquatic sites, SAV, and fisheries are also discussed for the project area.

3.3.1.2 Regulatory Setting

The Endangered Species Act (ESA of 1973 [16 U.S.C. 1531 et seq.]) mandates that all federal agencies consider the potential effects of their actions on species listed as federally threatened or endangered. Section 7 of the ESA requires federal agencies that fund, authorize, or carry out an action to ensure that their action is not likely to jeopardize the continued existence of any federally listed threatened or endangered species (including plant species) or result in the destruction or adverse modification of designated critical habitats. The lead federal agencies for implementing ESA are the U.S. Fish and Wildlife Service (USFWS) and the U.S. National Oceanic and Atmospheric Administration (NOAA) Fisheries Service. The USFWS maintains a worldwide list of endangered species. Species include birds, insects, fish, reptiles, mammals, crustaceans, flowers, grasses, and trees.

The ESA requires federal agencies, in consultation with the USFWS and/or the NOAA Fisheries Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The law also prohibits any action that causes a "taking" of any listed species of endangered fish or wildlife. Likewise, import, export, interstate, and foreign commerce of listed species are all generally prohibited.

All marine mammals are protected under the Marine Mammal Protection Act (MMPA) of 1972 as amended [16 U.S.C. 1361 et seq.]), and some species are additionally protected by the ESA. The Department of Commerce through the National Marine Fisheries Service (NMFS) is charged with protecting whales, dolphins, porpoises, seals, and sea lions. Walrus, manatees, otters, and polar bears are protected by the Department of the Interior through the USFWS. Marine mammals listed as threatened or endangered under the ESA are also automatically considered “depleted” under the MMPA.

The Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712) is the primary legislation in the United States enacted to conserve migratory birds. The MBTA prohibits the taking, killing, or possessing of migratory birds unless permitted by regulation. As of August 2006, 972 species were included on the list of migratory birds (71 FR 50193). Non-native species, such as the house sparrow (*Passer domesticus)*, European starling (*Sturnus vulgaris)*, rock pigeon (*Columba livia)*, and Mute Swan (*Cygnus olor*), are not protected by the MBTA.

The February 2007 (72 FR 8931) exemption to the MBTA allows for the incidental take of migratory birds by DoD during military readiness activities. This rule authorizes such take, with limitations, that result from military readiness activities. If any military readiness activity that may result in a significant adverse effect on a population of a migratory bird species within the Inner Range is proposed, a consultation with the USFWS to develop appropriate and reasonable conservation measures to minimize or mitigate identified significant adverse effects would be requested.

Additional protection for migratory birds on federal properties is provided by EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds. This EO stresses incorporating bird conservation principles in agency management plans and requires federal agencies to enter into a Memorandum of Understanding on migratory birds with the USFWS.

3.3.1.3 Terrestrial Biological Resources

Terrestrial biological resources at NAS Patuxent River, including Webster Field Annex, and the BIR are discussed below. Additional detail can be found in the Integrated Natural Resources Management Plans (INRMPs) for NAS Patuxent River and the BIR, respectively (NAVFAC 2002 and 2009a).

Terrestrial Vegetation Communities

Terrestrial plant communities on NAS Patuxent River are typical to the area of the ATR Inner Range as a whole and include forests, agricultural fields, old fields, and scrub-shrub areas. Table 3-9 provides a summary of the vegetation habitat types found at NAS Patuxent River.

Table 3-9 Habitat Types at NAS Patuxent River

Habitat Community	Acres at NAS Patuxent River	Acres at Webster Field Annex
Forested Areas	2,817	209
Agricultural Fields	585	162
Old Fields	221	6
Scrub-Shrub Areas	748	53

Source: NAVFAC 2002

Approximately 42 percent of the land area comprising the air station (2,817 ac [1,140 ha]) is characterized by forests of pine, hardwood tree species, shrubs, and vines. 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 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, 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 (NAVFAC 2002).

Agricultural land, which can be used for growing crops such as corn and soybeans, represents approximately eight percent of the landscape of NAS Patuxent River. The 585 ac (237 ha) of agricultural

land, located mainly around the eastern portion of the air station, are cropped for corn, soybeans, barley, rye, and sorghum. Approximately 221 ac (89 ha) 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 748 ac (303 ha) of NAS Patuxent River. Left untouched, these areas will also succeed to a young woodland cover type (NAVFAC 2002).

Webster Field Annex, like NAS Patuxent River, contains various vegetated habitats, including open fields, shrub communities, various forests, and agricultural fields. The agricultural lands at Webster Field Annex are located in the central portion of the annex near the runways. The southeast portion of Webster Field Annex consists of natural, unimproved lands, including open fields, forests, and scrub-shrub habitats. Figure 3-1 provides an overview of the vegetative communities of NAS Patuxent River, and Figure 3-2 provides a Webster Field Annex overview.

Vegetative communities at BIR have been characterized by several historical surveys, and 67 species of vascular plants have now been identified. Table 3-10 provides the plant species identified through these surveys. Many of these species inhabit wetlands areas, which are further discussed in a subsection below. Maryland Department of Natural Resources (MDNR) conducted surveys in 1970 and 1976 pursuant to the enactment of the Maryland State Tidal Wetlands Law; Sipple briefly visited the island in 1978 as part of a larger Chesapeake Bay survey; and McKewen and Brunori categorized vegetation for wildlife potential in 1981 (discussed in Navy 2003). Subsequent field investigations conducted by biologists from the MDNR and personnel from the NAS Patuxent River Natural Resources Office indicate that there have been no significant changes to the vegetation communities at BIR since the 1970 assessment (NAVFAC 2009a). Figure 3-3 displays the vegetative communities at BIR, based on surveys supporting the BIR INRMP.

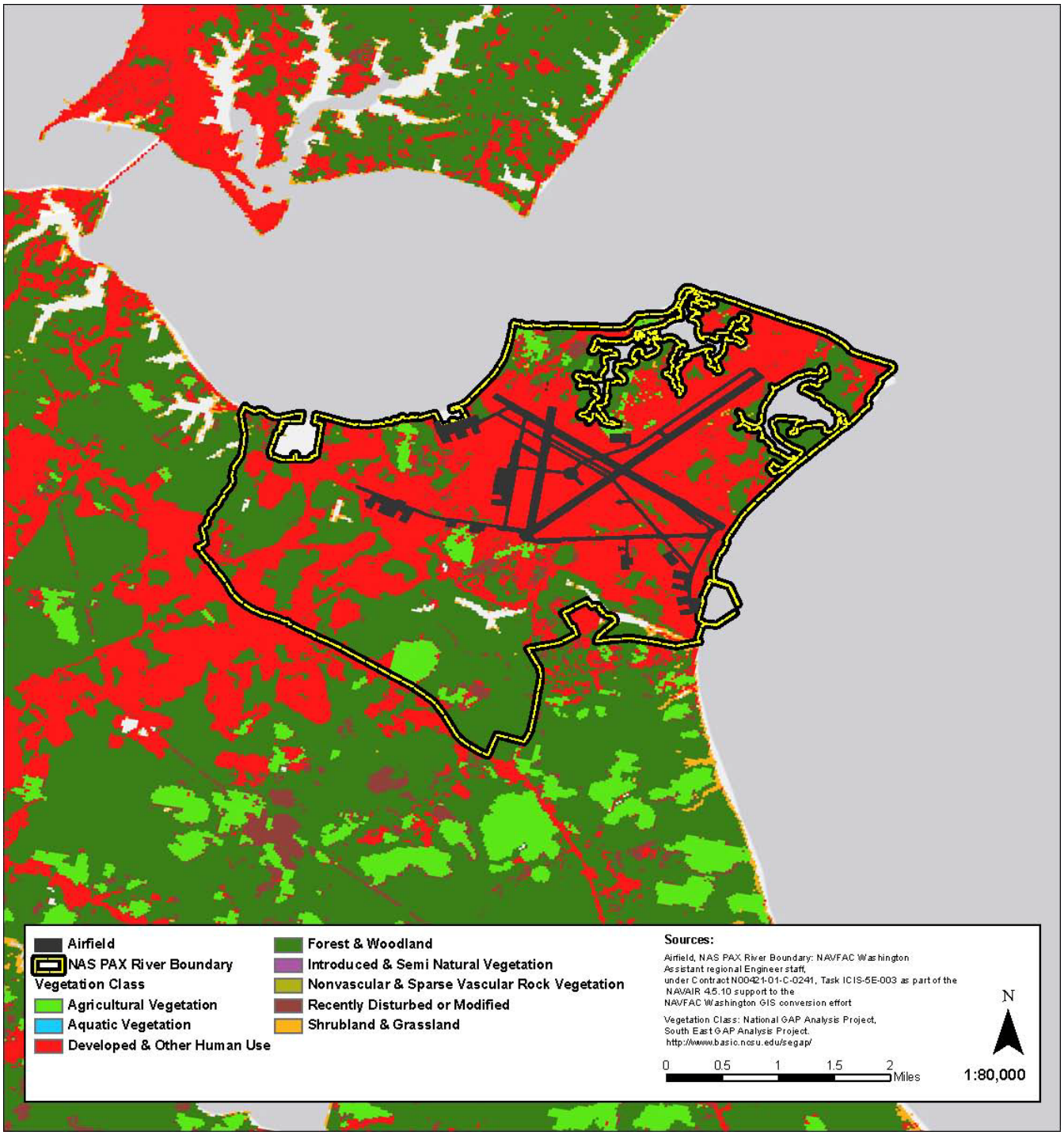

Figure 3-1 Vegetative Communities of the NAS Patuxent River Area

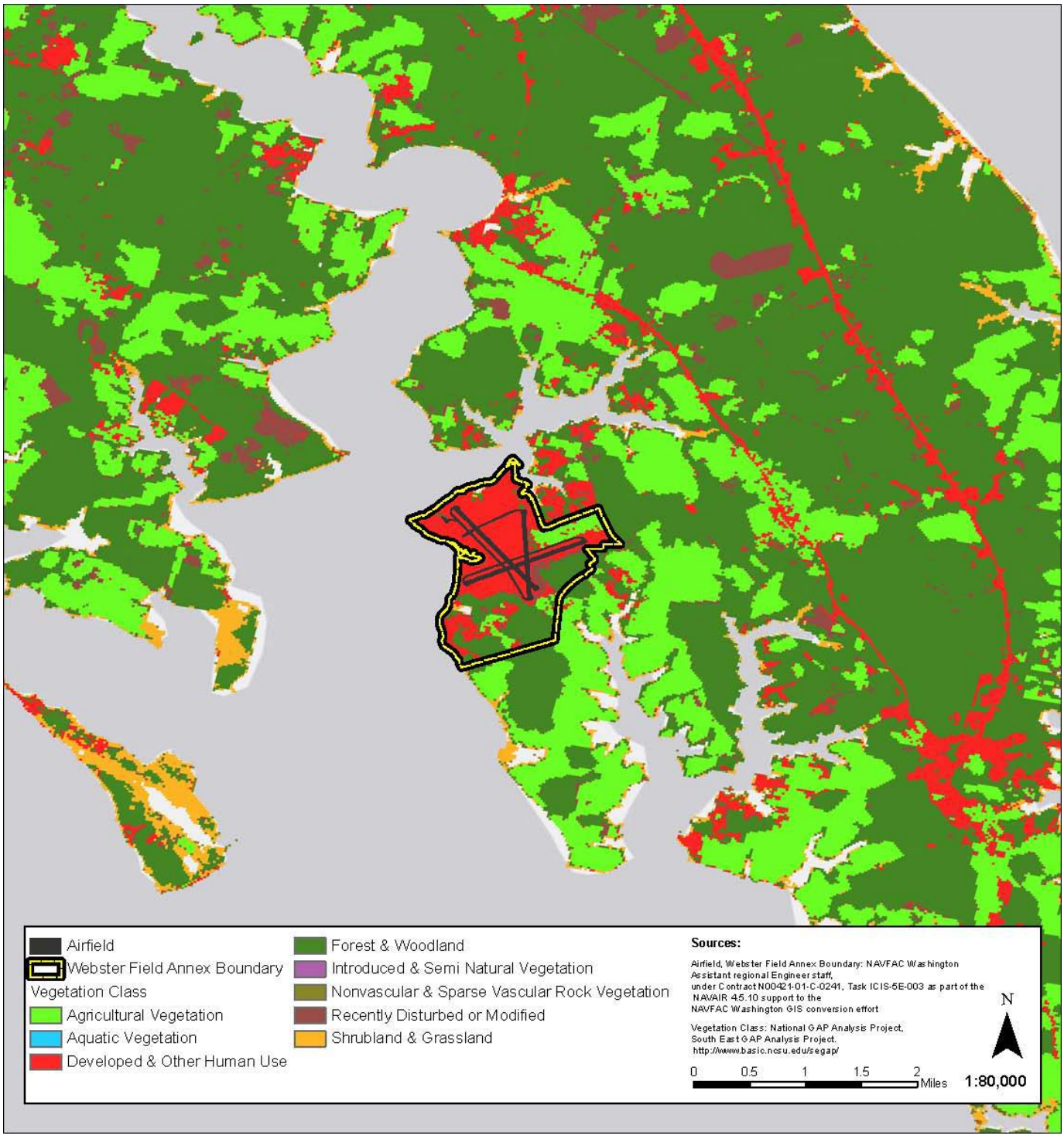

Figure 3-2 Vegetative Communities of the Webster Field Annex Area

Table 3-10 Plant Species Known to Occur at Bloodsworth Island Range

Scientific Name	Common Name	Habitat	Native/ Invasive	State Status
Agalinis maritima	Saltmarsh False-Foxglove	Saltgrass meadow	N	
Agalinis maritima forma alba	Saltmarsh White False-Foxglove	Saltgrass meadow	N	
Allium vineale	Field Garlic	Upland thicket	I	
Amaranthus cannabinus	Tidal-Marsh Amaranth	Saltgrass meadow	N	
Apocynum cannabinum	Dogbane	Sand beaches	N	
Asparagus officinalis	Asparagus	Marshelder thicket	I	
Atriplex hastata	Halberd-Leaved Orache	Sand beaches	N	
Baccharis halmifolia	Groundseltree	Upland thicket	N	
Cakile edentula	American Sea-Rocket	Sand beaches	N	
Calystegia sepium	Hedge False Bindweed	Sand beaches	N/I	
Celtis occidentalis	Common Hackberry	Sand beaches	N	
Cenchrus tribuloides	Dune-Sandbur	Sand beaches	N	
Centaurium spicatum	Spiked Century	Marshelder thicket	N	
Chamaesyce polygonifolia	Seaside-Spurge	Sand beaches	N	
Chenopodium berlanderi	Goosefoot	Sand beaches	N	
Conyza canadensis	Horseweed	Upland thicket	N	
Cuscuta indecora	Pretty Dodder	Marshelder thicket	N	
Cyperus esculentus	Nutsedge	Sand beaches	N	
Distichlis spicata	Saltgrass	Saltgrass meadow	N	
Eupatorium capillifolium	Dogfennel	Sand beaches	N	
Festuca sp	Fescue	Upland thicket	I	
Fimbristylis castanea	Marsh Fimbristylis	Saltmeadow cordgrass meadow	N	
Hibiscus mosheutos	Marshmallow	Smooth cordgrass meadow	N	
Ilex opaca	American Holly	Upland thicket	N	
Iva frutescens	Marshelder	Upland thicket	N	
Juncus dudleyi	Dudley's Rush	Marshelder thicket	N	
Juncus roemerianus	Black Needlerush	Needlerush marshland	N	
Juniperus virginiana	Eastern Redcedar	Upland thicket	N	
Kosteletzkya virginica	Seashore Mallow	Saltmeadow cordgrass meadow	N	
Limonium carolinianum	Sea-Lavender	Saltmeadow cordgrass meadow	N	
Lonicera japonica	Japanese Honeysuckle	Upland thicket	I	
Morella cerifera	Waxmyrtle	Upland thicket	N	
Panicum amarum	Bitter Panic Grass	Sand beaches	N	
Panicum virgatum	Switchgrass	Sand beaches	N	
Phragmites australis	Common Reed	Sand beaches	I/N	
Phytolacca americana	American Pokeweed	Upland thicket	N	
Pinus taeda	Loblolly Pine	Upland thicket	N	
Pluchea odorata	Sweetscent	Glasswort salt pan	N	
Poa annua	Annual bluegrass	Upland thicket	I	
Poa pratensis	Kentucky bluegrass	Upland thicket	I	
Polygonum glaucum	Seaside Knotweed	Sand beaches	N	E
Prunus serotina	Black Cherry	Upland thicket	N	
Rhus copallinum	Winged Sumac	Upland thicket	N	
Robinia pseudoacacia	Black Locust	Upland thicket	N	
Rubus sp.	Blackberry	Upland thicket	N/I	
Rumex verticillatus	Swamp Dock	Sand beaches	N	

Table 3-10 Plant Species Known to Occur at Bloodsworth Island Range (cont'd)

Scientific Name	Common Name	Habitat	Native/ Invasive	State Status
Ruppia maritima	Widgeongrass	Submerged aquatic vegetation	N	
Sabatia stellaris	Rose of Plymouth	Marshelder thicket	N	
Salicornia maritime	Slender Glasswort	Glasswort salt pan	N	
Salicornia virginica	Virginia Glasswort	Glasswort salt pan	N	
Salsola kali	Russian Thistle	Sand beaches	I	
Schoenoplectus maritimus	Saltmarsh Bulrush	Saltgrass meadow	N	
Sesuvium maritimum	Slender Sea-Purslane	Sand beaches	N	E
Setaria geniculata	Knotroot Foxtail	Marshelder thicket	N	
Solidago sempervirens	Seaside Goldenrod	Saltmeadow cordgrass meadow	N	
Spartina alterniflora	Saltmarsh Cordgrass	Smooth cordgrass meadow	N	
Spartina cynosuroides	Big Cordgrass	Marshelder thicket	N	
Spartina patens	Saltmeadow Cordgrass	Saltmeadow cordgrass meadow	N	
Strophostyles helvola	Trailing Fuzzybean	Sand beaches	N	
Symphyotrichum subulatum	Annual Saltmarsh Aster	Saltmeadow cordgrass meadow	N	
Symphyotrichum tenuifolium	Perennial Saltmarsh Aster	Saltgrass meadow	N	
Teucrium canadense	Canada Germander	Upland thicket	N	
Toxicodendron radicans	Poison Ivy	Upland thicket	N	
Xanthium strumarium	Cocklebur	Sand beaches	N	
Zannichellia palustrius	Horned Pondweed	Submerged aquatic vegetation	N	
Zostera marina	Eelgrass	Submerged aquatic vegetation	N	

Note: State Status E = Endangered
Sources: NAVFAC 2009a, MDNR 2010

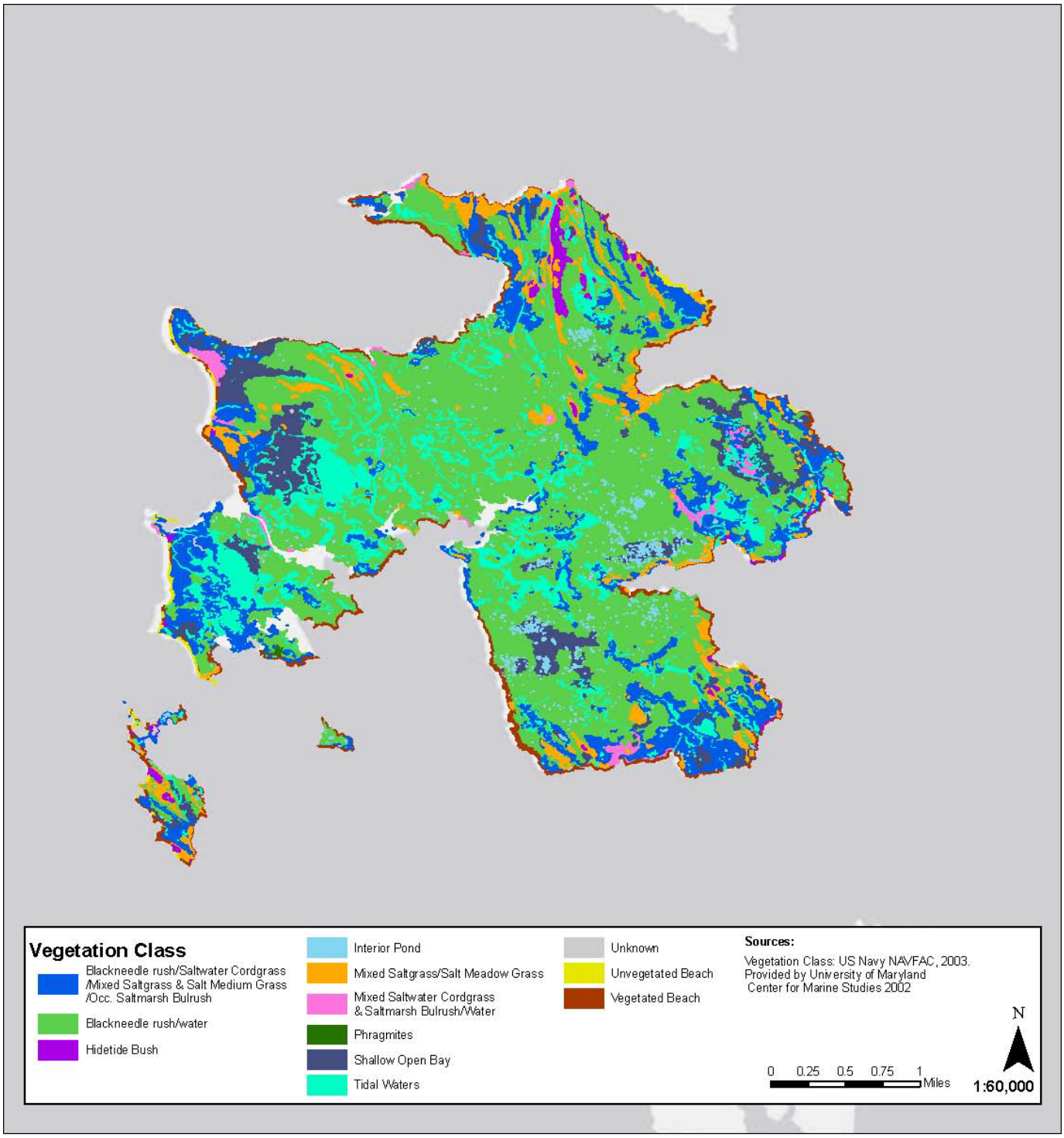

Figure 3-3 Vegetative Communities of the Bloodsworth Island Range

Terrestrial Wildlife

Wildlife management at the ATR Inner Range 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 43 species of mammals (NAVFAC 2002). 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 vulpes*), several bats (*Chiroptera* spp.), 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 (Navy 1998b).

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 (Navy 1998b).

Through the Bird/Animal Aircraft Strike Hazard (BASH) 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 (Navy 1998b).

Due in large part to the limited diversity of habitats on BIR, faunal diversity is fairly low. Mammals that are known to occur on the islands include common raccoon (*Procyon lotor*), river otter (*Lontra canadensis*), muskrat, eastern cottontail rabbit, red fox, and marsh rice rat (*Oryzomys palustris*). The raccoon appears to be the most common larger mammal, and the marsh rice rat appears to be the most abundant small mammal on the island (NAVFAC 2009a). White-tailed deer and sika deer (*Cervus nippon yakushimae*) have been observed on Bloodsworth Island in multiple surveys (Rambo 2012).

Over 260 bird species have been observed at the air station at some time during the year, with 29 of these species abundant, 92 common, and 85 uncommon. The rest are rare or occasional visitors, with several species only having been observed once. 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 1,000 ft [305m]). Although no longer a Navy possession, 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 NAS Patuxent River and Webster Field Annex. Long-term management goals include restoration of large blocks of old growth forest for forest interior bird species (Navy 1998b).

Birds represent the most diverse group of fauna that occurs at BIR. The range is located within the Atlantic Flyway, which is a major migration route for migratory birds along the United States east coast. Large numbers of birds are found in this corridor during the spring and fall migration periods. The range serves as an important stopover area during migration and as an overwintering area for waterfowl.

There are two confirmed and active bald eagle (*Haliaeetus leucocephalus*) nests on NAS Patuxent River, with at least two additional active nests within 0.5 mi (0.8 km) of the station boundary (Rambo 2012). While peregrine falcons (*Falco peregrinus*) have been observed in the vicinity of the air station during migration, they have not been observed nesting there.

Sea turtles occur in the waters surrounding NAS Patuxent River and Webster Field Annex. Several dead loggerhead sea turtles (*Caretta caretta*) have been found on the shores of the air station but are not believed to be nesting there or anywhere in the Chesapeake Bay. Nineteen amphibian and 29 reptilian species have been confirmed to occur on the air station. Of these, 6 are abundant, 18 are common, 3 are fairly common, and 17 are uncommon. The remaining four are rarely sighted in the area (Navy 1998b).

The diversity of herpetofauna on BIR is also very low. Only two species of reptiles are known to inhabit the islands: the diamondback terrapin (*Malaclemys terrapin*) and the northern watersnake (*Nerodia sipedon*). Other reptiles and amphibians that could potentially inhabit BIR, based on available habitat and occurrence in nearby areas, include ribbon snake (*Thamnophis sauritus sauritus*), eastern mud turtle (*Kinosternon subrubrum subrubrum*), spotted turtle (*Clemmys guttata*), and the eastern snapping turtle (*Chelydra serpentina*). Atlantic loggerhead sea turtle (*Caretta caretta*), and Kemp's ridley sea turtle (*Lepidochelys kempii*) have been confirmed in the waters immediately surrounding Bloodsworth Island and may occur on the island. These sea turtle sightings are rare, and sea turtles are not likely to be found on the islands of the BIR. Remains of the eastern box turtle (*Terrapene carolina*) have been found on Bloodsworth Island during surveys in the 1990s, but the species may now be extirpated from the island (Rambo 2012). Amphibians are unlikely to be found on the BIR (NAVFAC 2009a).

Terrestrial Special Status Species

Special status species include those species that are listed, proposed for listing, or are active candidates for listing as threatened or endangered under the federal ESA by the USFWS.

No federally listed threatened or endangered plant species are known to occur on NAS Patuxent River or Webster Field Annex, but several state-listed species have been found. The NAS Patuxent River INRMP provides lists of the MDNR-listed plant species as well as maps indicating their known locations. The NAS Patuxent River Natural Resources Office conducts surveys to positively identify federally listed plant species and map their locations. Currently, threatened and endangered plant species surveys take place on an as-needed basis, and potential project sites are investigated as part of the environmental review process.

Federally listed terrestrial wildlife species documented on NAS Patuxent River include the piping plover (*Charadrius melodus*) and the northeastern beach tiger beetle (*Cicindela dorsalis*).

A survey for rare plant species at BIR was conducted between February 2002 and August 2003. The island was visited ten times, primarily in late summer. The survey focused on areas with a high potential for supporting rare species, with an emphasis on those species that are state or federally listed as threatened or endangered. Three state-listed species: seaside knotweed (*Polygonum glaucum*), slender sea-purslane (*Sesuvium maritimum*), and swamp dock (*Rumex verticillatus*) were documented during the 2002-2003 survey. Swamp dock has since been removed from the state protected species list. Based on

habitat suitability, 13 additional rare plant species were identified as having potential to occur. Rare plant species that are known or have potential to occur at BIR are listed in Table 3-11 (NAVFAC 2009a).

BIR lies within the known range of several federal and state-listed wildlife species, which may occur on or within its vicinity. The state-endangered sedge wren (*Cistothorus platensis*) was documented in 2008. In addition, several species of marine mammals and sea turtles that are protected by the ESA have been documented in the Chesapeake Bay and may occur in the vicinity of BIR (NAVFAC 2009a). Table 3-12 lists the rare, threatened, or endangered animal species known to occur or with potential to occur at BIR.

Bald eagle. The bald eagle (*Haliaeetus leucocephalus*) was removed from federal threatened and endangered species lists in 2007 and was removed from the Maryland list of threatened and endangered species in 2010 but is still protected by laws, including the Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. § 668-668d) and the Lacey Act of 1900 (16 U.S.C. §§ 3371-3378). The bald eagle is found throughout the Chesapeake Bay region with a healthy population in the general vicinity of NAS Patuxent River. Nesting sites have been located on and around NAS Patuxent River. Annual bald eagle nesting surveys are performed by the College of William and Mary, covering all NAS Patuxent River property and flight corridors for nesting eagles. Through this effort, up to four active nests have been discovered and monitored in the near vicinity of NAS Patuxent River.

Bald eagles are known to nest on Bloodsworth Island and Adam Island. Two eagles were observed just south of a nest in the northern portion of Bloodsworth Island, which was designated as a no-fire area in 1983. Bald eagle nesting sites were confirmed in survey flights over Bloodsworth Island in 2012 and 2013. A nesting site was also confirmed on Adam Island during a 2012 site visit (Smith 2012). As bald eagles are federally protected by the Bald and Golden Eagle Protection Act, surveys would be conducted in areas with appropriate habitat prior to initiating mission or land use changes that could impact bald eagles (NAVFAC 2009a).

Peregrine Falcon. This species was federally de-listed in 1999, but is still listed as rare and in need of conservation by the state of Maryland and is protected under the MBTA. Recent surveys have identified peregrine falcon nests on Bloodsworth Island, the Hannibal Target Ship, and the Point No Point Lighthouse. Surveys would be conducted prior to implementing future mission or land use changes with potential to impact peregrine falcons (NAVFAC 2009a).

Piping plover. This federally listed endangered species is documented to occur on NAS Patuxent River by a single migratory record dating from the 1960s. The piping plover has not been observed on the station since this sighting (NAVFAC 2002).

Northeastern beach tiger beetle. A few individuals of the federally listed threatened northeastern beach tiger beetle have been observed on the ATR Inner Range. Subsequent surveys indicate that the beach habitat at the station is not adequate to support this species, so it is assumed that specimens encountered on NAS Patuxent River are actually located across the Patuxent River in Calvert County (NAVFAC 2002).

Seabeach Amaranth. This federally listed threatened species has the potential to occur on the BIR, but has not been observed during rare plant surveys over the past 10 years (NAVFAC 2009a).

Table 3-11 Rare, Threatened, and Endangered Plant Species Occurring and Potentially Occurring at the Bloodsworth Island Range

Scientific Name	Common Name	Known to Occur on BIR?	Federal Status	State Status	Rank
Amaranthus pumilus	Seabeach Amaranth	No	T	E	G2S1
Atriplex arenaria	Seabeach Orach	No			G5S3
Cuscutta indecora	Pretty Dodder	Yes			G5SH
Elecocharis albida	White Spikerush	No		E	G4S1
Elecocharis halophila	Saltmarsh Spikerush	No		E	G4S1
Glaux maritima	Sea Milkwort	No			G5SH
Honckenya peploides	Sea-beach Sandwort	No			G5SH
Lechea maritima	Beach Pinweed	No			G5S3
Plantago maritima	Seaside Plantain	No			G5S?
Polygonum glaucum	Seaside Knotweed	Yes		E	G3S1
Sabatia campanulata	Slender Marsh Pink	No		E	G5S1
Sesuvium maritimum	Slender Sea-purslane	Yes		E	G5S1
Sporobolus virginicus	Seashore Dropseed	No			G5SR
Suaeda linearis	Tall Sea-blite	No			G5S3
Triglochin maritimum	Seaside Arrow-grass	No			G5SR

Source: NAVFAC 2009a.

Notes: T = Threatened; E = Endangered; G2 = globally rare; G3 = very rare or distributed locally; G4 = apparently secure globally, but rare in parts of range; G5 = demonstrably secure globally, although rare in parts of range; S1 = highly state rare, S2 = state rare; S3 = rare to uncommon with the number of occurrences typically in the range of 21 to 100 in Maryland; S4 = apparently secure in Maryland; S5 = demonstrably secure in Maryland; SH = historically known from Maryland, but not verified for an extended period; SR = reported from Maryland, but without persuasive documentation; S? = not yet ranked.

3.3.1.4 Wetland and Marine Habitats

Wetlands

Wetland delineations for NAS Patuxent River and Webster Field Annex were performed with data collection between June and October 1995. The field delineations used the techniques for Routine Determinations described in the 1987 U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual (Technical Report Y-87-1). The interpretations follow the definitions listed in the Public Notices from the USACE dated September 26, 1990; October 4, 1990; and September 4, 1991. In order for an area to be classified as wetlands under this methodology, it must display (1) Hydric Soils, (2) Hydrophytic Vegetation, and (3) Indicators of Wetland Hydrology.

Several broad wetland types have been identified on NAS PAX and Webster Field Annex. These include Forested Wetlands, Scrub-Shrub Wetlands, Saline Marshes, Freshwater Tidal Marshes, Nontidal Marshes, and Open Water/Emergent Wetlands. There are also areas of created and disturbed wetland habitats (NAVFAC 2002). Table 3-13 provides the acreage of wetland types, as determined by the 1995 Wetlands Delineation.

Table 3-12 Rare, Threatened, and Endangered Animal Species Occurring and Potentially Occurring at the Bloodsworth Island Range

Scientific Name	Common Name	Federal Status	State Status	Rank
Birds				
Cistothorus platensis	Sedge Wren *		E	
Falco peregrinus	Peregrine Falcon *		I	G4T3S2
Haliaeetus leucocephalus	Bald Eagle *			G4S2S3B
Fish				
Acipenser brevirostrum	Shortnose Sturgeon	E	E	G3T2S2
Acipenser oxyrinchus	Atlantic Sturgeon	E		G3S1
Reptiles				
Caretta caretta	Loggerhead Turtle	T	T	G3S1B
Chelonia mydas	Green Sea Turtle	T	T	G3S1N
Dermochelys coricea	Leatherback Sea Turtle	E	E	G2S1
Eretmochelys imbricata	Atlantic Hawksbill Turtle	E	E	G3SRN
Leipidochelys kempii	Kemp's Ridley Sea Turtle	E	E	G1S1N
Marine Mammals				
Balaenoptera physalus	Fin Whale	E	E	G3G4SZN
Eubalaena glacialis	Northern Right Whale	E	E	G1SZN
Megaptera novaeangliae	Humpback Whale	E	E	G3SZN
Trichechus manatus	West India Manatee	E		

Source: NAVFAC 2009a.

* Documented at BIR.

Notes: T = Threatened; E = Endangered; G1 = highly global rare; G2 = globally rare; G3 = very rare or distributed locally; G4 = apparently secure globally, but rare in parts of range; S1 = highly state rare, S2 = state rare; S3 = rare to uncommon; SR = reported in Maryland but without a voucher specimen; SZ = migratory; S_N = species is migratory and rank refers only to non-breeding population; S_B = species is migratory and rank refers only to breeding populations.

At the time of this writing, ongoing wetlands delineations are being conducted at NAS Patuxent River and Webster Field Annex. The NAS Patuxent River wetlands delineations will encompass approximately 1,000 ac (405 ha) of developable land. The Webster Field Annex surveys will constitute a fence-to-fence delineation (Smith 2012).

Table 3-13 Wetlands Acreage at NAS Patuxent River and Webster Field Annex

Wetlands Type	Acreage
NAS Patuxent River	
Forested Wetlands	220.3
Scrub/Shrub Wetlands	82.5
Saline Marshes	63.4
Freshwater Tidal Marshes	53.7
Nontidal Marshes	1.58
Open Water/Emergent Wetlands	418.7
Webster Field Annex	
Forested Wetlands	121.2
Scrub/Shrub Wetlands	38.5
Saline Marshes	13.6
Freshwater Tidal Marshes	0
Nontidal Marshes	42.9
Open Water/Emergent Wetlands	12.6

Source: NAVFAC 2002.

The islands comprising the BIR consist almost entirely of wetland habitats. The wetlands on the BIR are predominantly estuarine emergent marshes dominated by black needlerush (*Juncus roemerianus*). Areas comprising black needlerush marsh are also intermixed with open water as a result of tidal guts (channels) that extend through the islands and from craters caused by previous ordnance deliveries. Other wetland communities on the BIR are restricted primarily to the perimeters of Bloodsworth Island and Adam Island. Wetland communities in these areas are estuarine emergent and scrub-shrub systems dominated by saltmeadow cordgrass (*Spartina patens*), an inland saltgrass (*Distichlis spicata*), marsh elder (*Iva frutescens*), and groundsel tree (*Baccharis halimifolia*) (NAVFAC 2009).

Submerged Aquatic Vegetation

SAV is comprised of vascular plants that grow completely underwater below the low-tide line in water depths up to 9 ft (2.7 m). Eleven species of SAV are commonly found in Chesapeake Bay and its tidal tributaries. Eelgrass (*Zostra marina*) is the dominant SAV species in the lower portion of the Bay in areas of higher salinities, while redhead grass (*Potamogeton perfoliatus*), sago pondweed (*Potamogeton pectinatus*), horned pondweed (*Pannichellia palustris*), and Eurasian watermilfoil (*Myriophyllum spicatum*) are common in the middle and upper portions of the Bay where salinities are lower. Widgeon grass (*Ruppia maritima*) is tolerant of both high- and low-salinity waters and is common through all regions of the Bay (NAVFAC 2009a).

SAV is an important contributor to the primary and secondary production of the Chesapeake Bay. SAV beds provide food and habitat for waterfowl, fish, shellfish, and invertebrates. SAV beds also produce oxygen, filter and trap sediments, protect shorelines from erosion by reducing the energy of wave action, and remove excess nutrients from the water column (thereby reducing the occurrence of algal blooms).

Figure 3-4 shows the extent and relative density of SAV that was mapped at the BIR in 2011, which is the most recent year of complete data. A total of 1,924 ac (779 ha) of SAV is identified adjacent to the shorelines of the islands comprising the BIR and the waters adjacent to Bishops Head Point (VIMS 2012). As can be seen, the largest SAV beds occur in Okahanikan Cove, which is situated off the northwest end of Bloodsworth Island, and in the shallow waters between Adam Island and Northeast Island. SAV also is present at the BIR in craters that were created on the islands by previous bombardment. Establishment of SAV in these areas is random, with some craters consisting only of open water and others supporting dense concentrations of SAV, primarily widgeon grass. Evaluation of the SAV at the BIR indicates that most of the beds are dominated by widgeon grass (NAVFAC 2009a).

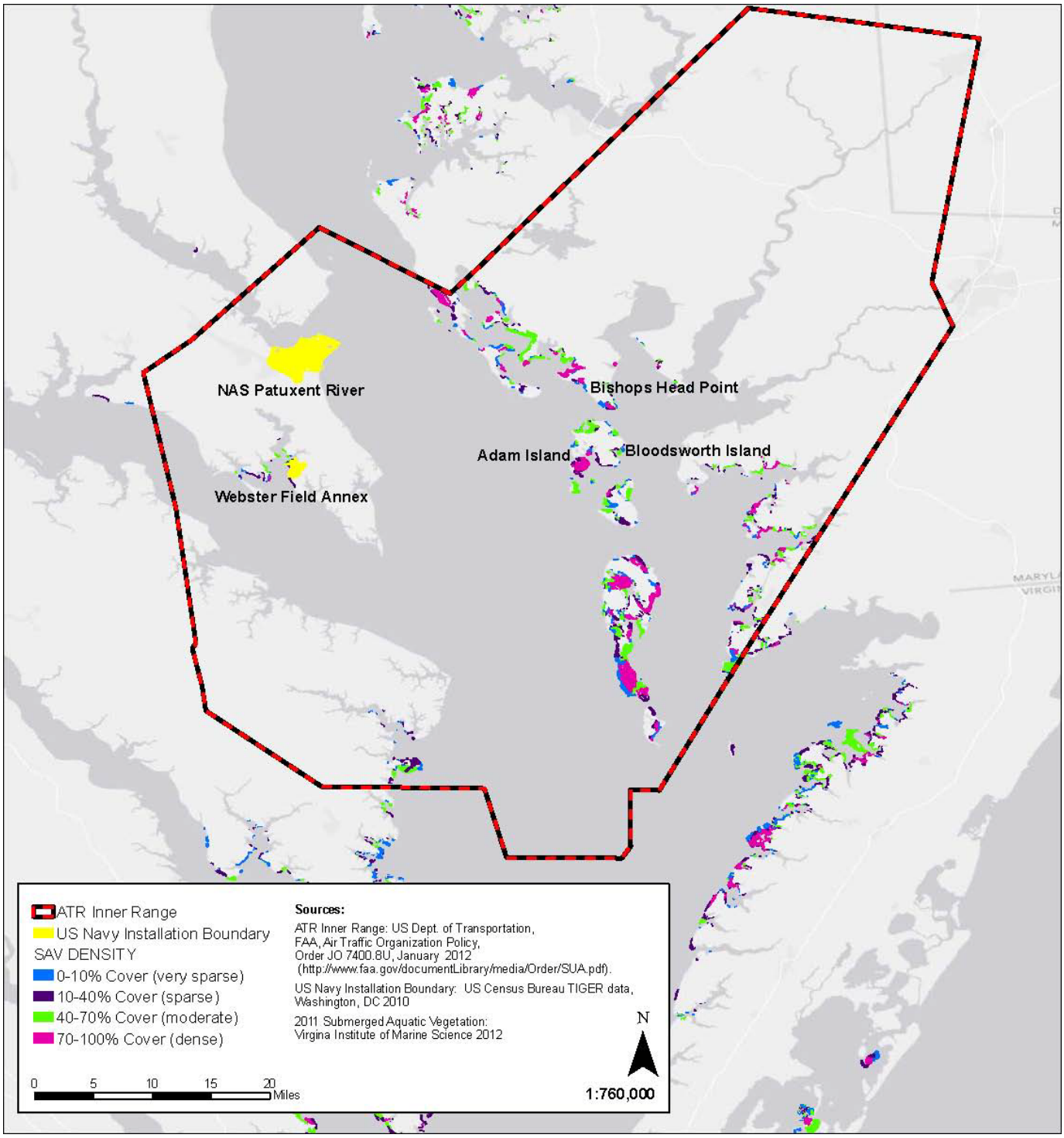

Figure 3-4 Submerged Aquatic Vegetation in the ATR Inner Range

Fish and Fisheries

The Chesapeake Bay, with its associated estuarine marshes, is considered the largest and most productive estuary in North America. The vast expanses of estuarine marshes lining Maryland's Eastern Shore provide quality habitat and feeding grounds for fish and shellfish populations. These marshes shelter the young and enhance the fertility of the water. Where SAV beds are available, fish and shellfish gain nursery and refuge sites.

Sampling data collected from 1990 through 1996 for bottom-dwelling organisms through the USEPA Environmental Management and Assessment Program indicated a diverse and relatively uniform assemblage of organisms at each sampling station. The overall diversity and abundance of bottom-dwellers identified at sampling stations in the vicinity of the ATR Inner Range are similar to those observed at other stations in the middle Chesapeake Bay. Recreational fish species common in the vicinity of ATR Inner Range include bluefish (*Pomatomus saltatrix)*, spot (*Leiostomus xanthurus)*, summer flounder (*Paralicthys dentatus)*, speckled trout (*Cynoscion nebulosus*), weakfish (*Cynoscion regalis*), Atlantic croaker (*Micropogonias undulatus*), striped bass (*Morone saxatilis*), Spanish mackerel (*Scomberomorus maculates*), black drum (*Pogonias cromis*), black sea bass (*Centropristis striata*), white perch (*Morone americana*), and oyster toadfish (*Opsanus tau*). Common bottom-dwelling invertebrate species in the vicinity of BIR include the blue crab (*Callinectes sapidus*), grass shrimp (*Palaemonetes pugio*), sand shrimp (*Metapenaeus monoceros*), and fiddler crab (*Uca minax*) (NAVFAC 2009a).

Essential Fish Habitat

Essential Fish Habitat (EFH) is defined under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) (16 U.S.C. 1801-1882), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), as "those waters and substrate necessary to fish for spawning, breeding, and feeding or growth to maturity." The Sustainable Fisheries Act requires that EFH be identified for those species actively managed under federal fishery management plans. This includes species managed by the regional fishery management councils established under the MSFCMA, as well as those species managed by NOAA Fisheries under federal fisheries management plans developed by the Secretary of Commerce.

EFH designations emphasize the importance of habitat protection to healthy fisheries and serve to protect and conserve the habitat of marine, estuarine, and anadromous finfish, mollusks, and crustaceans. EFH embodies both the water column (including its physical, chemical, and biological growth properties) and its underlying substrate (including sediment, hard bottom, and other submerged structures). Under the EFH definition, necessary habitat is that which is required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem. EFH is designated for a species' complete life cycle, including spawning, feeding, and growth to maturity, and may be specific for each life stage (e.g., eggs, larvae).

NOAA Fisheries and regional Fishery Management Councils have identified EFH in major estuaries, bays, and rivers along the northeastern coast of the United States. In the portion of the Chesapeake Bay where BIR is located (Tangier Sound), EFH has been designated (as summarized from the Guide to Essential Fish Habitat Designations in the Northeastern United States; NOAA 2007) for the following species:

- Three skates have EFH designations in the Chesapeake Bay and associated inlets. Clearnose skate (*Raja eglanteria*) has EFH designations for juvenile and adult in areas of the Chesapeake Bay and associated inlets in habitats with soft bottom, rocky or gravelly substrates. EFH is also designated for the juvenile and adult stages of little skate (*Leucoraja erinacea*) and winter skate (*Leucoraja ocellata*), including sandy, gravelly, or mud substrates in the Chesapeake Bay.
- Windowpane flounder (*Scopthalmus aquosus*). EFH for juvenile and adult windowpane flounder at BIR includes bottom habitats with a substrate of mud or fine-grained sand. Windowpane flounder could occur in the vicinity of the ATR Inner Range throughout the year.
- Summer flounder (*Paralicthys dentatus*). EFH for juvenile and adult summer flounder includes demersal (i.e., bottom) waters surrounding the Inner Range. Juveniles may use estuarine habitats such as SAV beds and open bay areas as nursery areas, and adults generally inhabit shallow estuarine waters during the warmer months from May through September.
- Bluefish is a schooling pelagic species and thus is not generally associated with bottom habitats. EFH for juvenile and adult Bluefish includes the pelagic water column. This species could be present in the vicinity of the ATR Inner Range primarily from April through October.
- Coastal migratory pelagic species. King mackerel (*Scomberomorus cavalla*), spanish mackerel, and cobia (*Rachycentron canadum*) are considered highly migratory species by NOAA Fisheries. EFH includes sandy shoals of capes and offshore bars, high-profile rocky bottom and barrier island ocean-side water, from the surf to the shelf break zone, including coastal inlets. EFH has been designated for all life stages of these species near the ATR Inner Range.
- Red drum (*Sciaenops occelatus*). EFH for the various life stages of red drum at the Inner Range includes tidal inlets and creeks, salt marshes, SAV, and unconsolidated bottom (i.e., soft sediments).
- Dusky shark (*Charcharinus obscurus*). EFH is designated for neonates and juveniles in the area surrounding the ATR Inner Range as shallow coastal waters, inlets and estuaries.
- Sandbar shark *(Charcharinus plumbeus*). EFH is designated for all life stages of sandbar shark in the region around the Inner Range as coastal and pelagic water between 82 and 656 ft (25 and 200 m) off shore.

EFH that is either important to the long-term productivity of one or more managed species populations or deemed to be particularly vulnerable to degradation may be identified by fishery management councils and NOAA Fisheries as a Habitat Area of Particular Concern (HAPC). SAV beds occurring at the ATR Inner Range are considered HAPC for adult and juvenile summer flounder and all life stages of red drum (Navy 2006).

Marine Birds

Raptors

Ospreys (*Pandion haliaetus*) are common nesters on the ATR Inner Range. During an August 1994 survey conducted by NAS Patuxent River personnel, 88 osprey nests were identified on the BIR. More recent surveys completed at the BIR also indicate that ospreys are common in the area. The ospreys nest on the ground and on nesting platforms erected by the Navy. In addition, ospreys have been observed nesting on pyramid targets previously used by the Atlantic Test Ranges, on the tail fins of inert rockets, and on old cars that have been placed as targets (Navy 2006).

Other raptor species known to use the BIR include the turkey vulture (*Cathartes aura*), black vulture (*Coragyps atratus*), sharp-shinned hawk (*Accipiter striatus*), broad-winged hawk (*Buteo platypterus*), red-tailed hawk (*Buteo jamaicensis*), Cooper's hawk (*Accipiter cooperi*), red-shouldered hawk (*Buteo lineatus*), northern harrier (*Circus cyaneus*), American kestrel (*Falco sparverius*), barn owl (*Tyto alba*), bald eagle (*Haliaeetus leucocephalus)*, and peregrine falcon (*Falco peregrinus*).

Waterfowl

Waterfowl nesting activity at BIR is limited by the lack of vegetation diversity (specifically uplands), vulnerability of nests to storm tides, competition from gulls and crows, and, infrequently, predation by red fox. However, nesting records exist for both black duck and blue-winged teal (*Anas discors*) (NAVFAC 2009a). Furthermore, Haramis (Haramis et al. 2000) completed a study on the breeding ecology of black ducks on Bloodsworth, Smith, and Great Marsh Islands. Their study found that the salt marsh habitats comprising the majority of the islands are of minimal value for black duck nesting. Their conclusion was based on a low frequency of nesting, limited re-nesting, low hatching success caused by predation, and vulnerability of nests to storm tides. Surveys completed by NAS Patuxent River natural resources personnel also have indicated that resident breeding black ducks are not nesting in large numbers on the upland ridges and hummocks of the BIR (Navy 2006).

The ATR Inner Range serves as an important overwintering and stopover area for migratory waterfowl. Large numbers of tundra swans (*Cygnus columbianus*), Canada geese, and over 15 species of ducks have been observed at the ATR Inner Range during the wintering period. Many of the waterfowl species use the cordgrass/saltgrass marsh and SAV within the ATR Inner Range as a source of food. Species such as long-tailed duck (*Clangula hyemalis*), scoters (*Melanitta* spp.), common goldeneye (*Bucephla clangula*), and bufflehead (*Bucephala albeola*) are common in the deeper open waters in the BIR. Near shore waters, especially around Bloodsworth Island, are important feeding and resting areas for diving bay ducks such as canvasback (*Aythya valisneria*), scaup (*Aythya* spp.), and redhead (*Aythya americana*). Interior wetlands and near shore waters are also used by puddle duck species such as northern pintail (*Anas acuta*), gadwall (*Anas strepera*), American wigeon (*Anas americana*), American black duck, and mallard. The natural pockets, coves, and tidal guts that occur at the ATR Inner Range also provide abundant cover for idle or resting waterfowl.

Since 1965, the Navy (via letter notification) has voluntarily discontinued exercises at the BIR during the migratory bird season in recognition of the importance of the BIR as an over-wintering area for waterfowl. Normally, closure has occurred from mid-October through mid-February, although actual closure dates have varied from year to year. During this period, the Navy has also suspended all overflights below 3,500 ft (1,067 m) in order to minimize the potential for bird strike hazard to aircraft. These restrictions have, in effect, created a large, undisturbed refuge for migratory waterfowl during the migration season.

Wading Birds

Nine species of wading birds are known to nest on the ATR Inner Range, including large numbers of great blue heron (*Ardea herodius*), green heron (*Butorides virescens*), black-crowned night heron (*Nycticorax nycticorax*), and yellow-crowned night heron (*Nycticorax violacea*). Other wading birds that nest on the BIR include little blue heron (*Egretta caerulea*), great egret (*Ardea alba)*, tri-colored heron (*Egretta tricolor)*, glossy ibis (*Plegadis chihi*), and snowy egret (*Egretta thula*). Historically, nesting by

wading birds on the BIR has been successful despite the heavy use of the BIR for military tests and training during the summer months. However, the area of Fin Creek Ridge (where most wading birds nest) in the northern portion of the island has been closed to range use and bombardment for the past 30 to 35 years, so these birds have not been exposed to much range activity, other than active wildlife management practices (Rambo 2012).

All of the wading bird species at the BIR are sustained by a variety of foods, including various fishes and crabs, which are associated with a variety of habitats from the interior marsh to offshore waters. Island habitats, such as those provided at the BIR, are attractive to these wading birds because they tend to have fewer predators, they place the birds in proximity to food resources, they improve the efficiency of foraging during the chick season, and they reduce the probability of human disturbance. Most herons breed in localized colonies of up to hundreds of nesting pairs in what is often referred to as a rookery. Nesting sites are primarily trees (both living and dead tree snags) and bushes.

Figure 3-5 indicates the location of the heron rookery on the northern part of Bloodsworth Island. This rookery includes artificial nesting platforms that were installed by the Navy in the early 1980s to address an observed decline in the number of heron nesting pairs. The decline was primarily due to a loss of nesting habitat, namely loblolly pines and other trees that were dying as a result of rising water levels and increasing salinity levels. A survey completed in May 2012 identified 66 heron nests on 65 poles (Swift 2013). To protect the heron rookery, the Navy designated the northern portion of Bloodsworth Island as a No Fire Area in 1983 (Navy 2006).

Rails, Shorebirds, Seabirds, and Pelicans

The ATR Inner Range supports nesting populations of rails and shorebirds, although their presence at the BIR is more extensive during the migratory season. Clapper rails (*Rallus longirostris*) are known to nest in relatively high numbers at the ATR Inner Range, with migrating king rails (*Rallus elegans*), Virginia rails (*Rallus limicola*), and sora rails (*Porzana carolinus*) also present during the fall, winter, and spring months.

Shorebird species known to use the ATR Inner Range include the common tern (*Sterna hirundo*), Forster's tern (*Sterna forsteri*), royal tern (*Sterna maxima*), willet (*Catoptrophorus semipalmatus*), yellowlegs (*Tringa melanoleuca*), black-bellied plover (*Pluvialis squatarola*), ruddy turnstone (*Arenaria interpres*), red knot (*Calidris canutus*), least sandpiper (*Calidris minutilla*), and western sandpiper (*Calidris mauri*). Of these, willets are the most common and the only species that breed at the ATR Inner Range.

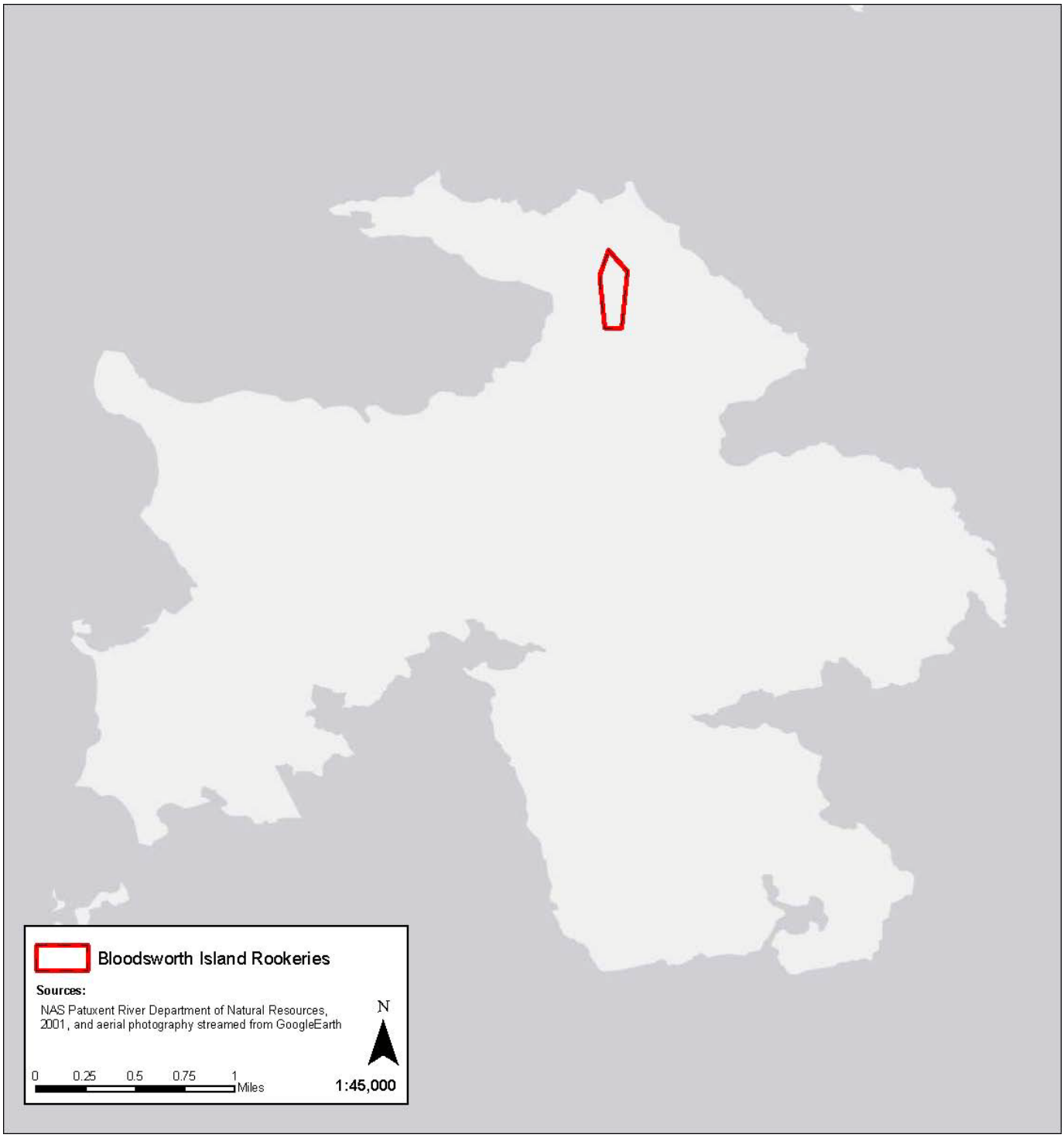

Figure 3-5 Rookeries and Nesting Sites in the Bloodsworth Island Range

Various species of gulls are common at the ATR Inner Range during the summer months, including the laughing gull (*Larus atricilla*), great black-backed gull (*Larus marinus*), herring gull (*Larus argentatus*), and ring-billed gull (*Larus delawarensis*). None of these species is known to currently nest at the BIR. Future nesting activity by these species, if it occurred, would likely be limited to the sandy beaches and shoals at the southern end of the BIR.

Brown pelicans (*Pelecanus occidentalis*) have documented breeding colonies on Spring Island and Adam Island and are expected to expand to Bloodsworth Island. As with all marine bird species, brown pelicans are protected under the MBTA.

Song Birds

Common breeding songbirds that occur at the ATR Inner Range include the red-winged blackbird (*Agelaius phoeniceus*), marsh wren (*Cistothorus palustris*), seaside sparrow (*Ammodramus maritimus*), and saltmarsh sharp-tailed sparrow (*Ammodramus caudacutus*).

Marine Mammals

Marine mammals are protected under the MMPA (16 U.S.C. § 1361). This law prohibits any person or vessel from "taking" marine mammals in the United States or on the high seas without authorization. Taking is "to harass, hunt, capture, collect, or kill, or attempt to harass, hunt, capture, collect, or kill any marine mammal" (16 U.S.C. § 1362). The 1994 amendments to the MMPA establish two types of takings or harassment, one that involves injury (Level A) and one that includes direct or indirect disturbance (Level B). In 2004, the definition of harassment was modified as a result of the passage of the National Defense Authorization Act for Fiscal Year 2004.

The Chesapeake Bay Marine Resources Assessment (MRA) (Navy 2009) identifies 10 marine mammal species with potential occurrence in the Bay; however, all species are more common in the lower Chesapeake Bay and particularly near the mouth of the Bay. MDNR and NOAA Fisheries stranding and sighting data indicate that individual marine mammals occasionally enter the Bay. Marine mammal species that could potentially be present near the ATR Inner Range are listed in Table 3-14.

It is important to note that these marine mammal species are present in the Bay at very low densities. In the decade spanning 1995 and 2004, 272 marine mammal strandings and sightings were reported within 30 mi (48 km) of the ATR Inner Range. This equates to an average presence of 27 animals per year over a possible 500 sq mi (1,295 sq km) or 0.054 animals per sq mi (0.021 animals per sq km). These stranding data further indicate that the bottlenose dolphin and harbor porpoise are the most common marine mammals occurring in the vicinity of the ATR Inner Range, comprising 57.4 percent and 22.8 percent, respectively, of the 272 reported strandings and sightings (Navy 2006). The few West Indian manatees (*Trichechus manatus*) that have been documented in the Chesapeake Bay have been known to travel far north into the Bay as well as farther north along the Atlantic Coast; although, in recent years the individual occurrences are reported primarily in the Bay's southern region (Navy 2009).

Marine Special Status Species

There have been no documented sightings of the federally listed threatened Atlantic loggerhead sea turtle in a live 'healthy' state at NAS Patuxent River; however, several carcasses have washed up on the beaches. Navy resource management encounters have all been with dead or dying, stranded specimens.

The green sea turtle (*Chelonia mydas*) is rarely encountered in the Bay (Navy 2009). Hawksbill turtles (*Eretmochelys imbricate*) are considered extralimital in the Chesapeake Bay, and only three hawkbills have been encountered in the Bay since 1979 (Navy 2009).

There have been multiple encounters with Kemp's Ridley Sea Turtles under similar conditions. Biologists at NAS Patuxent River are members of the official Maryland Marine Mammal and Sea Turtle Stranding network and routinely respond to reports of strandings, usually for data collection and salvage of specimens or tissue samples. The federally endangered leatherback sea turtle (*Dermchelys coriacea*) is a transient species that is also known to occur in the Chesapeake Bay and may use habitats in estuarine waters adjacent to the installation.

Based on the information from the USFWS Atlantic Sturgeon Reward Program (USFWS 2007) it is possible, though unlikely, that the shortnose sturgeon would be sighted in the ATR Inner Range. The majority of shortnose sturgeons have been documented in the upper Chesapeake Bay above the Bay Bridge which is approximately 50 mi (80 km) north of the Inner Range (USFSW 2007). In addition, during summer, shortnose sturgeons tend to feed in shallow riverine waters, away from the target areas in the Bay. During the remainder of the year (December through June) it is more likely that shortnose sturgeons could be found within the deeper waters of the Bay, but it is unlikely that they would occur in the Inner Range in great numbers, because the sturgeons are much more common within the upper regions of the Bay (USACE 2008).

Atlantic sturgeon inhabit rivers and estuaries during the spawning season (late spring and early summer in the mid-Atlantic), but spend most of their lives in coastal waters of the Atlantic Ocean. Spawning takes place in the freshwater portion of large, estuarine rivers. Atlantic sturgeons prefer to spawn in the deeper parts of moderately flowing (1.5 to 2.6 ft/s [46 to 76 cm/s]) rivers where the bottom substrate consists of hard surfaces (e.g., cobble) that are needed to attach eggs. Adults and sub-adults move into estuaries and pelagic coastal waters after the spawning season and prefer bottom substrates of gravel and sand. Water depth in the preferred habitat is typically 33 to 165 ft (10 to 50 m) (NOAA 2013).

Unobstructed access from the Atlantic Ocean to the waters around NAS Patuxent River makes the occurrence of oceanic cetaceans in the area possible. The federally endangered humpbacked whale (*Megaptera novaeangliae*) and North Atlantic right whale (*Bakaena glacialis*) have been observed in the vicinity of the ATR Inner Range. The West Indian manatee (*Trichechus manatus*) is also known to very rarely occur in the Chesapeake Bay (NAVFAC 2002).

Table 3-14 Marine Mammal Species that May Occur in the Vicinity of the ATR Inner Range

Scientific Name	Common Name	Frequency of Occurrence	Period of Occurrence	State/Fed Status
Species with Regular Occurrence in Middle/Upper Chesapeake Bay*				
Phocoena phocoena	Harbor Porpoise*	Regular [a] – U/M/L	Feb – Jun [a]	
Trichechus manatus	West Indian Manatee*	Regular [a] – U/M/L	Jun – Sep	E/E
Tursiops truncatus	Bottlenose Dolphin*	Regular [a] – U/M/L	May – Sep [a]	
Species with Regular/Rare Occurrence in Lower Chesapeake Bay				
Balaenoptera physalus	Fin Whale	Regular [a] – L	Feb – May [a]	E/E
Delphinus delphis	Common Short-beaked Dolphin	Rare [a] – L		
Eubalaena glacialis	Northern Right Whale	Rare [a] – L		E/E
Halichoerus grypus	Gray Seal	Rare [a] – L		
Phoca groenlandica	Harp Seal	Rare [a] – L		
Phoca vitulina	Harbor Seal	Regular [a] – L	Dec – Apr	
Species with Extralimital Occurrence in Chesapeake Bay				
Balaenoptera acutorostrata	Minke Whale	Extralimital [a] – U/M/L	Only 4 sightings since 1980	
Megaptera novaeangliae	Humpback Whale	Extralimital[a] – U/M[d,e] Regular [a] - L	Jan – Mar [b,c]	E/E

Notes: *These species have higher probability of occurrence in the ATR Inner Range than the species listed in the categories below.
U = Upper Bay, M = Middle Bay, L = Lower Bay (as defined by Lippson 2006).
Sources: a. Navy 2009, b. Barco et al. 2002, c. Swingle et al. 1993, d. VIMS 2009, e. Baynet 2010.

3.3.2 Environmental Consequences

3.3.2.1 Approach to Analysis

This description of environmental consequences addresses potential impacts from visual stimuli and noise from UAS, UMS, and UGS operation (including associated support craft); and acoustic sources associated with UMS operations. The noise and visual appearance of aircraft, surface vehicles, and vessels could disturb animals on land or the surface of the water, whereas the movement of vessels and subsurface acoustic sources could also affect marine species and/or habitats. Other consequences would arise as contaminants enter the marine habitats in the vicinity of the targets, due to debris from separation tests and other munitions tests settling on the Bay floor. Factors used to assess the significance of impacts to biological resources include the extent or degree to which the action would affect legally protected, sensitive, or otherwise important (commercially, recreationally, scientifically, or ecologically) habitats or species. Potential consequences of both direct and indirect impacts are considered.

Under the Proposed Action, UUV would be equipped with acoustic sources for underwater communications and tracking pingers (see the Table A-10 Appendix A). These devices are considered to be "non-impulsive" in that their use does not result in steep pressure rise or initial over- and under-pressure that characterize impulsive sources. An animal is considered "exposed" to a sound if the received sound level at the animal's location is above the background ambient noise level within a similar frequency band. Whether a marine animal is significantly affected must be determined from the best available scientific data regarding the potential physiological and behavioral responses to sound-producing activities and the possible costs and long-term consequences of those responses.

The sources considered in this EA are those of low source level, narrow bandwidth, downward-directed transmission, short pulse lengths, frequencies above known hearing ranges of marine mammals and sea

turtles, or some combination of these factors. Therefore, the devices considered in this EA have been excluded from quantitative analysis. Table A-10 (in Appendix A) provides a list of the sources considered in this EA. Many of the devices provided in the table are required equipment for safe operation of Navy vessels and are routinely used within the waters of the ATR Inner Range.

In the following sections, the potential impacts of activities associated with the Baseline Alternative and Proposed Action are analyzed by biological resource.

3.3.2.2 Alternative 1 – The No-Action Alternative (Baseline Alternative)

Impacts

Terrestrial Biological Resources

Terrestrial Vegetation and Wildlife Communities

Noise and visual stimuli from UAS, as well as support aircraft overflights, could disturb wildlife on land. However, operational constraints (provided in Section 3.3.2.4) would generally restrict UAS and supporting aircraft flights to a minimum of 1,000 ft (305 m) AGL, and occupied nesting areas would not in any case be overflown lower than 500 ft (152 m). Lower altitude flights would only involve small and quiet UAS that would have minimal if any effects on terrestrial wildlife. At 1,000 ft (305 m) AGL, received SELs from large manned or unmanned aircraft would range from 74.6 to 118.1 dBA (see Table 3-7 in Section 3.2, *Noise*). As such, overflights by large aircraft could disturb wildlife, but any such disturbance would be brief. Additionally, all Group 4 and 5 UAS flights would follow established air operation procedures within the ATR Inner Range.

Group 1, 2, and 3 UAS are expected to have little to no impact on wildlife from visual or noise stimuli due to their small size and limited range. The operational constraints described in Section 3.3.2.4 would also minimize the potential for new ground disturbance. Under the Baseline Alternative the cumulative flight tempo (manned and unmanned) would not change and would not significantly disrupt foraging, resting, or nesting behavior of terrestrial wildlife.

Under the Baseline Alternative, there would be no UGS operations introduced to the ATR Inner Range; therefore, no new impacts due to UGS activities would result. UMS operations would be restricted to established dock facilities and the open waters of the Inner Range and would not affect terrestrial species or habitats.

Implementation of the Baseline Alternative would not result in any new impacts; thus, there would be no significant impacts to terrestrial vegetation communities, or terrestrial wildlife.

Terrestrial Special Status Species

As provided in Section 3.3.1.3, the federally listed threatened Seabeach Amaranth has not been observed in the BIR over 10 years of rare plant surveys. As such, no impacts to Seabeach Amaranth communities are expected. However, Range personnel would be given biological resources awareness training prior to operations on the BIR.

UAS and UMS operations would maintain seasonal flight restrictions and minimum distances (as provided in Section 3.3.2.4) during bald eagle and peregrine falcon nesting seasons. No operations would

be conducted on beach areas. Furthermore, the beaches of the Inner Range do not provide adequate habitat for northeastern tiger beetle populations. Therefore, no impacts to northeastern tiger beetle populations or habitat is expected due to implementation of the Baseline Alternative.

As described above, UAS and UMS mission activities would not result in any significant impacts to terrestrial wildlife. For these reasons, the Baseline Alternative project activities would not result in any impacts to terrestrial special status species.

Marine Biological Resources

Marine Habitats and Invertebrates

UAS launches, flights, and supporting aircraft would have no effect on marine habitats or invertebrates. Operation of UMS and manned vessels would maintain minimum distances from shore to include allowances for sufficient depth and swell conditions. The target areas are not located within the intertidal zone of the banks of the Bay and, therefore, the Baseline Alternative would not impact the intertidal zone where invertebrate and marine plant and algae densities are typically high.

Prop wash from UMS and manned vessels could agitate and suspend 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 8.9 ft (2.7 m). Manned support craft 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 UMS and manned vessels is minimal, especially in comparison to overall boat or ship traffic within the Bay. As provided in Section 3.3.2.4, UMS and manned vessels would, whenever possible, operate at a minimum distance of 100 ft (30.5 m) from SAV beds. All UMS and vessel operations would be coordinated with environmental personnel to provide locations of the known SAV beds.

Operations at the surface targets, particularly during weapons/stores separation tests, would be maintained at levels below the 1998 FEIS thresholds. As indicated in the FEIS, the waters surrounding the target areas are too deep to support SAV; therefore, it is unlikely that stores would come to rest on SAV beds. Thus, the release of stores would not impact SAV beds in the Chesapeake Bay.

Marine Birds

Marine birds on the ATR Inner Range would be subjected to the occasional noise and visual stimuli created by UAS flying over during mission activities as well as support aircraft flights. However, the level of activity associated with the Baseline Alternative is a small fraction of ongoing Navy activity, and the aircraft in most cases are smaller and less noisy than conventional aircraft. Potential effects would be minimized by implementation of operational constraints (Section 3.3.2.4), which would generally require all UAS and support aircraft flights to maintain a minimum 1,000 ft (305 m) AGL. Lower altitude flights would only involve small and quiet UAS, and occupied nesting areas would not in any case be overflown lower than 500 ft (152 m). At 1,000 ft (305 m), received SELs from large manned or unmanned aircraft would range from 85.8 to 118.1 dBA (see Table 3-7 in Section 3.2, *Noise*). As such, overflights by large aircraft could disturb marine birds, but any such disturbance would be brief and not significant. Additionally, all Group 4 and 5 UAS would follow established air operation procedures within the ATR

Inner Range. Other appropriate protective measures for flights below 1,000 ft (305 m) would be developed on an as-needed basis and coordinated with environmental personnel prior to testing.

With the operational constraints, including a 3,500 ft (1,067 m) minimum altitude during migratory bird season, any noise and visual stimuli would be of low intensity (relatively distant) and would not be expected to produce more than a momentary reaction from individual birds and is not expected to disrupt important behaviors such as nesting, foraging, and daily or seasonal migrations. As such, no impacts to numbers, distributions, or populations of migratory birds, would be anticipated to result from the Baseline Alternative UAS mission activities and support aircraft flights.

UMS and support vessel operations would maintain a minimum distance of one quarter mile (402 m) from nesting areas, rookeries, and waterfowl areas during the appropriate operational constraint periods provided in Section 3.3.2.4. It is likely that UMS and support vessel operations would infrequently lead to birds flushing from the immediate area as an initial reaction to the noise disturbances. There would be ample similar habitat available to accommodate immediate resumption of loafing or feeding activities. No long-term physiological effects on waterfowl related to decreased feeding time or reduced energy reserves would be expected as a result of any sporadic and short-duration flushing episodes. Considering this, no impacts to numbers, distributions, or populations of migratory birds would be anticipated to result from the UMS and manned vessel operations associated with the Baseline Alternative.

Fish and EFH

There is no evidence that aircraft noise at sub-supersonic speeds has any effects on fishes (Manci et al. 1988). Project-related vessel traffic could disturb fish temporarily, but would not cause any harm to individuals. Weapon use and associated debris entering the water and sinking to the seafloor may disturb fish but would impact only a very small area of benthic habitat, in the immediate vicinity of the existing targets which experience ongoing use. The area of the seafloor that would be affected by weapon use and associated debris is an insignificant portion of the Bay floor in the project area, and the likelihood of striking a fish is negligible. Therefore, activities associated with the Baseline Alternative would have no effect on fish, including shortnose sturgeon and Atlantic sturgeon.

Under the provisions of the MSFCMA, federal agencies must consult with NMFS prior to undertaking any actions that may adversely affect EFH. Federal agencies retain the discretion to determine what actions fall within the definition of "adverse affect." Temporary or minimal impacts, as defined below, are not considered to "adversely affect" EFH. "Temporary impacts" are those that are limited in duration and that allow the particular environment to recover without measurable impact. "Minimal impacts" are those that may result in relatively small changes in the affected environment and insignificant changes in ecological functions. The ATR Inner Range includes EFH for coastal pelagic species, highly migratory species, and groundfish. All project-related effects on EFH for coastal pelagic and highly migratory species meet the definitions of temporary and minimal. Routine vessel movement on the Inner Range, as would occur in conjunction with the Baseline Alternative, would have no effect on EFH. Small quantities of unrecovered debris may float or sink through the water column, but this is unlikely to have any effect on EFH. HAPCs for summer flounder and red drum include SAV beds within the Inner Range (see Figure 3-4). SAV beds are avoided by Navy vessels as a matter of standard practice whenever possible. Otherwise, project-related vessel movement would be the same as routinely occurs on the Inner Range and unlikely to cause appreciable damage.

Marine Special Status Species

Fish

Potential impacts on Atlantic sturgeon and shortnose sturgeon from the Baseline Alternative activities would be related to debris ingestion and direct physical impact. Adult sturgeon feeding in the immediate vicinity of the target areas could potentially ingest newly deposited metal from UAS debris and weapon stores after it settles on the Bay floor. However, the probability of such an event occurring is considered remote, especially given the low number of Atlantic and shortnose sturgeon known to inhabit the Bay, most of which have been identified north of the BIR in the northern portion of the Bay.

The potential for a direct strike of Atlantic or shortnose sturgeon from delivery of air-to-ground non-explosive ordnance is similarly low given that the sturgeons are unlikely to be found in the vicinity of the target areas in large numbers. In addition, the velocity of the dropped ordnance decreases considerably on entry into the water, and most mobile species (e.g., fish) are able to move quickly enough to avoid being crushed or buried.

Pursuant to the ESA, debris ingestion and direct physical strikes associated with RDAT&E activities of the Baseline Alternative:

- May affect but is not likely to adversely affect, the ESA-listed Atlantic sturgeon and shortnose sturgeon; and
- Would have no effect on critical habitat for Atlantic sturgeon and shortnose sturgeon.

Sea Turtles

Only anecdotal data from strandings and sightings is currently available on the distribution of sea turtles in the Chesapeake Bay. No systematic data has been collected with which to estimate population densities, so it is not appropriate to estimate the probability of direct interaction or direct strike of sea turtles. However, the available data indicates that densities are very low in the middle portion of the Bay, and direct interaction or direct strike with sea turtles would be unlikely (Navy 1998b). The most likely response, if any, to UAS or UMS activity by a turtle on the surface of the water would be to dive underwater. Individuals below the surface would not be impacted by airborne noise as such noise quickly attenuates across the water surface interface. UMS and other in-water project activities would generate low-level engine noise which routinely occurs in nearshore waters and throughout the Inner Range and would be unlikely to elicit behavioral reactions, much less have the potential to cause hearing damage. The likelihood of debris or a projectile striking a sea turtle is negligible given the rarity of sea turtles. Due to the negligible likelihood of activities impacting individuals under any circumstances, there would be no effect or significant impact of the Baseline Alternative on Atlantic loggerhead, leatherback, or Kemp's ridley sea turtles.

Marine Mammals

Federally listed threatened and endangered marine mammals that may occur in the waters of Chesapeake Bay, mostly in the summer months, include the fin whale, humpback whale, northern right whale, and West Indian manatee. In general, the seasonal and transient nature of these species, combined with their low densities in the vicinity of the ATR Inner Range, would significantly reduce the potential for any adverse impacts on these species to occur during the proposed RDAT&E operations.

The potential for non-explosive ordnance to directly strike and injure or kill any of the listed marine mammals is extremely low, given the low density of marine mammals within the ATR Inner Range. As calculated in the Final Environmental Assessment for Operations at the Bloodsworth Island Range (Navy 2006), there is an average presence of 27 animals per year over a possible 500-square mile area (1,295 km^2) or 0.054 animals per square mile (0.021 animals/km^2). Also, the velocity of dropped ordnance decreases considerably on entry into the water, thereby decreasing the likelihood of significant injury to submerged species. In addition, only non-explosive ordnance would be used on the ATR Inner Range, thereby eliminating possible impacts from underwater concussive force.

The potential also exists for boats and other surface vessels to strike marine mammals. The likelihood of an UMS or Navy manned vessel striking an animal would be no greater than that for a recreational vessel. In addition, personnel on board vessels are trained to remain vigilant of potential obstructions along their route, which would include identifying the presence of marine mammals, thereby reducing the potential for a collision to occur. It is possible that some animals may become evasive as the sound of approaching vessels increases, although such a reaction would be short-lived and would not be significant.

The West Indian manatee spends significant amounts of time foraging in SAV. As described in the *Marine Habitats and Invertebrates* section above, operational constraints associated with the Baseline Alternative would minimize impacts to the SAV beds to negligible levels and would, therefore, result in no effects to the West Indian manatee related to loss of foraging habitat.

In conclusion, the Baseline Alternative would not significantly impact marine special status species on the ATR Inner Range or in nearshore waters.

Mitigation Measures

With implementation of proposed operational constraints, as provided in Section 3.3.2.4, the Baseline Alternative would result in no significant impacts to wildlife species or sensitive habitats at NAS Patuxent River, Webster Field Annex, or ATR Inner Range. Therefore, no mitigation measures are proposed or required.

3.3.2.3 Alternative 2 – The Preferred Alternative (Proposed Action)

Impacts

Terrestrial Biological Resources

Terrestrial Vegetation and Wildlife Communities

Manned support aircraft and Group 4 and 5 UAS flights would follow established air operation procedures within the ATR Inner Range, as well as implement operational constraints for UAS flights as provided in Section 3.3.2.4. As such, overflights by large aircraft could disturb wildlife, but any such disturbance would be brief.

Group 1, 2, and 3 UAS are expected to have little to no impact on wildlife from visual or noise stimuli due to their small size and limited range. Under the Proposed Action, Group 1 and 2 UAS flights would be conducted at Webster Field Annex and from boats in and around the BIR, and Group 3 UAS flights would originate from Webster Field Annex solely. Boat-launched UAS would be recovered via onboard systems or would land on Bloodsworth Island. Prior to Group 1 or 2 UAS operations on the BIR

environmental management personnel would define primary and alternate UAS landing locations, avoiding identified biological resources. UAS recovery would be performed via foot traffic only (no motorized vehicles would be used). Boats would use existing docking areas and would not conduct beach landings on or near areas with sensitive biological resources on Bloodsworth Island. Other operational constraints described in Section 3.3.2.4 would also minimize the potential for new ground disturbance. Under the Proposed Action the cumulative flight tempo (manned and unmanned) would remain below the 1998 FEIS threshold of 24,400 flight hours on the Inner Range and would not significantly disrupt foraging, resting, or nesting behavior of terrestrial wildlife.

Under the Proposed Action, UGS interoperability tests would be conducted at NAS Patuxent River. The UGS would be less than 700 lb (318 kg) in size and would be operated on previously disturbed sites, documented not to hold sensitive biological resources. Furthermore, UGS operations would follow seasonal operational constraints provided in Section 3.3.2.4, minimizing effects on bald eagles and peregrine falcons. Therefore, UGS operations associated with the Proposed Action would have no impacts on terrestrial biological resources.

UMS operations would be restricted to established dock facilities and the open waters of the Inner Range and would not affect terrestrial species or habitats.

Implementation of the Proposed Action would not result in any new impacts; thus, there would be no significant impacts to terrestrial vegetation communities, or terrestrial wildlife.

Terrestrial Special Status Species

As provided in Section 3.3.1.3, the federally listed threatened Seabeach Amaranth has not been observed in the BIR over 10 years of rare plant surveys. As such, no impacts to Seabeach Amaranth communities are expected. However, Range personnel would be given biological resources awareness training prior to operations on the BIR.

UAS, UMS, and UGS operations would maintain seasonal restrictions and minimum distances (as provided in Section 3.3.2.4) during bald eagle and peregrine falcon nesting seasons. No operations would be conducted on beach areas; therefore, no impacts to northeastern tiger beetle populations or habitat is expected due to implementation of the Proposed Action.

As described above, UAS and UMS mission activities would not result in any significant impacts to terrestrial wildlife. For these reasons, the Proposed Action activities would not result in any impacts to terrestrial special status species.

Marine Biological Resources

Marine Habitats and Invertebrates

UAS launches, flights, and supporting aircraft would have no effect on marine habitats or invertebrates. UGS operations would be conducted onshore at a distance from the shoreline and would thus not affect marine habitats or invertebrates. UMS and manned vessel operations would be conducted in the same manner described in the Baseline Alternative and therefore not significantly affect marine habitats or invertebrates.

Operations at the surface targets, particularly during weapons/stores separation tests and training, would be maintained at levels below the 1998 FEIS thresholds. As indicated in the FEIS, the waters surrounding the target areas are too deep to support SAV; therefore, it is unlikely that stores would come to rest on SAV beds. Thus, the release of stores would not impact SAV beds in the Chesapeake Bay.

Marine Birds

With the operational constraints provided in Section 3.3.2.4, any noise and visual stimuli would be of low intensity (relatively distant) and would not be expected to produce more than a momentary reaction from individual birds and is not expected to disrupt important behaviors such as nesting, foraging, and daily or seasonal migrations. As such, no impacts to numbers, distributions, or populations of migratory birds, would be anticipated to result from the Proposed Action. Minimum distance requirements and other operational restrictions would ensure that no impacts to numbers, distributions, or populations of migratory birds would be anticipated to result from the UMS and manned vessel operations associated with the Proposed Action.

Under the Proposed Action, UGS interoperability tests would be conducted. The UGS would be less than 700 lb (318 kg) in size and would be operated on previously disturbed sites documented not to hold sensitive biological resources. Furthermore, UGS operations would follow seasonal operational constraints provided in Section 3.3.2.4, minimizing effects on marine birds. Therefore, UGS operations associated with the Proposed Action would have no impacts on terrestrial biological resources.

Fish and EFH

The likelihood of the Proposed Action activities leading to direct strike of fish by expended stores or associated debris is negligible. Furthermore, the area of the seafloor adjacent to the target areas impacted by sinking debris would be a very small portion of the benthic habitat. Therefore, activities associated with the Proposed Action would have no effect on fish, including shortnose sturgeon and Atlantic sturgeon.

Routine vessel movement on the Inner Range, as would occur in conjunction with the Proposed Action, would have no effect on EFH. Small quantities of unrecovered debris may float or sink through the water column, but this is unlikely to have any effect on EFH. HAPCs for summer flounder and red drum include SAV beds within the Inner Range (see Figure 3-4). SAV beds are avoided by Navy vessels as a matter of standard practice whenever possible. Otherwise, project-related vessel movement would be the same as routinely occurs on the Inner Range and unlikely to cause appreciable damage.

Multiple studies have shown that direct trauma from non-impulsive sound sources, such as fathometers and pingers, are unlikely because of the relatively lower peak pressures and slower rise times than potentially injurious sources such as explosives. These studies include but are limited to the following:

- **Gearin et al. (2000)** studied responses of adult sockeye salmon (*Oncorhynchus nerka*) and sturgeon (*Acipenser* sp.) to pinger sounds produced by acoustic devices designed to deter marine mammals from gillnet fisheries. The pingers produced sounds with broadband energy with peaks at 2 kHz or 20 kHz. They found that fish did not exhibit any reaction or behavior change to the pingers, which demonstrated that the alarm was either inaudible to the salmon and sturgeon or that neither species was disturbed by the mid-frequency sound (Gearin et al. 2000). Based on hearing threshold data, it is highly likely that the salmonids did not hear the sounds.

- **Culik et al. (2001)** did a very limited number of experiments to determine the catch rate of herring (*Clupea harengus*) in the presence of pingers producing sounds that overlapped with the frequency range of hearing for herring (2.7 kHz to over 160 kHz). They found no change in catch rates in gill nets with or without the higher frequency (greater than 20 kHz) sounds present, although there was an increase in the catch rate with the signals from 2.7 kHz to 19 kHz (a different source than the higher frequency source). The results could mean that the fish did not "pay attention" to the higher frequency sound or that they did not hear it, but that lower frequency sounds may be attractive to fish. At the same time, it should be noted that there were no behavioral observations on the fish; therefore, how the fish actually responded when they detected the sound is not known.

Research discussed above, indicates that exposure of fish to transient, non-impulsive sources is unlikely to result in any hearing loss, and noise sources such as vessel movement and aircraft overflight lack the duration and intensity to cause hearing loss.

Impacts to fish due to non-impulsive sound are expected to be limited to short-term, minor behavioral responses; however, long-term consequences for populations would not be expected.

Marine Special Status Species

Fish

The potential for a direct strike of Atlantic or shortnose sturgeon from delivery of air-to-ground non-explosive ordnance is similarly low given that the sturgeons are unlikely to be found in the vicinity of the target areas in large numbers. In addition, the velocity of the dropped ordnance decreases considerably on entry into the water, and most mobile species (e.g., fish) are able to move quickly enough to avoid being crushed or buried. As the majority of Atlantic and shortnose sturgeon populations in the Chesapeake Bay are found 50 mi (80 km) north of the Inner Range, it is highly unlikely that populations of these federally listed species would be affected by ingestion of Proposed Action project debris in the vicinity of the target areas.

As a result of their preference for inshore and nearshore environments (Dadswell 2006; NMFS 1998), Atlantic sturgeon and shortnose sturgeon would be exposed to activities associated with the Proposed Action infrequently. As detailed by Gearin (Gearin et al. 2000), sturgeon species are unlikely to be able to detect the sound produced by the military active acoustic sources operating at frequencies higher than 200 kHz. Therefore, acoustic impacts from these sources are not expected. As discussed above, any short-term behavioral reactions or physiological stress are unlikely to lead to long-term consequences for individuals. Therefore, long-term consequences for populations are not expected.

In conclusion, debris ingestion, direct physical strikes, and acoustic sources associated with RDAT&E activities of the Proposed Action may affect but are not likely to adversely affect, the ESA-listed Atlantic sturgeon and shortnose sturgeon. The Proposed Action would have no effect on critical habitat for Atlantic sturgeon and shortnose sturgeon.

Sea Turtles

No systematic data has been collected with which to estimate sea turtle population densities in the ATR Inner Range, so it is not appropriate to estimate the probability of direct interaction or direct strike of sea

turtles. However, the available data indicates that densities are very low in the middle portion of the Bay, and direct interaction or direct strike with sea turtles would be unlikely (Navy 1998b).The most likely response, if any, to UAS or UMS activity by a turtle on the surface of the water would be to dive underwater. Individuals below the surface would not be impacted by airborne noise as such noise quickly attenuates across the Bay surface interface. UMS and other in-water project activities would generate low-level engine noise which routinely occurs in nearshore waters and throughout the Inner Range and would be unlikely to elicit behavioral reactions, much less have the potential to cause hearing damage. The likelihood of debris or a projectile striking a sea turtle is negligible given the rarity of sea turtles.

Little is known about how sea turtles use sound in their environment. Studies using green, loggerhead, and Kemp's ridley turtles found that sensitivity varies slightly by species and age class (Ketten and Bartol 2006). Sea turtles possess an overall hearing range of approximately 100 to 1,000 Hz, with an upper limit of 2,000 Hz (Ridgway et al., 1969; Ketten and Bartol, 2006).

Bartol and Musick (2003) have shown that sea turtles may detect objects within the water column (e.g., vessels, prey, predators) via some combination of auditory and visual cues. However, research examining the ability of sea turtles to avoid collisions with vessels shows they may rely more on their vision than auditory cues (Hazel et al. 2007). Similarly, while sea turtles may rely on acoustic cues to identify nesting beaches, they appear to rely on other non-acoustic cues for navigation, such as magnetic fields (Lohmann 1991; Lohmann and Lohmann 1996b) and light (Avens and Lohmann 2003). Additionally, they are not known to produce sounds underwater for communication. As a result, sound may play a limited role in a sea turtle's environment. Therefore, the potential for masking would be limited.

Furthermore, underwater acoustic sources analyzed in this EA would use frequency ranges that are higher than the estimated hearing range of sea turtles (10 Hz to 2 kHz). Therefore, these sources have no direct impact on sea turtle hearing.

In conclusion, there would be no effect or significant impact of the Proposed Action on Atlantic loggerhead, leatherback, or Kemp's ridley sea turtles.

Marine Mammals

Observing existing procedures and guidance would ensure that manned vessels and UMS operations rarely directly strike marine mammals or otherwise adversely impact marine mammal species. As described previously in the *Marine Habitats and Invertebrates* section, operational constraints, as provided in Section 3.3.2.4, would minimize impacts to the SAV beds to negligible levels and would, therefore, result in no effects to the West Indian manatee related to loss of foraging habitat.

The hearing abilities of baleen whales (including fin whale, humpback whale, and northern right whale) have not been studied directly. Behavioral and anatomical evidence indicates that they hear well at frequencies below 1 kHz (Richardson et al. 1995; Ketten 2000). Frankel (2005) noted that gray whales reacted to 21–25 kHz whale-finding sonar. Some baleen whales react to pinger sounds up to 28 kHz, but not to pingers or sonars emitting sounds at 36 kHz or above (Watkins 1986). In addition, baleen whales produce sounds at frequencies up to 8 kHz and, for humpbacks, with components to >24 kHz (Au et al. 2006). The anatomy of the baleen whale inner ear seems to be well adapted for detection of low-frequency sounds (Ketten 1995, 1998, 2000; Parks et al. 2007). Although humpbacks and minke whales (Berta et al. 2006) may have some auditory sensitivity to frequencies above 22 kHz, for baleen whales as

a group, the functional hearing range is thought to be about 7 Hz to 22 kHz. In 1998-2000, a study in the Eastern Tropical Pacific assessed the reactions of marine mammals to a 38-kHz echosounder and a 150-kHz acoustic pinger. Results indicated that mysticetes showed no significant responses when an echosounder and a pinger were transmitting (Gerrodette and Pettis 2005).

The West Indian manatee can apparently detect sounds and low-frequency vibrations from 15 Hz to 46 kHz, based on a study involving behavioral testing methods (Gerstein et al. 1999, 2008). A more recent study found that, in one Florida manatee, auditory sensitivity extended up to 90.5 kHz (Bauer et al. 2009).

The fathometers and pingers analyzed in this EA would be identical to COTS systems routinely used on commercial and recreational vessels. These devices would be of low source level and short pulse lengths. The active military devices would operate at frequencies greater than 200 kHz, well above the upper limits of marine mammal sensitivity. Therefore, these acoustic sources would not adversely affect marine mammals, including ESA-listed species.

In conclusion, direct strike (non-explosive weapons or vessels) of marine mammals may affect, but is not likely to adversely affect, the ESA-listed fin whale, humpback whale, northern right whale, and West Indian manatee. The Proposed Action activities would have no effect on ESA-listed species critical habitats and acoustic sources would have no effect on ESA-listed species.

Mitigation Measures

With implementation of proposed operational constraints, as provided in Section 3.3.2.4, the Proposed Action would result in no significant impacts to sensitive species or habitats at NAS Patuxent River, Webster Field Annex, or ATR Inner Range. Therefore, no mitigation measures are proposed or required.

3.3.2.4 Operational Constraints to be Applied to Unmanned Systems Operations

The following operational constraints have been specifically developed for the Baseline Alternative and Proposed Action of this EA and/or have been derived from conservation measures provided in the INRMP documents for NAS Patuxent River/Webster Field Annex (NAVFAC 2002) and the BIR (NAVFAC 2009a) as well as the FEIS (Navy 1998b). The operational constraints would apply to Baseline Alternative and Proposed Action operations, as appropriate.

- Group 4 and 5 UAS would follow established air operation procedures within the ATR Inner Range.
- In general, UAS and supporting aircraft flights would be restricted to an elevation of 1,000 ft (305 m) AGL or greater over the BIR. Lower altitude flights would only involve small and quiet UAS and bird nesting areas would not, in any case, be overflown at lower than 500 ft (152 m). Other appropriate protective measures for flights below 1,000 ft (305 m) would be developed on an as-needed basis and coordinated with environmental management personnel prior to initiating operations.
- All UAS launches would occur from previously disturbed areas and boats to eliminate the potential for new ground disturbance impacts.
- Visual surveillance of target areas would be conducted prior to stores separation tests and training to ensure that marine mammals are not in the target vicinity.

- Visual surveillance and passive acoustic monitoring would be conducted prior to use of active underwater acoustic sources to ensure that marine mammals are not in the vicinity of the acoustic source locations.
- All UGS would operate on previously disturbed land areas, which have been surveyed for biological and cultural resources.
- Based on the most current information available, environmental personnel would provide guidance to project participants regarding the locations of nesting sites and seabird rookeries. These locations would be subject to seasonal restrictions. These seasonal restrictions include, but are not limited to the following:
    - NAS Patuxent River and Webster Field Annex
        - Occupied nesting areas would not in any case be overflown lower than 500 ft (152 m)
        - No overflights would be conducted in the vicinity of peregrine falcon nesting locations during the period of 15 February through 15 June.
        - No overflights in the vicinity of bald eagle nest sites during the period of 15 December through 15 June.
        - UGS, UMS, and manned support vessels would maintain a minimum distance of 1,320 ft (402 m) from the nesting areas during the seasonal restrictions described above.
    - Bloodsworth Island
        - Occupied nesting areas would not in any case be overflown lower than 500 ft (152 m)
        - No overflights would be conducted in the vicinity of peregrine falcon nesting locations during the period of 15 February through 15 June.
        - No overflights in the vicinity of bald eagle nest sites during the period of 15 December through 15 June.
        - No summertime operations near Fin Creek Ridge due to heron nesting (1 February through 15 August).
        - No winter operations (15 November through 15 March) at the south end and west side of the island due to winter waterfowl.
            - UAS and support aircraft must maintain an elevation over 3,500 ft (1,067 m).
            - Flights may transect the island but cannot maintain pattern flight over the island or waterfowl areas during the winter months.
        - UAS may land on the island, away from sensitive biological and cultural resources.
        - UMS and manned support vessels would maintain a minimum distance of 1,320 ft (402 m) from the nesting areas during the seasonal restrictions described above.
    - Adam Island
        - Occupied nesting areas would not, in any case, be overflown lower than 500 ft (152 m)

- No overflights in the vicinity of bald eagle nesting sites on the southern portion of the island. UAS must maintain a horizontal distance of 660 ft (201 m) from the nesting sites. The restrictions apply from 15 December to 15 June.
- Overflights of the tower portion of the island are restricted from 15 May to 15 October due to pelican nesting season.
- UMS and manned support vessels would maintain a minimum distance of 1,320 ft (402 m) from the nesting areas during the seasonal restrictions described above.

- UMS and manned vessels would, whenever possible, operate at a minimum distance of 100 ft (30.5 m) from SAV beds. All UMS and vessel operations would be coordinated with environmental personnel to provide locations of the known SAV beds.

3.4 CULTURAL RESOURCES

3.4.1 Affected Environment

3.4.1.1 Definition of Resource

Cultural resources as they pertain to this EA consist of prehistoric and historic sites, structures, artifacts, districts that depict evidence of human activity considered important to any culture, subculture, or community. Cultural resources can be divided into three major categories: archaeological resources, architectural resources, and traditional cultural properties.

Archaeological resources consist of the material remains of prehistoric and/or historic human activity. The Archaeological Resources Protection Act of 1979 (ARPA) defines archaeological resources as "pottery, basketry, bottles, weapons, weapon projectiles, tools, structures or portions of structures, pit houses, rock paintings, rock carvings, intaglios, graves, human skeletal materials, or any portion or piece of any of the foregoing items" (16 U.S.C. 470bb).

Architectural resources include manmade structures including, but not limited to, standing buildings, dams, bridges, and canals. Under the National Historic Preservation Act of 1966 (NHPA) only architectural resources over the age of 50 years are considered for protection, however, younger structures can be afforded the same protection under special circumstances.

Traditional cultural resources may include archaeological resources, architectural resources, topographic features, plants, animals, and any other inanimate object deemed essential to the continuance of a traditional culture by Native Americans and other groups.

3.4.1.2 Regulatory Setting

A number of federal laws, executive orders, and regulations require that cultural resources meeting the eligibility criteria of the National Register of Historic Places be identified, evaluated, and considered when planning federal actions, including:

- Sections 106 and 110 of the NHPA;
- ARPA;
- The Antiquities Act (16 U.S.C. 431-433);
- EO 11593, Protection and Enhancement of the Cultural Environment; and
- OPNAVINST 5090.1C CH-1, Environmental Readiness Program Manual.

Section 106 of NHPA requires federal agencies to integrate consideration of historic preservation issues into the early stages of their planning. Under Section 106, the head of any federal agency having direct or indirect jurisdiction over a proposed federal or federally financed undertaking is required to account for the effects of this action on any district, site, building, structure, or object that is included or eligible for inclusion in the National Register. Eligibility determinations are based on National Register criteria. Section 106 consultation in the state of Maryland is conducted with the Maryland Historical Trust (MHT), which is the designated State Historic Preservation Office (SHPO). Cultural resources management procedures at NAS Patuxent River are described in the installation's 2011 *Integrated Cultural Resources Management Plan* [ICRMP, (NAVFAC 2011)].

3.4.1.3 Existing Conditions

The following subsections provide an overview of the known historic and archaeological resources of the ATR Inner Range, as provided in the ICRMP (NAVFAC 2011). To protect the resources described, no map figures with locations of resources are provided.

Historic Sites and Historic Architectural Resources

Surveys for historic districts and structures have concentrated on the largest properties associated with NAS Patuxent River; including the main installation, Webster Field, and Navy Recreation Center (NRC) Solomons. Cultural resource inventories are largely complete at these installation areas. Phase I surveys of the smaller ancillary properties were conducted in conjunction with the ICRMP (NAVFAC 2011). The following architectural investigations (among others) have been conducted on the ATR Inner Range to identify historic resources:

- *Naval Air Station Patuxent River Cultural Resource Survey, Volume II: Architecture.* On file, Natural Resources Branch of Naval Air Station Patuxent River (Pogue 1983);
- *Survey of World War II era Historic Military Resources at Naval Air Station, Patuxent River, Maryland.* Prepared for Naval Air Station, Patuxent River by Panamerican Consultants, Inc. (Hopkins and Rosenzweig 1993);
- *Historical Architectural Evaluation Naval Air Station, Patuxent River, Maryland. Resources Not Meeting National Register Criteria for Significance.* Prepared for Naval Air Station Patuxent River, Maryland by Louis Berger & Associates, Inc. Found in consultation files (MIHP No. SM-357) of the Maryland Historical Trust, Crownsville (Berger 1999);
- *Naval Air Station Patuxent River, Maryland: Historic and Architectural Resources.* Multiple Property Documentation Form Prepared for Naval Air Station Patuxent River, Maryland by the Louis Berger Group, Inc. (Pendleton et al. 2000);
- *Historic and Architectural Resources of the Early Cold War Period: 1950-1965, Naval Air Station Patuxent River, Maryland, Report of Field Investigations.* Prepared for Naval Air Station Patuxent River by Geo-Marine, Inc., Plano, Texas (Emery and Gasparini 2005);
- *Cold War Historic Context (1945-1989) and Architectural Survey and Evaluation, NAS Patuxent River, Webster Field, and Solomons Complex.* Prepared for Naval Air Station Patuxent River, Maryland by the Louis Berger Group, Inc. (Baynard et al. 2009); and
- Miscellaneous Determination of Eligibility Forms, NAS Patuxent River, Webster Field, and Solomons. Prepared for Naval Air Station Patuxent River, Maryland by the Louis Berger Group, Inc. (Kuhn 2010).

Four historic districts and ten individual resources at NAS have been determined historically significant and eligible for the NRHP. Copies of the NRHP forms for the NRHP-eligible historic districts and individual resources are provided in Appendix C of the NAS Patuxent River ICRMP. The five National Register-eligible historic districts are:

- Armament Test/Electronics Test/Weapons Test Historic District;
- Flight Test/Tactical Test/NAS Operations Historic District;
- Mattapany-Sewall Complex Historic District;
- Webster Field Historic District; and
- Bloodsworth Island.

Full descriptions of the historic districts are provided in the NAS Patuxent River ICRMP (NAVFAC 2011).

The 10 resources associated with NAS Patuxent River that are individually eligible for the NRHP are provided in Table 3-15.

Table 3-15 Individually Eligible Historic Resources

Building Number	Building Name	Facility	Year Built	MHT Concurrence
Quarters A	Quarters A	NRC Solomons	1840	
115	Radio Test Landplane Concrete Hangar	Main Installation	1944	3/13/2000
144	Electronics Test Shielded Hangar	Main Installation	1949	3/13/2000
301	NATS Seaplane Hangar	Main Installation	1943	3/13/2000
305	NATS Seaplane Hangar	Main Installation	1943	3/13/2000
306	NATS Seaplane Hangar	Main Installation	1943	3/13/2000
409	Administration Building	Main Installation	1943	3/13/2000
428	St. Nicholas Church	Main Installation	1915	3/13/2000
443	Firehouse No. 2	Main Installation	1944	3/13/2000
2189	Frank Knox School	Main Installation	1944	1/1/1999

Source: NAVFAC 2011

A historic landscape study was conducted in 2009 that identified and evaluated all monuments, memorials, and other elements of built environment landscapes of NAS Patuxent River, Webster Field, and NRC Solomons for NRHP eligibility. The survey described the physical characteristics of each landscape, including Spatial Organization and Land Use; Response to the Natural Environment; Circulation Networks; Boundary Demarcations; Vegetation; and Buildings, Structures, and Small-Scale Features. The survey recommended the runways and taxiways on NAS Patuxent River as contributing resources to the Armament Test and Flight Test Historic Districts. The drill field (Building No. 2427) and Flag Pole (Building No. 844) on Cedar Point Road across from the National Register-eligible Administration Building (Building No. 409) were recommended as contributing resources to the Administration Building (MHT No. SM-905). Other National Register-eligible landscapes include the St. Nicholas Cemetery, which was determined as contributing to the St. Nicholas Church (Building No. 428) in 2000 (MHT No. SM-138); the Seaplane Basins (Building Nos. 1174, 1175, 1176), which were determined as contributing to the Armament Test and the Flight Test historic districts in 1999; and the Mattapany landscape, which was determined a contributing resource to the Mattapany-Sewall Complex and included in the 1999 draft National Register nomination. The runways and taxiways on Webster Field were recommended as contributing to the Webster Field Historic District but have since been reconsidered and determined not eligible. The landscape of Quarters A Solomons was determined a contributing resource in 1999.

Resources that are not listed as Real Estate Property, such as the monuments and planes, may be treated by the Navy as Heritage Assets and not as landscape features. Heritage Assets are reported to the Curator of the Navy under a different program. In its implementation of the Chief Financial Officers Act of 1990 (PL 101-576), the DoN identified Heritage Assets as among the subcategories of Property, Plant and Equipment to be reported on annual Chief Financial Officers' financial statements. The Chief Financial Officers Act defines Heritage Assets as "items unique due to historical or natural significance; cultural,

educational or artistic importance; or significant architectural characteristics". Thus, monuments and memorials at NAS Patuxent River should be treated as Heritage Assets and not landscape features. The Navy's responsibility with regard to heritage assets is to treat them as potential historic properties as required by the NHPA; however, if certain heritage assets are found to be ineligible for the NRHP, then they are not subject to Section 106 review or Section 110 inventory requirements.

Archaeological Resources

NAS Patuxent River

The main installation has been the subject of a series of large-scale identification (Phase I) surveys and many smaller, generally development-driven surveys. In addition to the identification surveys, the main installation has been studied archaeologically for ground disturbance (Cultural Resources, Inc. 2002), and an archaeological predictive model has been produced for the installation area (Eagan, McAllister Associates, Inc. 2003). By 2004, most of the main installation had been surveyed and inventoried for archaeological resources (Sara and Bergevin 2004).

The site inventory at the main installation consists of 129 sites documenting occupation over the last 10,000 years. Determination of Eligibility (DOE) studies (Phase II investigations) have been conducted at Site 18ST642 (Tubby 1995), Site 18ST659 (Sara et al. 2006), portions of Site 18ST704 (Hornum et al. 1999; Huston et al. 2001), Site 18ST707 (Bedell and LeeDecker 2010), Site 18ST751 (Child et al. 2005), and Site 18ST754 (Sara et al. 2006).

Data recovery and mitigation studies (Phase III investigations) have been conducted at Site 18ST642 (Watts and Tubby 1998), Site 18ST659 (Sara et al. 2006), and portions of Site 18ST704 (Hornum et al. 2001).

One main installation site has been listed in the NRHP, Site 18ST390, Mattapany-Sewall. The site is an early Colonial manor estate that also has prehistoric components. The archaeological dimensions of the site have been individually listed in the NRHP. This site and other archaeological sites in the Mattapany area (Chaney 2000) may contribute to the established Mattapany-Sewall Historic District, although they have not been formally evaluated. Six other sites have been determined eligible for listing in the NRHP (Sites 18ST642, 18ST655, 18ST659, 18ST704, 18ST707, and 18ST751). Of the remaining sites, 60 have no NRHP eligibility determinations, and 53 have been determined not eligible for NRHP listing.

Webster Field Annex

The first archaeological investigations of Webster Field Annex were conducted in 1981 by the St. Mary's City Summer Field School in Archaeology. There was never a final full report on these investigations, although a draft manuscript is on file at Jefferson Patterson Park and Museum (Smolek 1981). Discussion of the 1981 investigations can be found in a later report on Southern Maryland Regional Archaeological Preservation Center's investigations of the Fort Point portion of the annex (Smolek et al. 1983) and in Galke and Loney's (2000) Phase I survey report of surveys conducted by Jefferson Patterson Park and Museum. The Fort Point area was investigated in a fruitless attempt to locate the early seventeenth-century St. Inigoes Fort, which had apparently been destroyed from years of shoreline transgression. The Southern Maryland Regional Preservation Center also investigated Priests Point, studying the ruins of the St. Inigoes Manor House (Site 18ST087) in advance of construction of a sewage treatment plant (Smolek et al. 1983). The Manor House property was studied in more detail the following year (Dinnell 1984). In 1984 and 1985, archaeological studies of the Old Chapel Field, Langley Hollow, and the Antenna Field

were undertaken in advance of utility line installation (MILCON P-713) (Pogue and Leeper 1984). A 5-acre portion of the base was surveyed in 1989 in advance of building construction (Roulette et al. 1989); the investigation included a Phase II study of a known site (18ST334). Webster Field was partly surveyed in 1996 (Galke and Loney 2000), leaving only the infield and another small area not surveyed for cultural resources. The site inventory consists of 57 sites with occupations spanning the last 8,000 years.

A number of DOE investigations have been conducted at the installation. The evaluated sites include Site 18ST087 (Hornum et al. 2001; Dinnell 1984), Site 18ST233 (Sperling and Galke 2001), Site 18ST234 (Sara and Wall 2004), Site 18ST325 (Smolek 1981), Site 18ST328 (Sara and Wall 2004), Site 18ST329 (Sperling and Galke 2001), Site 18ST333 (Katz 2010b), Site 18ST334 (Katz 2010a; Roulette et al. 1989), Site 18ST372 (Katz 2010a), Site 18ST373 (Katz 2010c), and Site 18ST688 (Clifford and Mozzi 1999). Phase II investigations were completed at three sites (18ST333, 18ST334, and 18ST373) as part of an environmental assessment of alternate locations for the P-140 MILCON project (Katz 2010b). Most recently, five previously recorded sites at Webster Field Annex were evaluated in Phase II investigations (Bedell and Katz 2012). Sites 18ST331, 18ST353, 18ST362, and 18ST637 were determined not eligible for the National Register. The historic component of Site 18ST365 was determined not eligible. No data recovery/mitigation studies (Phase III investigations) have been conducted at Webster Field Annex.

Of the site inventory, 5 sites have been recommended as eligible for listing in the NRHP (18ST087, 18ST233, 18ST234, 18ST329, and 18ST334), 23 have no eligibility determinations, and 29 have been determined not eligible for NRHP listing

Bloodsworth Island Range

In 1980, a Phase I identification survey was conducted of the entire BIR (Wilke 1980). The investigation consisted of shoreline survey and intensive survey of upland locations (non-marshland). Four archaeological sites (Sites 18DO79 through 18DO82) and 52 non-site find spots were identified. The Range was revisited by archaeologists in 1981 for Phase II investigation of Site 18DO82 and additional investigation of one of the find spots (Davidson 1982). During Davidson's work on the island, he identified two additional sites (18DO107 and 18DO108). In 1997, Sites 18DO79, 18DO80, and 18DO81 were investigated at the Phase II level (Botwick and McClane 1998). During that investigation the archaeologists identified a concentration of artifacts in an erosional context on the northern shore of the island that was later designated Site 18DO407.

The site inventory consists of seven sites with occupations spanning the last 5,000 years. Three sites at BIR have been determined eligible for listing in the NRHP (Sites 18DO79, 18DO80 and 18DO81), and three sites have been determined not eligible for the NRHP. There has been no eligibility determination for Site 18DO407. Site 18DO79 was recommended as not individually eligible for listing in the NRHP, but the investigators stated that it may be NRHP-eligible as part of a potential historic district (Botwick and McClane 1998); the historic district is listed as NRHP-eligible by MHT.

Submerged Resources

As part of mission activities NAS Patuxent River conducts limited actions in the waterways adjacent to installation areas and, in accordance with DoN policy (OPNAVINST 5090.1C CH-1 Chapter 27) and the NHPA, NAS Patuxent River is responsible for reviewing installation actions for potential impacts to submerged resources.

As codified in the Sunken Military Craft Act of 2004 (Title XIV of the FY2005 National Defense Authorization Act, Public Law Number 108-375), the U.S. Navy is the owner in perpetuity of wrecks of Navy warships, aircraft, and their cargoes. The DoN protects and manages these resources in compliance with U.S. historic preservation laws and U.S. Navy regulations, with oversight and permitting through the Underwater Archaeology Branch of the Naval Historical Center, located at the Washington Navy Yard. It should be noted that the State of Maryland has control of non-military submerged resources, as determined by the elevation of mean high tide, which is an important consideration for submerged archaeological resources that are not claimed by the U.S. Navy.

Although NAS Patuxent River has responsibilities for mission activities, it is not the primary agency or branch of the DoD managing cultural resources in the waterways. Under the auspices of Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) and Section 404 of the Clean Water Act (CWA) of 1972 (33 U.S.C. 1344) as amended, the USACE is typically the federal agency providing environmental oversight in navigable waterways. Large-scale stream improvements may be undertaken directly by the USACE (e.g., levee projects, some dredging and breakwater construction), and smaller scale projects are typically permitted by the USACE, with the USACE performing environmental (NEPA and NHPA compliance) reviews.

The waters of the lower Patuxent River and central Chesapeake Bay off NAS Patuxent River are considered sensitive for submerged archaeological resources, particularly for vessels from the War of 1812, the Civil War era, and the World War II/Cold War era. Literature on the underwater archaeology in the lower Patuxent and Potomac rivers and Chesapeake Bay includes the works of Shomette (1982, 1985, 1996, 2009). The Naval Historical Center began inventorying sunken Navy craft in 1993 and completed an inventory for Maryland in 1996 (not available for public review). The Maryland inventory includes 105 known military shipwrecks spanning the entirety of U.S. history and includes 21 different vessel types (e.g., armed military barges, schooners, and submarines) (Shomette 1997). Non-military wrecks are also common in the area, with documented losses numbering in the hundreds, including those of steamboats, watermen, and commercial vessels.

3.4.2 Environmental Consequences

3.4.2.1 Approach to Analysis

Consideration must be afforded to proposed actions that may diminish the integrity of the resource or alter the eligibility of the resource for the National Register. In order to assess the effects of a proposed action, the area of potential effect (APE) requires definition.

The APE represents the geographic area within which an undertaking would take place and may cause an effect to the ambient environment, including historic properties. The proposed actions to implement expansion of unmanned systems operations on the ATR Inner Range require a variety of air, marine, and land-based environments. Current activities conducted on the Inner Range are similar to those proposed in this EA; and as a result NAS Patuxent River, Webster Field Annex, and the Inner Range would continue to provide land-based support of these types of activities. The APE for the Baseline Alternative and the Proposed Action would encompass the same geographical area and includes the NAS Patuxent River and Webster Field Annex airstrips and open field spaces (away from the airstrips) used for UGS interoperability tests and the recovery of UAS, and the waters of the Inner Range.

The NHPA provides a graduated scale of impact thresholds for archaeological/architectural resources and traditional cultural resources. These thresholds are defined as the following:

Archaeological and Architectural Resources

- *No historic properties affected* – A negligible effect of an action that would not alter any of the characteristics that qualify a resource for eligibility in the NRHP.
- *No adverse effect* – A minor adverse effect that would be observable, but would not alter characteristics qualifying a resource for eligibility.
- *Adverse effect* – Moderate adverse effect that would diminish the characteristics of a resource that qualify it for the NRHP.
- *Adverse effect* – A major adverse effect that results in loss of NRHP eligibility.

Traditional Cultural Resources

- *No historic properties affected* – A negligible effect that would not alter resource conditions, access, or site preservation, or the relationship between the resource and the affiliated group's body of beliefs and practices.
- *No adverse effect* – A minor adverse effect that would have a slight but noticeable effect but would not appreciably alter resource conditions.
- *Adverse effect* – Even though the tribe's beliefs and practices would survive, a moderate adverse effect on traditional cultural resources would be apparent, and would alter resource conditions (such as traditional access or site preservation, or the relationship between the resource and the affiliated group's body of beliefs and practices).
- *Adverse effect* – A major adverse effect would result from actions that greatly affect resources and practices to the extent that survival of a group's beliefs and/or practices would be jeopardized.

3.4.2.2 Alternative 1 – The No-Action Alternative (Baseline Alternative)

Impacts

NAS Patuxent River

Under the Baseline Alternative, Group 4 and 5 UAS would take off and land at the NAS Patuxent River airstrip. The primary source of impact to cultural resources from flight activities would include noise and vibration.

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 1998). Normally, the most sensitive components of a structure to airborne noise are windows and, infrequently, plaster walls and ceilings. An evaluation of the peak sound pressures impinging on the structure is normally used to determine the possibility of damage. In general, with peak sound levels above 130 dB, there is the possibility of the excitation of structural component resonances. While certain frequencies (such as 30 hertz for window breakage) may be of more concern than other frequencies, conservatively, only sounds lasting more than one second above a sound level of 130 dB are potentially damaging to structural components (Wyle 2002). The 1998 FEIS found that the proposed flight activities studied in that document would not impact cultural resources (Navy 1998b). The Group 4 and 5 UAS flights associated with the Baseline Alternative would use

existing flight paths and would generate noise levels lower than F/A-18 and F-35 aircraft studied in the 1998 FEIS and 2009 RAICUZ for the Inner Range. As such, noise from UAS and support aircraft takeoff/landings and overflights would have minimal potential to impact cultural resources within the ATR Inner Range.

Under the Baseline Alternative, UMS operations would continue on the ATR Inner Range. This would involve boat and UMS operations to and from NAS Patuxent River. All vessels associated with the Baseline Alternative would use existing dock structures and would not conduct beach landings at Patuxent River, reducing potential impacts to near-shore resources.

Given the actions described above, the Baseline Alternative would have no adverse effect on cultural resources at NAS Patuxent River.

Webster Field Annex

Under the Baseline Alternative, Group 3 and 4 UAS would launch and land at the Webster Field Annex airstrip. Group 1 and 2 UAS launch and recovery would occur on the airstrip, existing roads and pad sites, as well as previously disturbed and surveyed field sites.

Group 3 and 4 UAS flights at Webster Field Annex would take off and land at the airstrip and would not generate noise and vibrations sufficient to impact cultural resources within the ATR Inner Range.

Smaller (Group 1 and 2) UAS would take off from the Webster Field Annex airstrip and existing roadways and pad sites. Each Group 1 and 2 UAS operation would have its own designated primary recovery site. Due to their vulnerability to adverse weather and potential loss of communications links, some smaller UAS operations would not land at the intended recovery site and could potentially impact cultural resources. Prior to UAS operations environmental personnel, in consultation with the Environmental Division Cultural Resources Manager (CRM), would define an alternate landing location that avoids identified cultural resource sites. The alternate landing site would only be intended for use of UAS under positive control. There would be no ground disturbing activities associated with any unmanned systems operations analyzed in this EA.

Implementation of the Baseline Alternative would have no adverse effect on cultural resources at the Webster Field Annex.

Bloodsworth Island Range and Target Areas

The Baseline Alternative would involve inert missile tests and weapon/stores separation tests consistent with existing RDAT&E and training activities on the ATR Inner Range, which excludes these types of tests on BIR. There is no evidence that historic underwater cultural resources are present in the vicinity of the target areas (see Table A-11 in Appendix A for a complete list of targets). As described in the 1998 FEIS, 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 resources if present," (Navy 1998b). Therefore, the Baseline Alternative would have no impact on historic properties on the BIR and the target areas.

Submerged Cultural Resources

The actions of the Baseline Alternative would be consistent with existing operations on the ATR Inner Range and would not introduce new risks to submerged cultural resources on the Inner Range.

Mitigation Measures

Implementation of the Baseline Alternative would not result in significant impacts to cultural resources; therefore, no mitigation measures are proposed or required.

3.4.2.3 Alternative 2 – The Preferred Alternative (Proposed Action)

Impacts

NAS Patuxent River

The Proposed Action would involve the same UAS and UMS operations at NAS Patuxent River as described under the Baseline Alternative but at a greater tempo. UAS and support aircraft flight operations would follow existing procedures and flight paths. Thus, effects on historic properties would be minimal.

UGS interoperability tests would be conducted at NAS Patuxent River. The UGS would be less than 700 lb (318 kg) in size and would be operated on previously disturbed sites documented not to hold identified cultural resources. There would be no ground disturbing activities associated with any unmanned systems operations analyzed in this EA.

Under the Proposed Action, UMS operations would be expanded on the ATR Inner Range. This would involve boat and UMS operations to and from NAS Patuxent River. All vessels associated with the Proposed Action would use existing dock structures and would not conduct beach landings at Patuxent River, reducing potential impacts to near-shore resources.

Implementation of the Proposed Action would have no adverse effect on cultural resources at NAS Patuxent River.

Webster Field Annex

Under the Proposed Action, Group 3 and 4 UAS would launch and land at the Webster Field Annex airstrip. Group 1 and 2 UAS launch and recovery would occur on the airstrip, existing roads and pad sites, as well as previously disturbed and surveyed field sites.

Group 3 and 4 UAS flights at Webster Field Annex would take off and land at the airstrip and would not generate noise and vibrations sufficient to impact cultural resources within the ATR Inner Range.

Smaller (Group 1 and 2) UAS would take off from the Webster Field Annex airstrip and existing roadways and pad sites. Each Group 1 and 2 UAS operation would have its own designated primary recovery site. Due to their vulnerability to adverse weather and potential loss of communications links, some smaller UAS operations would not land at the intended recovery site and could potentially impact cultural resources. Prior to UAS operations environmental personnel, in consultation with the CRM, would define an alternate landing location that avoids identified cultural resource sites. The alternate landing site would only be intended for use of UAS under positive control.

UGS interoperability tests would be conducted at Webster Field Annex. The UGS would be less than 700 lb (318 kg) in size and would be operated on previously disturbed sites documented not to hold identified cultural resources. There would be no ground disturbing activities associated with any unmanned systems operations analyzed in this EA.

Implementation of the Proposed Action would have no adverse effect on cultural resources at the Webster Field Annex.

Bloodsworth Island Range and Target Areas

Under the Proposed Action, Group 1 and 2 UAS would be launched from boats within the BIR. Most UAS would be recovered using onboard systems, but some would land on Bloodsworth Island. Prior to Group 1 or 2 UAS operations on the BIR, environmental personnel, in consultation with the CRM, would define primary and alternate UAS landing locations, avoiding identified cultural resource sites. UAS recovery would be performed via foot traffic only (no motorized vehicles would be used). Boats would use existing docking areas and would avoid beach landings near sensitive resources on Bloodsworth Island.

The Proposed Action would involve inert missile tests and weapon/stores separation tests consistent with existing RDAT&E activities on the ATR Inner Range, which excludes these types of tests on BIR. There is no evidence that historic underwater cultural resources are present in the vicinity of the target areas (see Table A-11 in Appendix A for a complete list of targets). As described in the 1998 FEIS, 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 resources if present," (Navy 1998b). Therefore, the Proposed Action would lead to no adverse effects on historic properties on the BIR and the target areas.

Submerged Cultural Resources

The Proposed Action would involve UMS activities on the ATR Inner Range, including USV and UUV operations. All boats and USVs associated with the Proposed Action would use existing dock structures and would not conduct beach landings at Patuxent River, reducing potential impacts to near-shore resources. UUVs would be launched in the Chesapeake Bay and would not make contact with the Bay floor or articles resting on the Bay floor. Considering this, the Proposed Action would have no adverse effects on submerged cultural resources.

Mitigation Measures

Implementation of the Proposed Action would not result in significant impacts to cultural resources; therefore, no mitigation measures are proposed or required.

3.5 AIRSPACE, LAND AND WATER USE

3.5.1 Affected Environment

3.5.1.1 Definition of Resource

The open air test range comprising the ATR Inner Range overlies approximately 2,352 sq mi (6,092 sq km) of the middle portion of the Chesapeake Bay and portions of Delaware, Maryland, and Virginia. Approximately one-half of the Inner Range, or 1,176 sq mi (3,046 sq km), lies over water, with the remainder overlying land. In Maryland, the Inner Range partially or wholly overlies the counties of Calvert, Dorchester, St. Mary's, Somerset, and Wicomico. In Virginia, the ATR Inner Range overlies portions of Accomack, Lancaster, Northumberland, and Westmoreland counties. In Delaware, the Inner Range overlies the southwest corner of Sussex County.

Special use airspace (SUA) refers to areas with defined dimensions where flight and other activities are confined due to their nature and the need to restrict or limit nonparticipating aircraft. The majority of SUA is established for military flight activities and may be used for commercial or general aviation when not reserved for military activities. Restricted Areas are airspace over U.S. land or territorial waters that are used by the military to exclude non-authorized aircraft and to contain hazardous military activities.

Land and water use comprises the natural conditions and/or human-modified activities occurring at a particular location. The terms "land use" or "water use" can also refer to the use of an area by recreational, commercial, and military users.

3.5.1.2 Regulatory Setting

Regulations applicable to all aircraft are promulgated by the FAA to define permissible uses of designated airspace and to control that use. These regulations are intended to accommodate the various categories of aviation, whether military, commercial, or general aviation. The regulatory scheme for airspace and air traffic control varies from highly controlled to uncontrolled. Examples of highly controlled air traffic situations are flights in the vicinity of airports, where aircraft are in a critical phase of flight, either take-off or landing.

3.5.1.3 Existing Conditions

<u>Airspace</u>

The ATR Inner Range is overlain by 2,352 sq mi (6,092 sq km) of SUA. Range operations in airspace such as the Inner Range typically involve multiple aircraft in high-speed and dynamic flight maneuvering. In order to maintain safe separation from all other air traffic, the FAA designates specific parcels of airspace (defined by lateral and vertical dimensions) as SUA for military use. This designation allows the military user to control and restrict the use of the designated airspace to authorized tests and related military flights. SUA designations include restricted airspaces, warning areas, and military operating areas. The Inner Range is composed of restricted areas R-4002 (surface to 20,000 ft [0 to 6,096 m]), R-4005 (surface up to, but not including, 25,000 ft [0 to 7,620 m]), R-4006 (3,500 ft up to, but not including 25,000 ft [1,067 m to 7,620 m]), R-4007 (surface up to, but not including 5,000 ft [0 to 1,524 m]), R-4008 (25,000 to 85,000 ft [7,620 m to 25,908 m]), and R-6609 (surface to 20,000 ft [0 to 6,096 m]). See Figure 3-6.

During periods that the ATR Inner Range SUA is activated (normally between 7 a.m. and 11 p.m.), the Atlantic Test Ranges maintains a military radar unit that provides restricted area containment surveillance under the supervision of the NAS Patuxent River Air Traffic Control facility. When the Restricted Areas/Special Use Airspace is not in use (normally after 11 p.m.), it is released back to FAA for command and control.

Land Use

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 maintenance) comprise another significant portion of the total land area. 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 (Navy 1998b).

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 Island 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 mall 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).

Webster Field Annex

Webster Field Annex encompasses a total of about 852 ac (341 ha) along the eastern shore of the St. Mary's River with St. Inigoes Creek and Molls Cove forming its northern boundary. The surrounding area 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 (Navy 1998b).

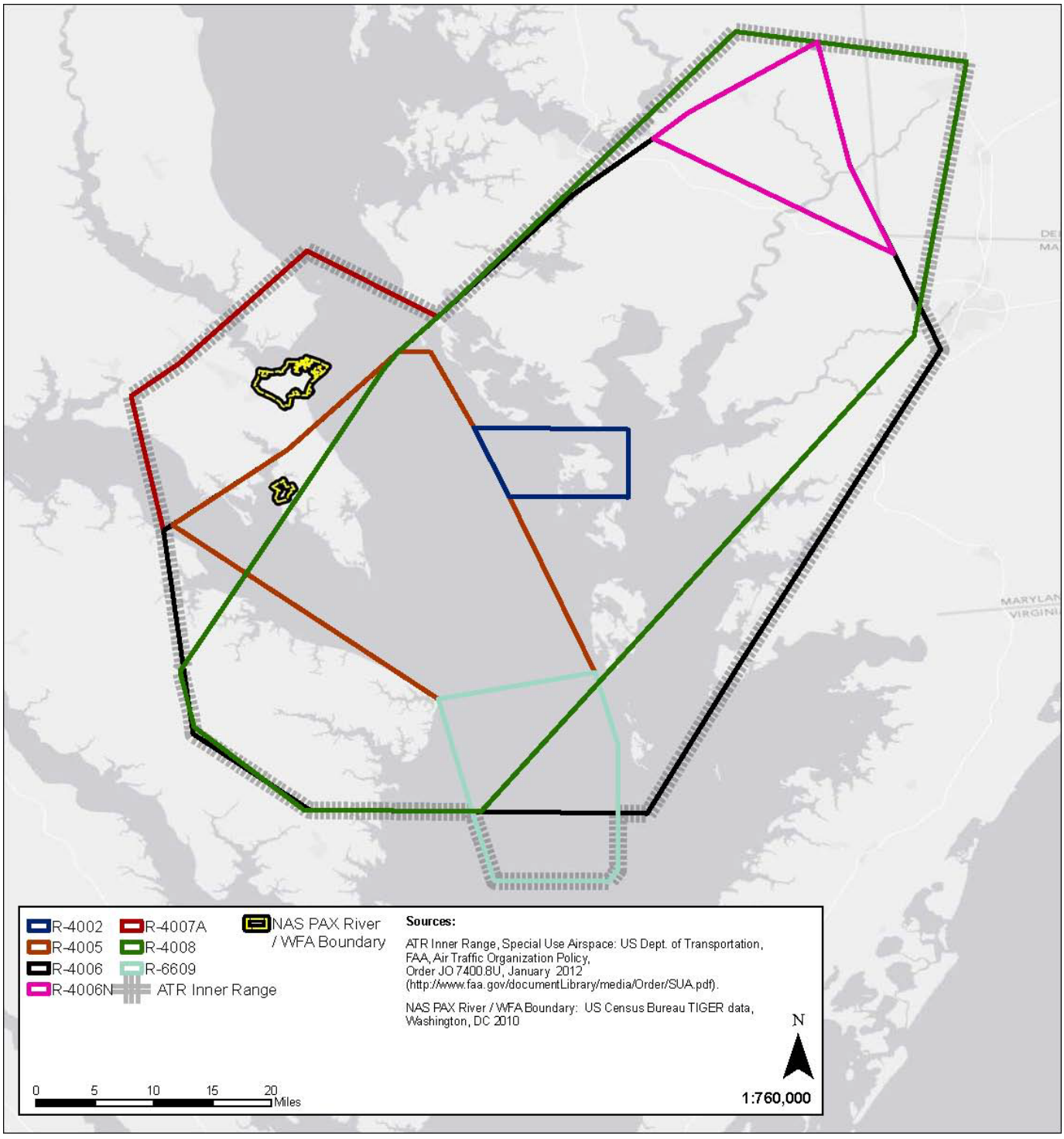

Figure 3-6 Restricted Airspace of the ATR Inner Range

The Bloodsworth Island Range and Target Areas

The uninhabited BIR, including islands and Surface Danger Zone, is located along the western edge of Maryland's Eastern Shore in the Lower Bay/Tangier Sound Region as defined by the MDNR. This region is roughly defined as the portion of Chesapeake Bay between the Little Choptank River in the north and the Maryland/Virginia border in the south.

Land areas in proximity to the BIR consist primarily of undeveloped wetlands, with federal and state wildlife management areas (WMAs) being the dominant land use, such as the South Marsh Island WMA, which is about 0.3 mi (0.48 km) to the south of the BIR's Surface Danger Zone across Hooper Strait. Chesapeake Bay's main shipping channel is about 3 mi (4.8 km) to the west of the BIR's Surface Danger Zone.

The nearest developed land is at Bishops Head Point in mainland Dorchester County, which is across Hooper Strait (about 1.2 mi [1.9 km] north of the BIR's Surface Danger Zone). Chesapeake Bay Foundation operates the Karen E. Noonan Center of Environmental Education along the shoreline at Bishops Head. The low-density communities of Crocheron and Wingate are located further inland to the northwest of the BIR.

Tangier Sound separates the BIR from Deal Island to the east by about 2.4 mi (3.9 km). This area comprises a corridor that extends along State Route 363 and includes the Somerset County, Maryland communities of Dames Quarter, Chance, Deal Island, and Wenona. Land uses within this corridor are low- and medium-density residential, interspersed with some commercial and institutional uses. Deal Island WMA borders this corridor to the east and isolates the area from other communities in Somerset County (Navy 2006).

On the surface beneath the Inner Range lie the aerial firing range and target areas. The aerial firing range and target areas are surrounded by a surface impact zone and consist of two fixed targets, two shallow water impact areas, and four virtual aim points. Entry into the surface impact zone requires approval and is often prohibited during testing. The targets are characterized as follows (NAVAIR 2012):

- Hooper Target Complex has been in operation since 1949. The target is located approximately 6.5 mi (10.5 km) north of Point No Point, Maryland. Hooper Target Complex is a concrete structure with four peripheral concrete columns each equipped with a sleeve for supporting five reflective plywood visual targets. These targets are not actually fired on. Actual targets are expendable items such as rafts, buoys, or barrels floating near the fixed target structure. Around the target is a prohibited circular area, approximately 1,000 yd (914 m) in radius. The nearest land to Hooper target is 2.6 nm (4.8 km) 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 3.5 nm (6.4 km) to the northeast. Around the target is a prohibited circular area, approximately 1,000 yd (914 m) in radius. South Marsh Island, comprising the South Marsh Wildlife Management Area, is not inhabited. The nearest inhabited land is Smith Island (population of 276 in 2010), located approximately 7.2 nm (13 km) east-southeast of the Hannibal target.

- Aim points SS1, SS2, SS3, and SUP are used during supersonic flight weapons separation tests. SS1, SS2, and SUP have been in use since the late 1980s. SS3 point was established in 2006. There are no physical targets associated with these aim points. Rather, aircrew attempt to impact selected aim points during testing.
- Bay Forest is an impact area located in shallow water, approximately 2 nm (3.7 km) east of the Elms Wildlife Management Area. The impact area is generally, but not exclusively, used when the ordnance under test requires recovery. The shallow water and sandy bottom in the vicinity of this impact area facilitates high-value ordnance recovery.
- The Shoal is a shallow water impact area, north of Bay Forest. The Shoals' hard, sandy bottom facilitates ordnance recovery; however, it is not frequently used.

Open Space and Recreational Resources

The ATR Inner Range 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 Inner Range include: National Wildlife Refuges (NWRs); state WMAs and natural areas; state and locally designated nature and historic parks; beaches; harbors and marinas; regional recreation areas; and dozens of landings and wharves. Table 3-16 provides an overview of the wildlife management and natural areas within the ATR Inner Range. Table 3-17 provides a selected list of recreational facilities in the vicinity of the ATR Inner Range.

Chesapeake Bay supports a significant commercial fishery that is an important source of income for Bay residents and represents a vital sector of the Maryland economy. The Division of Fisheries Statistics and Economics of the NOAA compiles statistics on the commercial harvest of fish and shellfish. In 2011, the commercial harvest of fish and shellfish from Maryland Chesapeake Bay waters totaled over 78 million pounds (35,470 metric tons) and had a reported retail value of $76 million (NMFS 2012).

The recreational fisheries of Chesapeake Bay also are a significant source of income for the region and the state. The NOAA Fisheries Marine Recreational Fisheries Statistics Survey provides information on landings and angler effort for recreational fisheries in the inland marine waters of Maryland, which is primarily comprised of the Chesapeake Bay. A variety of species are pursued by recreational anglers, including some that are also important commercial species. Recreational fish species common in the vicinity of the Inner Range include striped bass, bluefish, spot, summer flounder, black sea bass, white perch, and toadfish.

Recreational boating in Chesapeake Bay also provides significant revenue for the state economy. A study completed by the University of Maryland Sea Grant Extension Program found that expenditures related to recreational boating in Maryland exceeded $2.2 billion in 2009. According to the study, every six boats registered in Maryland lead to a full-time job somewhere in the state's economy, and each boat contributes about $9,230 per year in economic activity (Maryland Sea Grant 2011).

Table 3-16 Wildlife Management and Natural Areas within the Inner Range

Name	Location	Recreational Activities
National Wildlife Refuges		
Blackwater NWR	Cambridge	Fishing/boating; walking trails; bicycling; wildlife drive; nature study
Martin NWR	Smith Island and Watts Island	Closed to the public
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; hiking; camping; bird watching; nature photography
Ellis Bay	Nanticoke	Crabbing; fishing; boating; hunting; trapping; bird watching; nature photography
The Elms	Dameron	Crabbing; fishing; hiking; environmental education center
Fairmont	Rumbley	Crabbing; fishing; boating; hunting; trapping; hiking; camping; bird watching; nature photography
Fishing Bay	Dorchester County	Crabbing; fishing; boating; hunting; trapping; bicycling; hiking; bird watching; nature photography
Le Compte	Vienna	Hunting; trapping; hiking; bird watching; nature photography
St. Inigoes State Forest	St. Inigoes	Crabbing, fishing, hunting
South Marsh Island	South Marsh Island	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
Delaware Wildlife Areas		
Nanticoke	Seaford	Fishing; boating; nature trails

Source: Navy 1998b.

Table 3-17 Recreational Facilities in the ATR Inner Range Region *

Facility	Location
Beaches	
Elms Beach	vicinity of Dameron, MD
Kohk Island	vicinity of Smith Point, VA
Vir-Mar Beach	vicinity of Smith Point, VA
Harbors and Beaches	
Deal Island Harbor	Deal Island, MD
Webster's Cover 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 State Forest	vicinity of St. Mary's, MD
Tyaskin Recreation Area	Tyaskin, MD
Calvert Cliffs State Park	Lusby, MD

Source: Navy 2008.
**Note*: This table does not provide a comprehensive list of all public recreation areas near the ATR Inner Range.

Coastal Zone Management Act Consistency Determination

Maryland, Virginia, and Delaware have federally approved management plans 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.

Furthermore, the Federal Coastal Zone Management Act Reauthorization Amendments of 1990 state 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 consistent with (to the maximum extent practicable) the enforceable policies of each state's coastal zone management program and policies.

Maryland

Maryland's coastal zone management plan is a comprehensive and coordinated program, based on existing laws and authorities, for the protection, preservation, and orderly development of the State's coastal resources. Specific goals, objectives, and policies were developed for the management of uses and activities which have a direct, and potentially significant, effect on coastal resources. Overall management is achieved through the use of existing state regulatory programs, the State of Maryland EO 01.01.1978, *Coastal Zone Management*, and Memoranda of Understanding between appropriate state departments. The federal consistency review is based on the enforceable policies of the coastal zone management plan.

The MDNR is the lead agency for the State's Coastal Zone Management Program (CZMP). Within MDNR, the Coastal Zone Management Division of the Watershed Services Unit is the lead agency for the coastal zone management plan. The federal consistency requirements are carried out by the Coastal Zone Consistency Division in the Wetlands and Waterways Program of the Water Management Administration

in the MDE. Coastal Zone Consistency evaluates proposed federal activities affecting the State's coastal zone to ensure consistency with the enforceable policies of the State's coastal zone management plan. Although the Water Management Administration is responsible for concurrence with the federal consistency determination, the decision is often based partially or entirely upon the findings of a variety of agencies within the coastal zone management plan network, depending upon the nature of the proposed activity (MDE 2004).

Virginia

The Virginia CZMP is a network of Virginia state agencies and local governments, established in 1986 through Virginia EO, *Legal Authority to Manage Virginia's Proposed Coastal Resources Management Program*, which administers enforceable laws, regulations and policies that protect coastal resources and foster sustainable development.

The VDEQ serves as the lead agency for Virginia's networked program. Through an office headquartered at VDEQ, it helps agencies and localities develop and implement coordinated coastal policies and solve coastal management problems. The overarching goal is to protect coastal resources and strengthen Virginia's coastal economy.

Delaware

In response to the CZMA of 1972, Delaware prepared a Final Environmental Impact Statement (FEIS) for the development of a coastal program and submitted it to NOAA. In 1979, the Delaware Coastal Management Program was approved by NOAA under authority of the CZMA (15 CFR Part 923). The FEIS established the Delaware Coastal Management Program (DCMP), as well as its goals and policies, and became Delaware's Program Document. This document has been periodically updated to reflect changes in Delaware's environmental laws and regulations as well as activities affecting coastal uses and resources. The Delaware Department of Natural Resources and Environmental Control (DNREC) is the agency responsible for administering the State's Coastal Management Program (DCMP 2011).

As a military installation under exclusive federal jurisdiction, NAS Patuxent River is excluded from the legal definition of coastal zone. Although excluded, NAWCAD will ensure that the Proposed Action is consistent to the maximum extent practicable with the enforceable policies of the Maryland, Virginia, and Delaware CZMPs and will submit a Coastal Consistency Determination to each of the state offices for concurrence that the Proposed Action would be consistent with the enforceable policies and mechanisms of their respective CZMPs. These correspondences are provided in Appendix C.

3.5.2 Environmental Consequences

3.5.2.1 Approach to Analysis

Factors used to assess the significance of impacts on air space include 1) consideration of an alternative's potential to result in an increase in the number of flights such that they could not be accommodated within established operational procedures and flight patterns, 2) a requirement for an airspace modification, or 3) an increase in air traffic that might increase collision potential between military and non-participating civilian operations.

Land and water use impacts would be significant if they would: 1) be inconsistent or in non-compliance with applicable land and water use plans or policies, 2) preclude the viability of an existing land or water

use activity, 3) preclude continued use or occupation of an area, 4) be incompatible with adjacent or vicinity land or water use to the extent that public health or safety is threatened, or 5) conflict with airfield planning criteria established to ensure the safety and protection of human life and property.

3.5.2.2 Alternative 1 – The No-Action Alternative (Baseline Alternative)

Impacts

Airspace

As provided in Table 3-18, the five-year average of ATR Inner Range restricted airspace use totals 18,151 flight hours. It is assumed that the Baseline Alternative would involve this flight tempo, which would be 6,249 flight hours less than the 24,400 flight hour limit established in the 1998 FEIS. Even assuming the highest operations year (2011) tempo of 20,391 flight hours would allow an annual planning buffer of approximately 4,009 flight hours per year.

The types of safety issues and procedures that could affect airspace use are discussed in Section 3.7, *Public Health and Safety*, and would not result in a significant impact. Furthermore, the Baseline Alternative does not include proposed airspace modifications and would not change the existing relationship of the Navy's SUA with federal airways, uncharted visual flight routes, and airport-related air traffic operations. In addition, all testing and training would only occur in airspace that was clear of non-participating aircraft. Any operations that have the potential of creating hazards to aircraft would be coordinated with the FAA to ensure that non-participating aircraft are not in the hazard area.

Table 3-18 Flight Hours on the ATR Inner Range

Calendar Year	Flight Hours within Restricted Airspace
2007	17,889
2008	17,195
2009	16,613
2010	18,667
2011	20,391
Average	18,151

Source: NAVAIR 2012.

Land Use

Land use associated with the Baseline Alternative would be consistent with current land uses and designations at NAS Patuxent River, at Webster Field Annex, and on the ATR Inner Range. Project activities would take place at locations previously designated for such activities. Personnel would remain at current levels and would represent no increase in infrastructure use.

In accordance with existing safety procedures, access to portions of Inner Range would be temporarily restricted during testing operations. UAS launches would be conducted from sites designated for RDAT&E purposes including airfield areas and roadways. UMS and support vessels operate within the Inner Range under direct control of NAWCAD Range Operations, with support provided by Range Safety.

Activities associated with the Baseline Alternative would involve temporary closure of UAS launch and recovery sites. Areas outside the UAS launch and recovery sites would continue operations as normal

during unmanned systems RDAT&E and training operations. Given the marginal increase in activities and minor disruptions due to temporary closures, the Baseline Alternative would not yield significant land use impacts.

Open Space and Recreational Resources

Open space resources located within the ATR include: 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 Baseline 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 Baseline Alternative, as flight operations would not increase and would continue to 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 3,500 ft (1,067 m) and 25,000 ft (7,620 m), respectively. Overflights of the NWRs and WMAs at this minimum altitude would be 1,500 ft (450 m) greater than the minimum flight altitude allowed by a FAA interagency agreement with the US Department of the Interior (FAA Advisory Circular 91-36D). 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 Baseline 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 2.6 nm (4.8 km) 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 Baseline Alternative.

The Baseline Alternative would require clearance of recreational boating and fishing activities within small portions of the Bay during RDAT&E and training activities. This clearance time would be lower than clearance times provided in the 1998 FEIS or approximately 16 hours per week for an FEIS-assumed 24,400 flight hours. This translates to approximately 16 percent of summer daylight hours. As determined in the FEIS, this period of restriction would not have significant impacts on either recreational boaters or fishermen (Navy 1998b). It is assumed that unmanned systems operations would not result in a significant number of clearance events. Table 3-19 provides a summary of target clearance events for the 5-year period of 2007 through 2011.

Similar to the Preferred Alternative of the 1998 FEIS, the Baseline Alternative 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. The total area cleared would be determined on a case-by-case basis. The level of closure would not pose a significant limitation to commercial fishing activities since:

- The duration of RDAT&E and training activities would be short in duration (usually one to three hours);

- Commercial and recreational fishermen could fish other areas of the Bay during Navy operations and return after the RDAT&E and training activities were completed.

Table 3-19 Target Area Clearances – 2007 through 2011

Clearance Event Description	Calendar Year					Annual FEIS Projections
	2007	2008	2009	2010	2011	
Total Clearance Events	107	39	63	44	67	324
Hours Cleared	173	78	117	81	190	840
Watercraft Cleared	350	40	107	75	66	N/A

Source: NAVAIR 2012.
Note: N/A = Not Applicable, as the FEIS provided no annual projection.

Mitigation Measures

Implementation of the Baseline Alternative would not result in significant airspace, land use, or water use impacts. Therefore, no mitigation measures are proposed or required.

3.5.2.3 Alternative 2 – The Preferred Alternative (Proposed Action)

Impacts

Airspace
The Proposed Action would involve 3,467 UAS flight hours within the Inner Range (Table 3-20), or 2,062 flight hours greater than the Baseline Alternative. When this difference is added to the 5-year average of 18,151 flight hours reported on the ATR Inner Range (Table 3-18), a total of 20,213 flight hours is projected for the Proposed Action. This total is 4,187 flight hours less than the 24,400 flight hour limit established in the 1998 FEIS. Even assuming the highest operations year (2011) tempo of 20,391 flight hours would allow a planning buffer of approximately 1,947 flight hours per year.

The Proposed Action does not include proposed airspace modifications and would not change the existing relationship of the Navy's SUA with federal airways, uncharted visual flight routes, and airport-related air traffic operations. In addition, all testing and training would only occur in airspace that was clear of non-participating aircraft. Any operations that have the potential of creating hazards to aircraft would be coordinated with the FAA to ensure that non-participating aircraft are not in the hazard area.

Table 3-20 Assumed Flight Tempo – Proposed Action

UAS Group	Number of Sorties	Flight Hours [1]
1	192	384
2	27	252
3	102	751
4	120	1,056
5	232	1,024
Total	673	3,467

Notes:
1. Represents flight hours within ATR Inner Range restricted airspace.
2. BAMS/Triton flights would involve 1.5 hours in the restricted airspace per flight; UCLASS would operate within the restricted airspace 90% of the operational time.

Land Use

Under the Proposed Action there would be temporary increases in personnel during RDAT&E events, however the increased unmanned systems operations would represent only marginal increases to current activity levels. Activities associated with the Proposed Action would involve temporary closure of UAS launch and recovery sites. Areas outside the UAS launch and recovery sites would continue operations as normal during unmanned systems RDAT&E and training operations. Given the marginal increase in activities and minor disruptions due to temporary closures, the Proposed Action would not yield significant land use impacts.

Open Space and Recreational Resources

Under the Proposed Action, open space resources would continue to experience aircraft overflights. However, the use and availability of these resources would not be anticipated to change under the Proposed Action, as increased flight operations would not affect users or uses of those open space resources.

Adherence to existing minimum altitude restrictions 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 Proposed Action.

The Proposed Action would require the clearance of recreational boating and fishing activities as well as the closure of portions of the Bay to commercial fishing. These clearances and closures would be similar to those analyzed in the 1998 FEIS and would not pose significant impacts to recreational and commercial boaters on the Bay.

Mitigation Measures

Implementation of the Proposed Action would not result in significant airspace, land use, or water use impacts. Therefore, no mitigation measures are proposed or required.

3.6 MARINE SEDIMENTS AND WATER QUALITY

3.6.1 Affected Environment

3.6.1.1 Definition of Resource

This section describes the general conditions, marine or nearshore water quality, and bathymetry and sediment quality within the vicinity of the ATR Inner Range. The general description includes the extent of the area as well as estuarine flow. Water quality describes the chemical and physical composition of water as affected by natural conditions and human activities. Bathymetry describes the depth of the Bay floor, and sediment quality describes the composition of bottom sediments.

3.6.1.2 Regulatory Setting

Water resource regulations focus on the right to use water and protection of water quality. The principal federal laws protecting water quality are the CWA, as amended (33 U.S.C. 1251 et seq.) and the Safe Drinking Water Act (42 U.S.C. 300f et seq.). Both laws are enforced by the USEPA. The CWA provides protection of surface water quality and preservation of wetlands.

All maritime operations associated with the Proposed Action would be conducted within the State of Maryland. Maryland state authorities include:

- Nontidal Wetlands Protection Act, Annotated Code of Maryland, Environment Article, Section 5-901, et Seq.;
- Appropriation or Use of Waters, Reservoirs, and Dams, Annotated Code of Maryland, Environment Article, Section 5-501, et Seq.;
- Wetlands and Riparian Rights, Annotated Code of Maryland, Environment Article, Section 16-101; and
- Water Pollution Control, Annotated Code of Maryland, Environmental Article, Sections 9-313 through 9-323.

3.6.1.3 Existing Conditions

Chesapeake Bay and Inner Range Areas Contained Within

The ATR Inner Range lies entirely within the Chesapeake Bay Watershed. The Chesapeake Bay is the largest estuary in North America, extending approximately 200 mi (322 km) from the mouth of the Susquehanna River in northeast Maryland to Cape Henry in Virginia. The Chesapeake Bay Watershed encompasses more than 64,000 sq mi (166,000 sq km) and includes portions of Virginia, Maryland, Delaware, West Virginia, New York, Pennsylvania, and the District of Columbia (CBP 2012).

Freshwater enters the Bay from 19 principal rivers and over 400 smaller tributaries, which collectively drain the entire Chesapeake Bay Watershed. Tributaries along the western shore drain large watersheds that extend to the Appalachian Mountains and are the primary contributors of fresh water to the Bay. The Eastern Shore tributaries drain the low-lying Delmarva Peninsula and often form extensive tidal marsh areas near the coast. The Susquehanna, Potomac, and James Rivers are the principal tributary systems supporting the estuarine environment and collectively contribute over 80 percent of the freshwater inflow to the Bay (Navy 2006).

Water circulation in Chesapeake Bay is generally characterized by higher salinity waters moving up the Bay near the Eastern Shore and fresher surface waters flowing seaward near the western shore (U.S. Navy 1998b). Salinity levels in the middle portion of Chesapeake Bay are typical of brackish waters and range between 10 and 20 parts per thousand (ppt). Vertical stratification occurs in the Bay and can result in bottom waters having salinity levels of 2 to 3 ppt higher than surface waters (Navy 1998b). Typical surface salinity in the vicinity of the ATR Inner Range ranges from 14 to 18 ppt (Cantillo, Lauenstein, and O'Connor, 1998). Chesapeake Bay has an average depth of 30 ft (9.1 m), although some portions of the central channel of the Bay west of Bloodsworth Island reach depths of up to 175 ft (53.3 m).

Sediments in the middle portion of the Chesapeake Bay are generally comprised of sands along the shallow, near-shore margins and on shelves surrounding the peninsulas and islands near the Eastern Shore. Silty clay sediments are common in the western portion of the Bay in deeper water areas. Previous sediment sampling of the waters surrounding the ATR Inner Range indicates that bottom materials consist almost entirely of soft substrates, including a relatively even distribution of fine sand, silt, and clay (Navy 2006).

Surface water features on the ATR Inner Range include the various tidal creeks that extend through Bloodsworth, Pone, Adam, and Northeast islands. A semi-enclosed open-water area identified as Swan Pond is located in the western end of Bloodsworth Island. Freshwater on the ATR Inner Range is either nonexistent or scarce and limited to small, temporary pockets that form after storm events.

Water quality issues affecting Chesapeake Bay include excessive nutrient loading, which causes algal blooms, hypoxia, and loss of sea grasses; chemical contamination; air pollution; depleted shellfish and fish stocks; and outbreaks of the toxin-producing organism *Pfiesteria*. Various government-commissioned studies have been completed during the last two decades to identify and address these issues. The majority of these studies have focused on nutrients and sediment contamination (CBP 2012).

Patuxent River

NAS Patuxent River is bordered on the north by the Patuxent River, which drains a watershed of about 930 sq mi (2,418 sq km) 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.

The main pollutants that impair water quality in the Patuxent River are nitrogen, phosphorous and sediment. Nitrogen and phosphorous feed algae blooms in the river, which block sunlight from entering the water and impair survival of plants and animals that live on the river floor. When the algae die the decomposition process consumes all the available oxygen in the water, creating dead zones where living things cannot grow. These oxygen-deprived "dead zones" have been growing in size and duration. Sediment also impairs river life by smothering grasses and oyster beds (Bevan-Dangel and Tutman 2007).

In 2005, 34 percent of the nitrogen in the Patuxent River came from urban runoff, 22 percent came from agriculture, 16 percent came from point sources such as wastewater treatment plants, 12 percent came from septic systems, and one percent came from direct atmospheric deposition to the water. The sources of phosphorous were roughly the same, with slightly more coming from point sources such as wastewater treatment plants instead of septic systems. Just over half the sediment in the river comes from agriculture with another fourth arising from urban runoff (MDNR 2007).

Generally speaking, pollution loads have gone down over the last thirty years. However, recent water quality monitoring trends show pollution to be slowly increasing and water clarity to be steadily decreasing over the last decade. Habitat is degrading as well, particularly in the middle section of the river. Algae blooms, including toxic algae blooms, have been increasing in the lower regions of the river. Grasses in the lower part of the river are only at 10 percent of their restoration goal (MDNR2007).

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 two to 28 ac (0.8 to 11.2 ha), 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 EO 11988, Floodplain Management (Navy 1998b).

There are three permitted outfalls, 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 monitored for pH, total suspended solids, total petroleum hydrocarbons, and temperature (as appropriate) (Navy 1998b).

3.6.2 Environmental Consequences

3.6.2.1 Approach to Analysis

The 1998 FEIS thoroughly analyzed water quality and sediment impacts to the ATR Inner Range that would result from implementation of the action proposed in the FEIS (Navy 1998b). The analysis provided in this section compares the Baseline Alternative and Proposed Action to the actions proposed in the 1998 FEIS.

3.6.2.2 Alternative 1 – The No-Action Alternative (Baseline Alternative)

Impacts

Marine Sediments and Water Quality

The activities of the Baseline Alternative are consistent with the Preferred Alternative of the 1998 FEIS. The primary source of impact to marine sediments and water quality would be stores dropped or jettisoned from UAS in close vicinity of the targets described in Section 3.5.1.3. 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, and mines. Other stores would remain in Bay sediments (Navy 1998b).

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. 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. Most of these missiles would be shapes without warheads and solid fuel rocket 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 ATR Inner Range 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 (Navy 1998b).

Surface Water

Under the Baseline Alternative, there would be no planned military construction or other disturbances to the ground surface. 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 Annex, 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 ATR Inner Range.

Groundwater

Since the Baseline Alternative would involve only RDAT&E activities with no ground impact operations, there would be no effect on groundwater resources. Based on recent water quality studies, no accumulation of metals or chemicals exist on the ATR Inner Range that can be attributed to its use for range operations, and no metals are present in the water column or in sediments that would pose an unacceptable risk to human health or the environment (NAVAIR 2007). In addition, no wells would be installed on the Inner Range as part of the Baseline Alternative, and no activities would intersect the aquifer system. Consequently, the Baseline Alternative RDAT&E activities would have no effect on groundwater resources.

Mitigation Measures

Implementation of the Baseline Alternative would not result in significant impacts to marine sediments and water quality; therefore, no mitigation measures are proposed or required.

3.6.2.3 Alternative 2 – The Preferred Alternative (Proposed Action)

Impacts

Marine Sediments and Water Quality

There would be a higher risk of UAS crashes or hard landings associated with the proposed increase in UAS flight operations tempo, as compared to the Baseline Alternative. Group 1 or 2 UAS would be more likely to experience an accident than larger UAS. Group 3, 4, and 5 UAS must meet more stringent airworthiness standards and loss of these larger systems would yield great loss of financial and technical resources. As such, redundant systems are installed in Group 3, 4, and 5 UAS to ensure a higher level of reliability and lower probability of accidents occurring.

Many times the UAS that strike the water surface are reusable and are recovered unless they break into multiple pieces and sink. In this case, hazardous liquids within the UAS (such as hydraulic fluids) may be released. Should an UAS be irrecoverable, the large volume of water and constant estuarine flows in the Bay would dilute any remaining hazardous liquids to well below a level of significance. Most of the solid material would be dense and would settle to the bottom, where it would be covered with sediment, coated by chemical processes (e.g., corrosion), or encrusted by organisms (e.g., barnacles). The large volume of

water in the Bay, combined with the constant circulation, would quickly dilute any leached hazardous substances.

Surface Water

Under the Proposed Action, there would be no planned military construction or other disturbances to the ground surface. Continued adherence to existing plans and instructions would minimize any impact to surface water resources.

Groundwater

Since the Proposed Action would involve only RDAT&E activities with no ground impact operations, there would be no effect on groundwater resources. In addition, no wells would be installed on the Inner Range as part of the Proposed Action, and no activities would intersect the aquifer system. Consequently, the Proposed Action RDAT&E activities would have no effect on groundwater resources.

Mitigation Measures

Implementation of the Proposed Action would not result in significant impacts to marine sediments and water quality; therefore, no mitigation measures are proposed or required.

3.7 PUBLIC HEALTH AND SAFETY

3.7.1 Affected Environment

3.7.1.1 Definition of Resource

Safety is defined as the protection of workers and the public from hazards. The total accident spectrum encompasses not only injury to personnel, but also damage or destruction of property or products. For worker safety, the boundary of the immediate work area defines the region of influence. For public health and safety, the region of influence varies depending on the nature of the operation; this area may extend for miles beyond the source of the hazard.

The primary safety issues associated with the Proposed Action include those inherent to flight operations, weapons testing, and operation of Navy vessels. The safety policy of NAWCAD is to take every reasonable precaution in the planning and execution of all operations that occur at NAS Patuxent River, Webster Field Annex, BIR, and on the ATR Inner Range to prevent injury to people and damage to property. This involves implementing extensive measures for risk mitigation as well as increased range control in the areas determined to have the highest risk to public health and safety.

3.7.1.2 Regulatory Setting

The Occupational Safety and Health Administration is responsible for protecting worker health and safety in non-military workplaces. Relevant regulations are found at 20 CFR 1910. Protection of public health and safety is a responsibility of the USEPA as mandated through a variety of laws, including the Resource Conservation and Recovery Act (42 U.S.C. §§ 6901 et seq.); the Comprehensive Environmental Response, Compensation, and Liability Act (42 U.S.C. §§ 9601 et seq., Sections 101[14] and 101[33]) and the Superfund Amendments and Reauthorization Act of 1986, (Public Law 99-499); the CWA; and the CAA. Additional safety responsibilities are mandated by the Department of Transportation, whose regulations can be found at 49 CFR.

The sections below provide an overview of existing safety and occupational health policies and procedures in place at the Inner Range, with specific directives and standards that apply to the testing and training activities associated with the Proposed Action. Key among these directives are OPNAVINST 5100.23G, *The Navy Safety and Occupational Health Program Manual* (30 Dec 2005), and DoD Directive 3200.11, *Use, Management, and Operation of Department of Defense Major Range and Test Facilities*.

3.7.1.3 Existing Conditions

Safety during all testing and training operations is a top priority. The Atlantic Test Ranges prepares and periodically updates a *Range Safety Manual* (NAWCAD Instruction 3710.1) that governs operations conducted within the ATR Inner Range. Unique safety and security measures for flight operations are addressed in the *Range Safety Manual*. Range hazard patterns, the area that must be cleared to provide safety to the public and Navy test participants are developed by the Range Safety Office. Additionally, safety oversight is applied through a wide range of other policies and procedures issued by the NAS Patuxent River Air Operations Department, NAVAIR, NAWCAD, Naval Test Wing Atlantic, and others.

Because unexploded ordnance (UXO) is known to be present on the BIR, the primary focus of the safety program is to prevent unauthorized access onto the Inner Range islands and target areas. All UXO, whether intact or fragmented, present a potential safety hazard. No Trespassing signs are clearly located around the perimeter of the BIR to discourage unauthorized use of the area. As mentioned previously, the surface of each of the islands comprising the BIR are not to be entered at any time unless authorized. Furthermore, all personnel walking on the surface of BIR islands must be accompanied by a qualified explosive ordnance disposal (EOD) monitor. This restriction is complemented by the No Navigation Zone that has been established within 75 yd (68.6 m) of Bloodsworth Island, Pone Island, Northeast Island, or any NAS Patuxent River property. No fishing, crabbing, or hunting is allowed within the No Navigation Zone unless authorization is obtained (i.e., appropriate fishing or hunting license).

NAS Patuxent River currently conducts aircraft operations (including departures and arrivals) that effectively and safely deal with aircraft traveling through the various elements of the airspace without incident. This level of safety is achieved through direct and constant coordination with ATC personnel and adherence to FAA rules and directives. The area from the surface to 18,000 ft (5,490 m) MSL is the region of most concern to the FAA regarding operational issues with civil and commercial aviation

BASH also constitutes a safety concern because of the potential for damage to aircraft, or injury to aircrews or local populations if an aircraft crash should occur in a populated area. Aircraft occasionally encounter birds at altitudes of 30,000 ft (9,144 m) AGL/MSL or higher. However, most birds fly close to the ground with over 97 percent of reported bird-strikes occurring below 3,000 ft (914 m) AGL. Approximately 30 percent of bird-strikes happen in the airport environment, and almost 55 percent occur during low-altitude flights.

3.7.2 Environmental Consequences

3.7.2.1 Approach to Analysis

This section evaluates potential human health and safety effects associated with the Baseline Alternative and the Proposed Action. The primary sources of public health and safety impacts from the two alternatives would be aircraft flight operations and the use of kinetic weapons.

3.7.2.2 Alternative 1 – The No-Action Alternative (Baseline Alternative)

Impacts

Aircraft Operations

The greatest potential risk to public health and safety arise from the operation of Groups 4 and 5 UAS. These UASs would operate in the National Airspace System under Instrument Flight Rules and would comply with all applicable procedures, clearances and instructions prescribed by NAS Patuxent River ATC, the NAVAIR Flight Clearance Office, and the FAA Certificate of Authorization (COA).

Several types of instrumentation are in place at ground locations within the Inner Range, air station and annex to measure test aircraft and weapons 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 ATR Inner Range 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 ATR Inner Range restricted airspace is heavily used by all NAWCAD test operations.

NAS Patuxent River Air Operations is responsible for monitoring and controlling the ATR Inner Range airspace while it is activated. Flight controllers at Air Operations use air search radars to de-conflict the air traffic within the Inner Range, including the airfields and the restricted airspace. For safety purposes, only ten "flights" of aircraft are permitted to operate within the Inner Range at any one time (known as the "ten aircraft rule"). A "flight" of aircraft may consist of one or more aircraft in a tight formation, usually a test aircraft and chase plane combination. Rarely does a flight consist of more than two aircraft. This rule was implemented to provide a safe flying environment in the Inner Range and minimize the potential for mishaps (Navy 1998b).

The proposed UAS flight activity would be consistent with the management and safety requirements currently in place at NAS Patuxent River and the Webster Field Annex. To decrease the risk to public health and safety, the following safety operations would be implemented:

- Groups 4 and 5 UAS would be operated within the glide range of emergency divert airfields, whenever possible;
- Group 4 and 5 UAS would not be operated over highly populated areas;
- Contact with ATC would be maintained to support traffic de-confliction and area containment within the restricted areas;
- Weather monitoring would be conducted to identify high turbulence areas and other meteorological activity that may precipitate modification of planned operations;
- Groups 4 and 5 UAS would be operated with at least two operational command/communication links:

  - UAS would automatically transmit a FAA-required code if communication links are lost;
  - Mission plans would be developed to safely and predictably provide for UAS operation even if communication links are lost;
- All UAS would be operated within their prescribed altitude limits;
- Flight termination systems (e.g., parachute release, engine kill system) would be used if control of UAS could not be maintained.

To reduce the risk of UAS collisions with birds, all flights would be conducted in accordance with the NAS Patuxent River BASH Plan (NAVFAC 2002).

Through the implementation of the measures provided above, the Baseline Alternative flight activities would not yield significant impacts to public health and safety.

Kinetic Weapons

Kinetic weapons to be used in the unmanned systems RDAT&E activities would include missiles and rockets fired from UAS platforms as well as other weapons/stores used in separation tests. All missiles/ rockets fired or weapons stores used in separation tests would involve inert munitions.

The storage and handling of munitions would be conducted in accordance with NAVSEA OP 5, *Ammunition and Explosives Safety Ashore*, as well as NAWCAD and NAVFAC procedures. Safety interlocks, administrative controls, and hazard safety zones would be incorporated with all weapons delivery activities, minimizing the potential for release of munitions. Hearing protection would be required for all personnel in areas where the noise level would be above 85 dBA.

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, the U.S. 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, ATR Inner Range 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 (Navy 1998b).

Weapons/stores separation tests are designed to meet two safety-related objectives. First, the flight profile is designed to be accommodated within restricted airspace. Second, the combination of flight profile and separation event is designed such that the required surface impact hazard area would 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 Inner Range are conducted with inert stores. Training involving weapons/stores separations is performed to provide personnel experience in the flight characteristics and conditions associated with such operations.

Through implementation of existing safety protocols, clearance procedures, and hazards communications there would be no significant impacts to public health and safety due to the use of kinetic weapons. Occupational safety and health impacts would also be insignificant, given the adherence to stringent procedures and the implementation of administrative and engineered controls.

Mitigation Measures

Implementation of the Baseline Alternative would result in no significant public health and safety impacts. Therefore, no mitigation measures are proposed or required.

3.7.2.3 Alternative 2 – The Preferred Alternative (Proposed Action)

Impacts

Aircraft Operations

The proposed UAS flight activity would be consistent with the management and safety requirements currently in place at NAS Patuxent River, Webster Field Annex, BIR, and on the Inner Range. Although the Proposed Action would involve an increase in aircraft operations, implementation of safety measures provided in Section 3.7.2.2 would decrease risk to public health and safety.

Implementation of the Proposed Action would require occasional UAS landings on Bloodsworth Island. The UAS would be recovered by personnel on foot (no motorized vehicles), accompanied by an EOD monitor to ensure that no UXO is disturbed by the recovery team.

To reduce the risk of UAS collisions with birds, all flights would be conducted in accordance with the NAS Patuxent River BASH Plan (NAVFAC 2002).

Through the implementation of the measures provided in Section 3.7.2.2, the Proposed Action flight activities would not yield significant impacts to public health and safety.

Kinetic Weapons

Kinetic weapons to be used in the unmanned systems RDAT&E activities would include missiles and rockets fired from UAS platforms as well as other weapons/stores used in separation tests. All missiles/ rockets fired or weapons stores used in separation tests would involve inert munitions.

The storage and handling of munitions would be conducted in accordance with NAVSEA OP 5, *Ammunition and Explosives Safety Ashore*, as well as NAWCAD and NAVFAC procedures. Safety interlocks, administrative controls, and hazard safety zones would be incorporated with all weapons delivery activities, minimizing the potential for release of munitions. Hearing protection would be required for all personnel in areas where the noise level would be above 85 dBA.

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, the U.S. 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, ATR Inner Range 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 (Navy 1998b).

Through implementation of existing safety protocols, clearance procedures, and hazards communications there would be no significant impacts to public health and safety due to the use of kinetic weapons. Occupational safety and health impacts would also be insignificant, given the adherence to stringent procedures and the implementation of administrative and engineered controls.

Mitigation Measures

Implementation of the Proposed Action would result in no significant public health and safety impacts. Therefore, no mitigation measures are proposed or required.

CHAPTER 4 CUMULATIVE IMPACTS

4.1 DEFINITION OF CUMULATIVE IMPACTS

The CEQ regulations (40 CFR 1500-1508) implementing the procedural provisions of the NEPA of 1969, as amended (42 U.S.C. 4321), define cumulative impacts as "the impact on the environment which results 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. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7)."

4.2 CUMULATIVE IMPACTS OF THE PROPOSED ACTION

This EA analyzes the potential for cumulative impacts to resources from the Proposed Action in concert with other Navy and non-Navy sponsored activities within the ATR Inner Range. Resources assessed for cumulative impacts are those that were assessed for direct or indirect impacts in this EA; specifically, air quality, noise, biological resources, cultural resources, air/land/water use, marine sediments and water quality, and public health and safety.

Addressing cumulative impacts requires knowledge of the historical, current (on-going), and known future actions of Navy and non-Navy activities within the Inner Range that have the potential to impact the same resources potentially affected by the Proposed Action. The major Navy activity occurring within the Inner Range is aviation aircraft testing, which has the potential for operational overlap and/or interaction with the Proposed Action, and similar affects to the same resources. Table 4-1 provides a list of major Navy and Marine Corps aircraft test programs that are currently conducting, and are projected to continue conducting, flight tests within the Inner Range for the foreseeable future. Aircraft test programs involve years of flight testing to ensure that the aircraft would perform as designed before being issued to U.S. Navy Fleet squadrons to use in deployments. After the aircraft program has completed all of its major flight testing milestones and the aircraft is delivered to the Fleet, there is typically a Follow-On Test & Evaluation (FOT&E) period to evaluate upgrades to software and hardware and new weapons that enhance the aircrafts' capabilities.

Table 4-1 On-Going Major Aircraft Testing Programs at the ATR Inner Range

Aircraft Platform	Aircraft Type	Aircraft Testing Period	FOT&E of Upgraded and New Onboard Systems
EA-18G	Fixed wing jet	2006 – 2009	2010 – 2013
F-35 (JSF)	Fixed wing jet	2000 – 2014	2014 – 2022
E-2D	Fixed wing prop	2007 – 2015	2016 – 2020
MH-60R	Rotary wing (helo)	1997 – 2005	2006 – 2020
P-8A	Fixed wing jet	2003 – 2014	2014 –>
MQ-8 Fire Scout	Rotary wing UAS	2005 – 2010	2011 – 2020
V-22	Tilt rotor prop	1997 – 2005	2005 – 2015
H-1 Upgrades	Rotary wing (helo)	2004 – 2009	2010 – 2020
MH-60S	Rotary wing (helo)	1995 – 2002	2003 – 2020
F/A-18E/F	Fixed wing jet	1996 – 2000	2001 – 2013
P-3/EP-3	Fixed wing prop	1961 – 2008	2008 – 2013
MQ-4C BAMS/Triton	Fixed wing UAS		
UCAS/UCLASS	Fixed wing UAS		

Selected, past, current, and known future non-Navy activities that could potentially impact sensitive resource areas are listed in Table 4-2.

With regard to the expansion of unmanned systems operations on the ATR Inner Range, the assessment of the effects of proposed actions on resources of the Chesapeake Bay is reflected in Chapter 3, Affected Environment and Environmental Consequences, which serves as a description of the baseline or current environmental condition of the ATR Inner Range.

Table 4-2 Non-Navy Activities on the Middle Chesapeake Bay

Activity	Brief Description of Activity	Timeframe	Resources Potentially Impacted
Commercial Shipping	Baltimore, MD is a large, international shipping port located at the northern end of the Bay. Large cargo ships transit the Bay, passing through the Study Area, daily.	Past, Current, Future	Marine mammals, recreational activities, Navy activities, air emissions
Recreational Boating	The Bay is a popular location for boating. A wide variety of personal watercraft are used most of the year, including within the Study Area.	Past, Current, Future	Marine mammals, commercial shipping, Navy activities, airborne noise, air emissions
General Aviation	There are 35 public or private general aviation airports located within 30 nm of NAS Patuxent River supporting a significant number of small aircraft operations in the region (GlobalAir.com 2013).	Past, Current, Future	Airborne noise, air emissions
Maryland Broadband Cooperative (MdBC) Project	MdBC proposed to extend a broadband fiber optic communications cable across Chesapeake Bay.	Future	Marine mammals, commercial shipping, recreational activities, Navy activities
Liquid Natural Gas (LNG) Plant Expansion	The LNG plant located just north of Cove Point is expanding to add capacity. The expansion would result in additional commercial LNG tankers traversing the Study Area.	Future	Marine mammals, Navy activities, GHG emissions, recreational activities
Commercial/ Recreational Fishing	Both commercial and recreational fishing are popular activities conducted throughout the year from shore and boats.	Past, Current, Future	Marine mammals, air emissions, airborne noise, commercial shipping, Navy activities
Research	Universities; state and federal agencies conduct research on the Bay, involving sampling/surveys of water, bottom substrates, and estuarine species. Visual surveys from aircraft have been conducted.	Past, Current, Future	Air emissions, airborne noise, marine mammals

4.2.1 Air Quality

The potential impact to air quality from Navy aircraft testing in the ATR Inner Range is assessed based upon the total number of flight hours across all test programs annually (Navy 1998b). As new Navy aircraft programs conduct all or part of their flight testing within the Inner Range, the number of annual flight hours can fluctuate from year-to-year, depending upon the different requirements of each flight test phase. In general, a new aircraft program would gradually increase toward peak activity while other more

mature programs' testing would gradually decrease to a minimum level once it has been demonstrated that the aircraft is functioning as designed (Navy 1998b).

Based on analysis of past and on-going levels of testing at the Inner Range, current and future Navy actions are not expected to exceed the level of activity analyzed in the Preferred Alternative (i.e., Alternative Three) that was adopted in the 1999 FEIS ROD. Flight hours at the Inner Range reached an anticipated peak of 20,391 in 2011 and are expected to gradually decrease over subsequent years (NAVAIR 2012). Implementation of the Proposed Action would require approximately 3,458 flight hours per year, which equates to fourteen percent of total annual flight hours (based on the 1998 FEIS maximum of 24,400) occurring within the Inner Range.

The primary criterion for determining whether an action has significant air quality cumulative impacts is whether the project is consistent with an approved SIP for the air basin to achieve and maintain air quality consistent with NAAQS. The 1998 FEIS analysis conducted on the potential for cumulative air quality impacts from Navy operations included assessment of actions that had already occurred, were currently occurring, and were projected-to occur at the Inner Range (Navy 1998b).

Non-Navy activities which may affect air quality in the Chesapeake Bay region include commercial shipping, general aviation, recreational boating (including recreational fishing from a boat), commercial fishing (from a boat), and research on the Bay. There is no indication that the frequency or intensity of these activities would increase significantly or dramatically from current levels.

The estimated emissions associated with the Proposed Action would be below *de minimis* threshold levels for conformity for the MWNAA. Therefore, the Proposed Action would conform to the State of Maryland SIPs for the 8-hour O_3 NAAQS and the $PM_{2.5}$ NAAQS (MDE 2012, MWAQC 2008) and would not trigger a conformity determination under Section 176(c) of the CAA. Implementation of the Proposed Action would lead to emissions of approximately 784.4 metric tons (864.7 tons) of CO_{2e}. The CO_{2e} emissions associated with the Proposed Action would amount to approximately 1.06×10^{-7} of the total CO_{2e} emissions generated by the U.S (6,821.8 million metric tons) (USEPA 2012c). Emissions under the Proposed Action are also below the 25,000 metric tons of CO_{2e} level proposed in the draft NEPA guidance provided by the CEQ.

These negligible impacts, when added to the impacts from the other aircraft testing programs, would account for a very small percentage increase of overall air emissions budgets for the MWNAA and would not have a significant cumulative impact on air quality.

4.2.2 Noise

The Proposed Action would have only short-term, localized noise effects. Moreover, these short-term impacts, when added to the impacts from the other listed aircraft testing programs, would account for a relatively small change to the overall noise environment. Noise from current testing and training activities, along with other pending Navy actions; have been largely accounted for in RDAT&E activities that were analyzed in the 1998 FEIS. As a result, the Proposed Action would not have a significant cumulative impact on noise.

4.2.3 Biological Resources

This section considers the cumulative impacts to biological resources from the Proposed Action in concert with other Navy and non-Navy activities conducted in the ATR Inner Range. Four components of unmanned systems operations have the potential to affect biological resources:

- Visual stimuli and noise from UAS and UMS operations;
- Acoustic sources associated with UMS operations;
- Contaminants entering the marine habitats of the Inner Range; and
- Direct strike between vehicles/ordnance and animals.

As described in Section 3.3.2, operational constraints such as maintaining minimum distances from sensitive habitats and populations and seasonal restriction of operations would reduce the visual and noise impacts on ATR Inner Range biological resources.

Other man-made sources of underwater sound occurring in the Inner Range include vessel traffic, industrial operations (e.g., pile driving, dredging), and non-Navy sonar transmission (e.g., fathometers) used by the public. The proposed acoustic sources associated with the Proposed Action are of low source level, narrow bandwidth, downward-directed transmission, short pulse lengths, frequencies above known hearing ranges of marine mammals and sea turtles, or some combination of these factors. As described in Section 3.3.2.3, the Proposed Action use of underwater acoustic sources would lead to short-term behavioral responses in fish, marine mammals, and birds. No long-term effects on Inner Range populations.

The Proposed Action would lead to introduction of some materials into the waters of the ATR Inner Range, in the form of expended stores, non-explosive munitions, or UAS parts. Small quantities of unrecovered debris may float or sink through the water column, but this is unlikely to have any effect on fish, marine mammals, birds, and sensitive habitats (e.g., SAV).

The potential for a direct strike to occur from delivery of air-to-ground non-explosive ordnance is similarly low given the species' distribution in the vicinity of the ATR Inner Range. In addition, the velocity of the dropped ordnance decreases considerably on entry into the water, and most mobile species (e.g., birds and fish) are able to move quickly enough to avoid being crushed or buried.

When combined with existing Navy and non-Navy Inner Range operations, the Proposed Action activities would not exceed operational thresholds analyzed in the 1998 FEIS and would not lead to significant cumulative impacts on biological resources.

4.2.4 Cultural Resources

Implementation of the Proposed Action would not adversely impact cultural resources and would not result in disturbance of known archaeological sites. There would be no new ground disturbing activities associated with any unmanned systems operations analyzed in this EA. Therefore, the Proposed Action, in conjunction with other past, present, and foreseeable activities, would not result in cumulative impacts to cultural resources.

4.2.5 Airspace, Land, and Water Use

Implementation of the Proposed Action would not result in significant airspace, land, or water use impacts. Existing land use designations would not change as a result of the Proposed Action, and the existing land uses within the ATR Inner Range would continue to be used for the same purposes. The Proposed Action would not impose new restrictions on the public's right of access to the Bay in the Coastal Zone. Access to the near shore areas around NAS Patuxent River, Webster Field Annex, the BIR, and target areas is restricted for reasons of public health and safety or military security. Therefore, implementation of the Proposed Action, in conjunction with other past, present, and foreseeable actions would not result in cumulative impacts to land or water use.

4.2.6 Marine Sediments and Water Quality

The Proposed Action would have only short-term, localized effects, if any, on sediment and water quality. As described in the 1998 FEIS, previous, ongoing, and proposed future actions in support of training and RDAT&E are not expected to measurably affect sediment quality, nor to result in violations of water quality standards and criteria because pollutants are released in relatively small quantities and are widely dispersed in the environment. Due to the limited scope of potential sediment and water quality impacts associated with the Proposed Action, the RDAT&E and training activities would have only minor, temporary effects, if any, and would not measurably add to quantities of pollutants in the marine environment. Hence there would be no cumulative impact on marine sediments and water quality.

4.2.7 Public Health and Safety

Scheduling procedures associated with test and training events would be in accordance with existing ATR Inner Range coordination procedures to ensure the safety of participants as well as non-participants. These procedures ensure that unmanned systems operations would only occur in appropriate areas and with compatible activities. As a result, implementation of the Proposed Action would not have a cumulative effect on public health and safety.

CHAPTER 5 OTHER CONSIDERATIONS REQUIRED BY NEPA

This chapter addresses additional topics required by NEPA. These include identifying and analyzing irreversible and irretrievable commitments of resources and possible conflicts with federal, regional, state and local plans, policies, and controls. Issues related to EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-income Populations,* and EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks,* are also presented.

5.1 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Resources that are irreversibly or irretrievably committed to a project are those that are used on a long term or permanent basis. This includes the use of non-renewable resources such as metal, fuel, and other natural or cultural resources. These resources are non-retrievable in that they would be used for this project when they could have been used for other purposes. Human labor is also considered a non-retrievable resource. Another topic that falls under this category is the unavoidable destruction of natural resources that could limit the range of potential uses of that particular environment.

Under the Proposed Action, unmanned systems operations would be conducted at NAS Patuxent River, Webster Field Annex, and on the ATR Inner Range. The unmanned systems operations would not result in a significant irreversible or irretrievable commitment of resources. Fuel for the necessary operation of vehicles and equipment would be a commitment of resources; however, this use of fuel would have a negligible impact on fossil fuel resources and human labor associated with Navy operations and training. Expended stores would fall into the Bay in the Inner Range, and some would not be retrieved. This would constitute a commitment of resources but would have a negligible impact as these components are constructed elsewhere and are readily available.

5.2 ENVIRONMENTAL JUSTICE AND PROTECTION OF CHILDREN

Unmanned systems operations would occur at NAS Patuxent River, Webster Field Annex, BIR, and on the ATR Inner Range. The Inner Range is a military installation controlled by the Navy. Human inhabitants of NAS Patuxent River are DoD personnel and/or contractors for the purpose of managing and maintaining Navy land and facilities. Military personnel live on station at NAS Patuxent River. Low-income populations, minorities, and children would not be affected by implementation of the Proposed Action. Therefore, EO 12898 and 13045 are satisfied.

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This EA was prepared for the United States Department of the Navy, NAWCAD/NAS Patuxent River, Maryland, by Epsilon Systems Solutions, Inc. and Resource Management Concepts, Inc. A list of the participants in the preparation of the EA is presented below.

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* Employed by Resource Management Concepts, Inc.

Appendix A

Operational Information

This appendix provides operational information used to develop the alternatives analyzed in this EA.

A.1 DESCRIPTION OF UNMANNED SYSTEMS

Tables A1 and A2 and A4 through A6 provide example platforms for each category of UAS, UGS, and UMS. Table A-3 describes UGS modes of operation. These tables include parameters used in the analysis of environmental impacts associated with their use.

Table A-1 Example UAS

UAS Group	UAS	Gross Weight (lb)	Launch Type	Engine/ Fuel Type
1	**WASP Class**	1	Hand	Battery
	TACMAV	0.8	Hand	Battery
	Dragoneye/ Swift (RQ-14A/B)	5.5	Hand or slingshot	Battery
	Raven (RQ-11B/C)	5	Hand	Battery
	FPASS	8	Slingshot	Battery
	T-Hawk (RQ-16A)	19.7	Vertical take-off and Landing (VTOL)	Gasoline
	Pointer	11	Hand or vehicle mount	Battery
	Aqua/Terra Puma	10	Hand	Battery
	Draganflyer X6	3.3	Hand	Battery
2	**ScanEagle**	40	Catapult	JP-5
	Silver Fox	20	Catapult or runway	Gasoline/JP-5
	Aerosonde	33	Catapult	Gasoline
3	**Aero Class**	88	Catapult	Gasoline
	Shadow (RQ-7B)	375	Catapult or runway	Gasoline
	Neptune (RQ-15A)	130	Catapult (can be shipboard)	Gasoline
	XPV-1	130	Runway	Gasoline
	XPV-2	130	Runway	Gasoline or hydrogen fuel cell
	Integrator (STUAS)	130	Catapult	JP-5 & JP-8
4	**Hunter (MQ-5B)**	1,620	Runway	Gasoline
	Fire Scout (MQ-8B/C)	3,150	VTOL	JP-5/JP-8
	Grey Eagle (MQ-1A/B/C)	3,200	Runway	Diesel, AV Gas
	Hummingbird (A-160)	6,500	VTOL	Gasoline
5	**Reaper (MQ-9A)**	10,500	Runway	JP-5/JP-8
	Global Observer	9,100	Runway	Liquid hydrogen
	N-UCAS (X-47)	46,000	Runway	JP-5/JP-8
	BAMS/Triton (MQ-4 C)	32,250	Runway	JP-5/JP-8
	UCLASS	TBD	TBD	TBD

Table A-2 Example LTA UAS

LTA UAS	Length (ft)/ Volume (ft^3)	Engine/Fuel Type	Endurance (day)/ Max. Altitude (ft)
Advanced Airship Flying Laboratory (AAFL)	200/ 275,000	JP-5/JP-8	2/ 20,000
Tethered Aerostat Radar System (TARS)	208/ 420,000	Tethered	30/ 15,000
Joint Land Attack Elevated Netted Sensor (JLENS)	233/ 590,000	Tethered	30/ 15,000
Rapid Aerostat Initial Deployment (RAID)	49/ 10,200	Tethered	5/ 1,000
Rapidly Elevated Aerostat Platform (REAP)	31/ 2,600	Tethered	10/ 300
Persistent Threat Detection System (PTDS)	114/ 64,000	Tethered	30/ 5,000
Long Endurance Multi-sensor Vehicle (LEMV)	250/ 1,341,957	JP-5/JP-8	21/ 20,000

Table A-3 UGS Modes of Operation

Mode of Operation	Description
Tethered	A mode of control wherein the human operator controls the UGS through a direct, wired connection. An example of such connection would be a fiber optic cable. Typically LOS must be maintained under tethered operation; however, under certain circumstances, a LOS is not necessary (i.e., operation in tunnel, around corners, etc).
Remote Controlled	A mode of control wherein the human operator must dedicate 100 percent of their attention to system operation without benefit of sensory feedback from the vehicle. A LOS must be maintained with the vehicle under remote control operation.
Teleoperated	A mode of control wherein the human operator has control of the UGS through cues provided by video, audio and digital feedback. The human operator controls the UGS through a wireless connection transmitted over radio frequencies. The human operator must dedicate 100 percent of their time to operating the UGS. A LOS does not necessarily need to be maintained under teleoperation.
Autonomous	A mode of control wherein the UGS is self-sufficient. The human operator can program a mission for the UGS, but the UGS would execute the mission without any human interaction. There are varying levels of autonomy in regards to the level of human interaction with the UGS.
Semi-autonomous	A UGS that has multiple modes of control occurring simultaneously to include at least one autonomously controlled function. The level of semi-autonomy can vary greatly between UGS systems.

Table A-4 Example UGS

UGS	Vehicle Weight (lb)	Wheeled or Tracked	Payload Capacity (lb)
BomBot, MK 4 MOD 0 EOD Robot	29	Wheeled	15
Dragon Runner	17	Wheeled	N/A
Multifunction, Agile, Remote-Controlled Robot (MARCbot)	25	Wheeled	N/A
Unmanned Ground Reconnaissance	120	Tracked	35
Remote Ordnance Neutralization System (RONS)	700	Wheeled	60

Table A-5 Example USV

Vehicle Class	USV	Craft Type
Harbor Class	**Protector – Harbor Class USV**	7- and 9-meter RIB
	Zodiac	7-meter RIB
Snorkeler Class	**Remote Multi-Mission Vehicle (RMMV)**	Semi-submersible
Fleet Class	**SPARTAN**	7- and 11-meter RIB
	Unmanned Sea Service Vehicle	11-meter hydrofoil and rigid hull craft
	Mine Warfare USV	11-meter rigid hull craft
	Odyssey USV	11-meter rigid hull craft
	Multi-Mission Surface Unmanned Vehicles (MMUSV)	11-meter RIB
	Mobile Ship Target (MST)	266-foot ship
	High Speed Maneuvering Surface Target (HSMST)	11-meter RIB
	Fast Attack Craft Target (FACT)	50-foot craft
X-Class	**Sea Doo**	4-meter converted sports craft
	Hydrographic Unmanned Surface Craft (HUSCy) Scout	10-foot twin hull craft

Table A-6 Example UUV

Vehicle Class	UUV	Missions Supported
Man-Portable and Light Weight Systems	**SMCM UUV Increment 1**	MCM
Man-Portable	**Bottom UUV Localization System (BULS)**	MCM
	iRobot 1KA Seaglider	Oceanography
	iRobot 15A Ranger	MCM, ISR
	iRobot Transphibian	MCM, ISR
Light Weight	**SMCM UUV Increment 2**	MCM
Heavy Weight	**Battlespace Preparation Autonomous Undersea Vehicle (BPAUV)**	MCM
	SMCM UUV Increment 3	MCM
	Long-Term Mine Reconnaissance System	ASW
	Mission Reconfigurable UUV System (MRRUVS)	ISR, MCM

A.2 PAYLOADS AND SENSORS

Expendable Payloads

Expendable payloads include conventional ordnance, gun ammunition, countermeasures, and other items. Representative types of expendable payloads are listed in Table A-7.

Table A-7 Representative Types of Expendable Payloads

Types of Expendable Payloads
Inert Conventional Ordnance
Bombs (Cluster, Guided, General Purpose, Practice)
Mines
Missiles
Rockets
Torpedoes
Gun Ammunition
Large Caliber (20mm, 25mm, 30mm, 40mm)
Small Caliber (5.56mm, 7.62mm, 0.50cal)
Countermeasures
Chaff
Decoy Devices
Illumination and Decoy Flares
Jamming Devices
Other Items
Fuel Tanks
Launchers/Dispensers
Marine Markers
Miscellaneous Shapes that Simulate High Cost Expendables
Signal Cartridges/Spotting Charges
Sonobuoys

Sensors and Electromagnetic Systems

Table A-8 lists the representative types of sensors that are typically deployed on unmanned systems.

Table A-8 Representative Types of Sensors

Types of Sensors
Electronic Jammers
Electro-optical (EO) imagery
Infrared (IR)
Inverse Synthetic Aperture Radar (ISAR)
Laser radar (LADAR)
Laser range finder/designator (LRF/D)
Light detection and ranging (LIDAR)
Measurement and signatures intelligence
Meteorological / Maritime sensors
Moving target detector
Signal intelligence (SIGINT)
Simulant and threat detectors
Synthetic aperture radar (SAR)
Topographical mapping

Table A-9 provides details on the classes of lasers that may be used during unmanned systems operations in the ATR.

Table A-9 Classes of Lasers

Laser Class	Class Description	Energy Emitted	Safety Issues	Examples
Class 1*	Low powered devices considered safe from all potential hazards	N/A	No injury, regardless of exposure time, to eyes or skin. No safety measures necessary.	Laser printers, toys, compact disc players, compact disc read-only memory devices, laboratory analytical equipment
Class 2*	Low power, visible light lasers that could possibly cause damage to a person's eyes	< 1 milliwatt (mW)	Usually safe. Eye protection normally afforded by the aversion response (turning away from a bright light source or closing or blinking eyes). If directly viewed for long periods of time with no blinking, damage to eyes could result.	Pointers used in presentations, toys, range finding equipment, aiming devices
Class 3**	Medium Power	< 500 mW	May be hazardous to eyes under direct and specular reflection (almost perfect reflection such as a mirror) viewing conditions, but is normally not hazardous.	Laser scanners, military hand-held laser rangefinders, entertainment light shows, target illuminators
Class 4	High Power	> 500 mW	Direct beam or specular reflection is hazardous to eyes and skin. May pose a diffuse reflection hazard (reflected off an imperfect reflective surface) or fire hazard. May produce air pollutants.	Medical surgery, research, drilling, cutting, welding, aircraft target designator used for guided weapons, military laser weapons

* Class 1M and 2M categories also exist, which have the same parameters as above, except that direct viewing with an optical instrument such as a telescope could be potentially hazardous.

**Two subcategories exist under Class 3: Class 3R lasers are potentially hazardous if the eye is appropriately focused and stable, but probability of injury is low; energy emitted is < 5 mW. Class 3B may be hazardous under direct and specular reflection viewing conditions; energy emitted is < 500 mW.

Source: American National Standards Institute (2007)

Non-Impulsive Sub-Surface Acoustic Sources

Manned support vessels and UMS considered in this EA at times would use underwater non-impulsive acoustic sources. These devices are considered to be "non-impulsive" in that their use does not result in steep pressure rise or initial over- and under-pressure that characterize impulsive sources and their potential for structural injury on marine mammal, turtle, and fish species.

These sources include systems identical to COTS systems and military countermeasure devices. The sources analyzed in this EA are those of low source level, narrow bandwidth, downward-directed transmission, short pulse lengths, frequencies above known hearing ranges of marine mammals and sea turtles (>200 kHz), or some combination of these factors. Therefore, the devices considered in this EA have been excluded from quantitative analysis. Table A-10 provides a list of the sources considered in this EA. The first two devices provided in the table are required equipment for safe operation of Navy vessels and are routinely used within the waters of the ATR Inner Range. Passive sonars are only used to listen to incoming sounds and do not emit sound energy into the water. Passive sonars, therefore, cannot acoustically affect the environment.

Table A-10 Representative Non-Impulsive Sources

System	Frequency	Reason not Analyzed	System Description
Commercially Available Systems			
Surface Ship Fathometer	12 kHz	System is not unique to military and operates identically to any commercially available bottom sounder.	Depth finder on surface ships
Submarine Fathometer	12 kHz	System is not unique to military and operates identically to any commercially available bottom sounder.	Depth finder on submarine or UUV
Tracking Pinger	10 – 40 kHz	System is not unique to military and operates identically to any commercially available underwater locator.	Location transponder that sends signal to shipboard or handheld device
Military-Specific Equipment			
SQR-19	Passive	System is a passive towed array emitting no active sonar.	A listening device towed behind a surface ship
TB-16/23/29/33	Passive	System is a passive towed array emitting no active sonar.	A listening device towed behind a submarine
AN/SLQ-48	>200 kHz	System frequency outside the upper frequency limit for marine mammals	System on UUVs used to identify underwater objects

Sources: Teledyne Benthos 2013 & Navy 2008

The AN/SQR-19 (Figure A-1) is a tactical towed array sonar that is able to passively detect adversary submarines at a very long range. The AN/SQR-19, which is a component of the AN/SQQ-89 sonar suite, is a series of hydrophones towed from a cable several thousand feet behind the ship (Navy 2008).

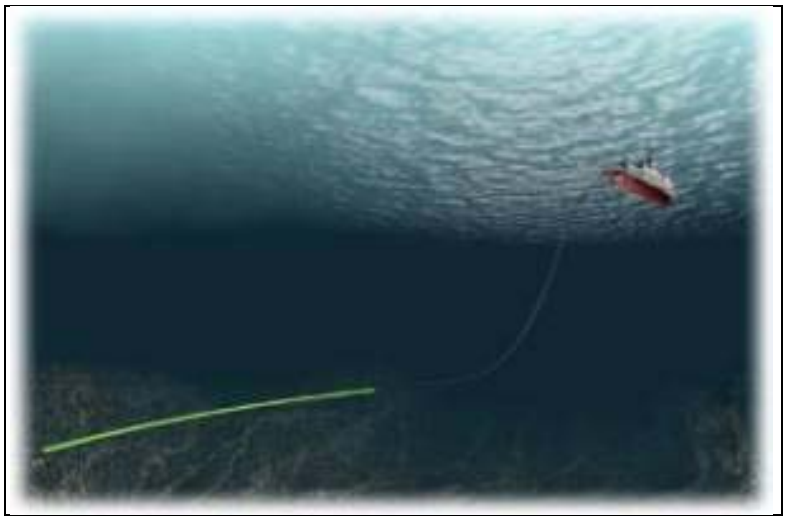

Figure A-1 AN/SQR-19

TB-16, TB-23, TB-29, and TB-33 are passive acoustic sensor arrays (Figure A-2), which are towed behind a submarine on a cable 2,400 ft (732 m) long. The actual arrays vary in length from several hundred to several thousand feet long, depending on the type (Navy 2008).

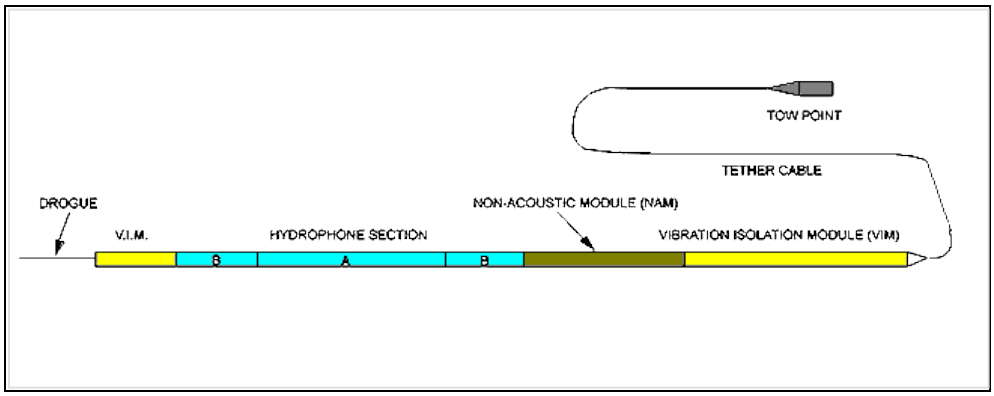

Figure A-2 Passive Acoustic Sensor Towed Array Schematic

The AN/SLQ-48 (Figure A-3) is a system that uses a remote-controlled submersible vehicle to identify underwater objects, and if they are mines, render them safe. The prime feature of the vehicle is the 2,700 lb (1,225 kg) tethered, video and sonar-equipped mine neutralization vehicle. Typically, this system would involve use of explosive destructive charges (Navy 2008), but no explosive charges would be used on the ATR Inner Range.

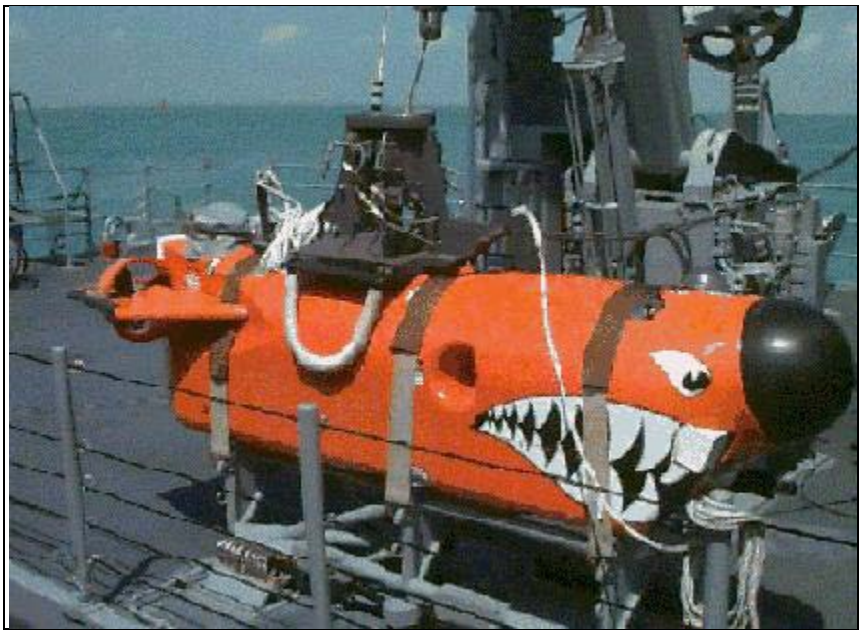

Figure A-3 AN/SLQ-48

Targets

Unmanned systems operations would utilize the full spectrum of targets available at ATR, (Table A-11).

Table A-11 ATR Targets

Target Type	Target
Fixed Target	Hannibal Target
	Hooper Target Complex
Aim Points	Supersonic Aim Points 1, 2, and 3
	Supersonic Impact Point
Impact Areas	Bay Forest Impact Area
	Shoal Impact Area
Surface Targets	30 Fountain Boat
	HARM/Infrared Drifting Barge Target
	High Speed Maneuverable Surface Target
	Improved Surface Towed Target
	Inflatable Banana Target
	Jet Skis and Jet Ski Hulks
	Low-Cost Modular Towed Target
	Patrol Boat
	Pax Pontoon Target
	Ship-Deployed Surface Target
	QST-35 Seaborne Powered Targets
Aerial Targets	BQM-34S
	BQM-74E
Land Targets	Fixed, Mobile, and Anti-Radiation Targets
	Full-Scale, Three-Dimensional Plastic Targets (e.g. Battle Tank)
Instrumented Target Boards	Improved Mobile Infrared Signature Target Boards
	Tri-bar Target Boards

Ground Activities

Table A-12 provides a description of ground support activities associated with unmanned systems operations.

Table A-12 Ground Activities

Type of Ground Activity	Description
Launch and Recovery	Larger UAS platforms would be launched and recovered from prepared runways, and conventional catapult and arresting gear. Smaller UAS platforms would be launched by hand, or from grass strips, rail launchers and other available platforms. Recovery systems would include conventional landing on grass strips, net or cable recovery systems, and other simple recovery systems.
Pre and Post Flight Activity	Functional systems test, payload installation or removal, ground taxi, engine run up, taxi tests, and other routine activities.
Maintenance	Routine maintenance such as corrosion control, low-observable repair, wash down, and system/subsystem repair would be accomplished in hangers or support facilities that are equipped to handle any hazardous materials such as solvents, sealants, epoxies, solder, and adhesives for repair.
Servicing	Changing or adding lubrication, hydraulic fluids, fuels, coolants, refrigerants and charging or replacing batteries would be accomplished in hangars and other facilities that are equipped to handle these hazardous materials.

Facilities

Table A-13 lists the facilities available for unmanned systems testing.

Table A-13 Facilities

Facilities
Flight Test Facilities
Microwave Facility
Time Space Position Information System Facilities
Real-Time Avionics Flight Test Facility
Remote Electronic Warfare Site (Point Lookout)
Marine Operations and Target Support Facility
Telemetry Data Systems
Test and Evaluation Data Processing Center
Wallops Target Detachment
Catapult, Arresting Gear, and Take-off Assist Facilities
Ground Test Facilities
Propulsion
Aircraft Test and Evaluation Facility
Engine Test Cell Facilities
Propulsion System Evaluation Facility
Communications and Navigation Systems
Airborne Strategic Communication Engineering and Test Facility
Tactical Aircraft and Mission Planning Facility
Communications Test and Evaluation Facility
Combat Identification Systems Data Analysis Center
Navy Identification Friend or Foe Test and Evaluation Laboratory
Aircraft Navigation Systems Integration Laboratory
Aircraft Systems Integration
Helicopter Mission Systems Support Center
Ship Ground Station – Surface/Aviation Interoperability Laboratory
Fixed Wing Anti-Surface Warfare and Antisubmarine Warfare Laboratory
Air Combat Environment Test and Evaluation Facility
Unmanned Systems Research and Development Lab
Manned Flight Simulator Facility
Shielded Hangar
Warfare Simulation Laboratory
Threat Air Defense Laboratory
Electronic Warfare Integration Systems Test Laboratory
Communication, Navigation, and Identification Laboratory
Advanced Systems Integration Laboratory
Aircraft Anechoic Test Facility
Electromagnetic Environmental Effects Facilities
Electromagnetic Environmental Generating System Laboratory
Radar
Radar Systems Test and Evaluation Roof-Top Laboratory
Surveillance and Topographical Analysis Radar Systems Laboratory
Ground Range Antenna Test Facility
Aircraft Imaging Support Facility
Facilities for Antenna and Radar Cross Section Measurement
Aircraft Subsystem Test
Landing Systems Test Laboratory
Aircraft Electrical Evaluation Facility

Facilities
Aircraft Stores Certification Test Facility
Antenna Testing Laboratory Automated System
Electro-Optical and Reconnaissance System Test Facility
Electromagnetic Radiation
Naval Electromagnetic Radiation Facility
Electromagnetic Pulse Test Facilities
Electromagnetic Interference Laboratory
Special Applications Facilities
Robert N. Becker Aircraft Technologies Laboratory
Aircraft Modification Facility Hanger 101 Complex
Aircraft Prototyping Facility

Appendix B

Record of Non-Applicability and Air Quality Calculations

MEMORANDUM FOR THE RECORD

From:

To:

Subj: RECORD OF NON-APPLICABILITY (RONA);

Ref: (a) U.S. Environmental Protection Agency, Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule, published in the Federal Register on 30 November 1993 (40 CFR Parts 6, 51, and 93)

(b) U.S. Environmental Protection Agency, Revisions to the General Conformity Regulations; Final Rule, published in the Federal Register on 5 April 2010 (40 CFR Parts 51 and 93)

(c) OPNAVINST 5090.1C (Appendix F), 30 October 2007

Encl: (1) Atlantic Test Ranges Expansion of Unmanned Systems Operations Emissions Analysis for Clean Air Act Conformity Applicability

1. The references (a), (b), and (c) provide implementing guidance for documenting Clean Air Act (CAA) Conformity Determination requirements. The General Conformity Rule applies to federal actions proposed within areas which are designated as either non-attainment or maintenance areas for a National Ambient Air Quality Standard (NAAQS) for any of the criteria pollutants.

2. Test activities associated with the Proposed Action would be conducted at NAS Patuxent River, Webster Field Annex, and the Atlantic Test Ranges (ATR) Inner Range. The project area is located in St. Mary's County, which is in the Maryland Tri-County Region of St. Mary’s, Calvert, and Charles Counties. Calvert and Charles Counties are included in the Metropolitan Washington Nonattainment Area (MWNAA). Table 1 lists the attainment status of the Tri-County Region. A plan for achieving attainment for the 8-hour ozone (O_3) NAAQS for the MWNAA was prepared by the Metropolitan Washington Air Quality Committee (MWAQC) in 2007. The MWAQC was established by the governors of Maryland and Virginia and the mayor of the District of Columbia to prepare a regionally coordinated air quality plan to comply with the requirements of the CAA Amendments of 1990.

Recommendations in the MWAQC plan are forwarded to the state environmental agencies for consideration in their air quality attainment planning. In turn, each state submits a SIP revision to the USEPA for review and approval.

Table 1 NAS Patuxent River Complex Attainment Status

Criteria Pollutant	St. Mary's County	Calvert County	Charles County
CO	Attainment	Attainment	Attainment
Pb	Attainment	Attainment	Attainment
NO_2	Attainment	Attainment	Attainment
O_3	Attainment	Moderate Nonattainment	Moderate Nonattainment
PM_{10}	Attainment	Attainment	Attainment
$PM_{2.5}$	Attainment	Attainment	Nonattainment
SO_2	Attainment	Attainment	Attainment

Source: Criteria Pollutant Area Summary Report (as of July 2012), USEPA.

3. An emissions analysis for the proposed unmanned systems operations at the on the ATR Inner Range is provided in the enclosure. Emissions estimates for the Proposed Action have been compared to *de minimis* thresholds of a nonattainment area. *de minimis* thresholds for criteria pollutants would not be exceeded as a result of implementation of the Proposed Action and a formal Conformity Determination is not considered necessary.

4. To the best of my knowledge, the information presented in this RONA is correct and accurate, and I concur in the finding that implementation of the Proposed Action does not require a formal CAA Conformity Determination.

_____

Name
Title

ATLANTIC TEST RANGES EXPANSION OF UNMANNED SYSTEMS OPERATIONS EMISSIONS ANALYSIS FOR CLEAN AIR ACT CONFORMITY APPLICABILITY

INTRODUCTION

The U.S. Environmental Protection Agency (USEPA) published *Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule,* in the Federal Register on 30 November 1993 (40 CFR Parts 6, 51, and 93). USEPA published *Revisions to the General Conformity Regulations; Final Rule,* in the Federal Register on 5 April 2010 (40 CFR Parts 51 and 93). The U.S. Navy published *Interim Guidance on Compliance with the Clean Air Act (CAA) General Conformity Rule* in Appendix F, OPNAVINST 5090.1C, dated 30 October 2007. These publications provide implementing guidance to document Clean Air Act Conformity Determination requirements. Regulations within the General Conformity Rule state that no department, agency, or instrumentality of the federal government shall engage in, support in any way or provide financial assistance for, license to permit, or approve any activity that does not conform to an applicable implementation plan. It is the responsibility of the federal agency to determine whether a federal action conforms to the applicable implementation plan, before the action is taken (40 CFR Part 1 51.850[a]).

The General Conformity Rule applies to federal actions proposed within areas which are designated as either non-attainment or maintenance areas for a National Ambient Air Quality Standard (NAAQS) for any of the criteria pollutants. Former non-attainment areas that have attained a NAAQS are designated as maintenance areas. Emissions of pollutants for which an area is in attainment are exempt from conformity analyses.

The Navy proposes to expand unmanned systems research, development, acquisition, testing and evaluation (RDAT&E) and training operations within the Atlantic Test Ranges (ATR) Inner Range, which includes approximately 1,800 square nautical miles (2,352 sq mi, 6,092 sq km) of restricted airspace, underlying surface waters, and land test areas at NAS Patuxent River, Webster Field Annex, and Bloodsworth Island Range. NAS Patuxent River and Webster Field Annex are located in St. Mary's County, which is in the Maryland Tri-County Region of St. Mary’s, Calvert, and Charles Counties. Calvert and Charles Counties are included in the Metropolitan Washington Nonattainment Area (MWNAA) for the 8-hour ozone (O_3) NAAQS.

An emissions analysis for the proposed unmanned systems operations at the on the ATR Inner Range is provided in this enclosure. Emissions estimates for the Proposed Action have been compared to *de minimis* thresholds of a nonattainment area. *de minimis* thresholds for criteria pollutants would not be exceeded as a result of implementation of the Proposed Action and a formal Conformity Determination is not considered necessary.

PROPOSED ACTION

Action Proponent: Naval Air Warfare Center Aircraft Division (NAWCAD).

Location: ATR Inner Range, NAS Patuxent River, and Webster Field Annex, Maryland.

Proposed Action Name: Atlantic Test Ranges Expansion of Unmanned Systems Operations

Proposed Action Summary: The Proposed Action is to expand unmanned systems RDAT&E and training operations in the ATR Inner Range. This action includes multiple types of UAS, UGS, and UMS either separately or as part of complex multi-system groups. Testing of unmanned systems would support the development of new generation unmanned platforms and their associated sensors and payloads. Operations may range from a single vehicle, to multiple vehicles, to integration testing between air, ground, and maritime platforms.

Air Emissions Summary:

Estimated emissions associated with the Proposed Action were calculated and are provided in Table 1. The emissions analysis assumed that there would be no increase in personal vehicle traffic on NAS Patuxent River or at Webster Field Annex. It was also assumed that ground support equipment (GSE) usage would not increase over existing levels at NAS Patuxent River or at Webster Field Annex.

Engine emissions attributable to the flight operations during climb out and approach below 3,000 ft (914 m) AGL were considered in this analysis for all UAS flights. Chase aircraft would be used in support of the Proposed Action. It is estimated that 10 helicopter sorties and 20 F/A-18 sorties would be conducted annually in support of Fire Scout and UCLASS operations, respectively. All chase aircraft operations would be based at NAS Patuxent River.

It is assumed that all UGS operated on the ATR Inner Range would be battery operated, and would thus have no criteria pollutant emissions.

Affected Air Basin: Metropolitan Washington Nonattainment Area (MWNAA).

Table 1 Proposed Action Annual Emissions

Component	Pollutant (tpy)					
	VOC	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**CO_2**
Unmanned Aircraft Systems	0.948	1.20	0.710	0.118	0.130	439.0
Chase Aircraft	0.563	0.410	1.57	0.0255	0.409	200.0
Unmanned Maritime Systems	0.505	1.30	13.1	--	0.0082	132.0
Manned Vessels	0.330	0.928	7.86	--	0.0066	88.6
Total	**2.35**	**3.84**	**23.2**	**0.144**	**0.554**	**859.6**
de minimis threshold	50	100	NA	NA	100	
Exceeds de minimis threshold?	No	No	No	No	No	

Emission Calculations – Proposed Action

Aircraft Emissions

ScanEagle			Emission Factors (lb/1000 lb fuel)							
Mode	Fuel flow (lb/min)	T.I.M (min)	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	1.42E-01	5	29.11	0.39	18.22	2.19	14.2	2849	0.0875	0.101
Climb out	1.11E-01	10	29.11	0.39	18.22	2.19	14.2	2849	0.0875	0.101
Approach	4.74E-02	15	29.11	0.39	18.22	2.19	14.2	2849	0.0875	0.101
Idle (taxi in)	1.11E-02	5	29.11	0.39	18.22	2.19	14.2	2849	0.0875	0.101
Idle (taxi out)	1.11E-02	5	29.11	0.39	18.22	2.19	14.2	2849	0.0875	0.101

ScanEagle	Emissions per operation (lb)							
Mode	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	2.07E-02	2.77E-04	1.30E-02	1.56E-03	1.01E-02	2.03E+00	6.22E-05	7.18E-05
Climb out	3.22E-02	4.30E-04	2.02E-02	2.42E-03	1.57E-02	3.15E+00	9.68E-05	1.12E-04
Approach	2.07E-02	2.77E-04	1.30E-02	1.56E-03	1.01E-02	2.03E+00	6.22E-05	7.18E-05
Idle (taxi in)	1.61E-03	2.15E-05	1.01E-03	1.21E-04	7.85E-04	1.58E-01	4.84E-06	5.59E-06
Idle (taxi out)	1.61E-03	2.15E-05	1.01E-03	1.21E-04	7.85E-04	1.58E-01	4.84E-06	5.59E-06
TOTAL	7.68E-02	1.03E-03	4.81E-02	5.78E-03	3.75E-02	7.52E+00	2.31E-04	2.67E-04

STUAS		Emission Factors (lb/1000 lb fuel)								
Mode	Fuel flow (lb/min)	T.I.M (min)	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	2.50E-02	5	29.11	0.39	18.22	2.19	14.2	2849	0.0875	0.101
Climb out	1.94E-02	10	29.11	0.39	18.22	2.19	14.2	2849	0.0875	0.101
Approach	8.33E-02	15	29.11	0.39	18.22	2.19	14.2	2849	0.0875	0.101
Idle (taxi in)	1.94E-02	5	29.11	0.39	18.22	2.19	14.2	2849	0.0875	0.101
Idle (taxi out)	1.94E-02	5	29.11	0.39	18.22	2.19	14.2	2849	0.0875	0.101

STUAS	Emissions per operation (lb)							
Mode	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	3.64E-03	4.86E-05	2.28E-03	2.74E-01	1.78E-03	3.56E-01	1.09E-05	1.26E-05
Climb out	5.66E-03	7.56E-05	3.54E-03	4.26E-01	2.76E-03	5.54E-01	1.70E-05	1.96E-05
Approach	3.64E-02	4.86E-04	2.28E-02	2.74E+00	1.77E-02	3.56E+00	1.09E-04	1.26E-04
Idle (taxi in)	2.83E-03	3.78E-05	1.77E-03	2.13E-01	1.38E-03	2.77E-01	8.51E-06	9.82E-06
Idle (taxi out)	2.83E-03	3.78E-05	1.77E-03	2.13E-01	1.38E-03	2.77E-01	8.51E-06	9.82E-06
TOTAL	5.13E-02	6.86E-04	3.21E-02	3.87E+00	2.51E-02	5.03E+00	1.54E-04	1.78E-04

Aerolight			Emission Factors (lb/1000 lb fuel)							
Mode	Fuel flow (lb/min)	T.I.M (min)	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	1.05E-01	5	29.11	0.39	18.22	2.19	14.2	2849	0.0875	0.101
Climb out	9.54E-02	10	29.11	0.39	18.22	2.19	14.2	2849	0.0875	0.101
Approach	7.34E-02	15	29.11	0.39	18.22	2.19	14.2	2849	0.0875	0.101
Idle (taxi in)	7.34E-03	5	29.11	0.39	18.22	2.19	14.2	2849	0.0875	0.101
Idle (taxi out)	7.34E-03	5	29.11	0.39	18.22	2.19	14.2	2849	0.0875	0.101

Aerolight	Emissions per operation (lb)							
Mode	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	1.89E-02	1.38E-02	8.76E-03	7.42E-04	9.05E-04	1.36E+00	5.66E-05	6.54E-05
Climb out	3.77E-02	2.76E-02	1.75E-02	1.48E-03	1.81E-03	2.71E+00	8.82E-05	1.02E-04
Approach	5.66E-02	4.15E-02	2.62E-02	2.23E-03	2.72E-03	4.06E+00	5.66E-04	6.54E-04
Idle (taxi in)	1.89E-02	1.38E-02	8.76E-03	7.42E-04	9.05E-04	1.36E+00	4.42E-05	5.10E-05
Idle (taxi out)	1.89E-02	1.38E-02	8.76E-03	7.42E-04	9.05E-04	1.36E+00	4.42E-05	5.10E-05
TOTAL	1.51E-01	1.11E-01	7.00E-02	5.94E-03	7.24E-03	1.08E+01	8.01E-04	9.24E-04

Source = AP-42

Shadow			Emission Factors (lb/min)					
Mode	Fuel flow (lb/min)	T.I.M (min)	VOC	NOX	CO	SOX	PM	CO2
Take off	3.61E-01	5	1.30E-02	9.53E-03	6.03E-03	5.12E-04	6.25E-04	0.936
Climb out	3.29E-01	10	1.30E-02	9.53E-03	6.03E-03	5.12E-04	6.25E-04	0.936
Approach	2.53E-01	15	1.30E-02	9.53E-03	6.03E-03	5.12E-04	6.25E-04	0.936
Idle (taxi in)	2.53E-02	5	1.30E-02	9.53E-03	6.03E-03	5.12E-04	6.25E-04	0.936
Idle (taxi out)	2.53E-02	5	1.30E-02	9.53E-03	6.03E-03	5.12E-04	6.25E-04	0.936

Shadow	Emissions per operation (lb)					
Mode	VOC	NOX	CO	SOX	PM	CO2
Take off	6.50E-02	4.77E-02	3.02E-02	2.56E-03	3.12E-03	4.68E+00
Climb out	1.30E-01	9.53E-02	6.03E-02	5.12E-03	6.25E-03	9.36E+00
Approach	1.95E-01	1.43E-01	9.05E-02	7.68E-03	9.37E-03	1.40E+01
Idle (taxi in)	6.50E-02	4.77E-02	3.02E-02	2.56E-03	3.12E-03	4.68E+00
Idle (taxi out)	6.50E-02	4.77E-02	3.02E-02	2.56E-03	3.12E-03	4.68E+00
TOTAL	5.20E-01	3.81E-01	2.41E-01	2.05E-02	2.50E-02	3.74E+01

Data source = USAF 2002 (for Bell 407)

Fire Scout			Emission Factors (lb/1000 lb fuel)							
Mode	Fuel flow (lb/min)	T.I.M (min)	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
TO/CO	11.61	6.8	0.3	6.33	3.59	0.4	0.31	2849	0.0875	0.101
Approach	3.78	6.8	15.02	2.52	37.71	0.4	2.95	2849	0.0875	0.101
Idle (taxi in)	2.66	7	64.28	1.58	31.45	0.4	1.44	2849	0.0875	0.101
Idle (taxi out)	2.66	8	64.28	1.58	31.45	0.4	1.44	2849	0.0875	0.101

Fire Scout	Emissions per operation (lb)							
Mode	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	2.37E-02	5.00E-01	2.83E-01	3.16E-02	2.45E-02	2.25E+02	6.91E-03	7.97E-03
Approach	3.86E-01	6.48E-02	9.69E-01	1.03E-02	7.58E-02	7.32E+01	2.25E-03	2.60E-03
Idle (taxi in)	1.20E+00	2.94E-02	5.86E-01	7.45E-03	2.68E-02	5.30E+01	1.63E-03	1.88E-03
Idle (taxi out)	1.37E+00	3.36E-02	6.69E-01	8.51E-03	3.06E-02	6.06E+01	1.86E-03	2.15E-03
TOTAL	2.98E+00	6.27E-01	2.51E+00	5.78E-02	1.58E-01	4.12E+02	1.27E-02	1.46E-02

Grey Eagle		Emission Factors (lb/1000 lb fuel)						
Mode	Fuel flow (lb/min)	T.I.M (min)	VOC	NOX	CO	SOX	PM	CO2
Take off	1.55E+00	5	5.59E-02	4.10E-02	2.59E-02	2.20E-03	2.69E-03	4.02E+00
Climb out	1.41E+00	10	5.59E-02	4.10E-02	2.59E-02	2.20E-03	2.69E-03	4.02E+00
Approach	1.09E+00	15	5.59E-02	4.10E-02	2.59E-02	2.20E-03	2.69E-03	4.02E+00
Idle (taxi in)	1.09E-01	5	5.59E-02	4.10E-02	2.59E-02	2.20E-03	2.69E-03	4.02E+00
Idle (taxi out)	1.09E-01	5	5.59E-02	4.10E-02	2.59E-02	2.20E-03	2.69E-03	4.02E+00

Grey Eagle	Emissions per operation (lb)					
Mode	VOC	NOX	CO	SOX	PM	CO2
Take off	2.80E-01	2.05E-01	1.30E-01	1.10E-02	1.34E-02	2.01E+01
Climb out	5.59E-01	4.10E-01	2.59E-01	2.20E-02	2.69E-02	4.02E+01
Approach	8.39E-01	6.15E-01	3.89E-01	3.30E-02	4.03E-02	6.02E+01
Idle (taxi in)	2.80E-01	2.05E-01	1.30E-01	1.10E-02	1.34E-02	2.01E+01
Idle (taxi out)	2.80E-01	2.05E-01	1.30E-01	1.10E-02	1.34E-02	2.01E+01
TOTAL	2.24E+00	1.64E+00	1.04E+00	8.81E-02	1.07E-01	1.61E+02

Data source = USAF 2002

BAMS/Triton			Emission Factors (lb/1000 lb fuel)							
Mode	Fuel flow (lb/min)	T.I.M (min)	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	34.33	2	0.01	15.06	0.45	0.4	1.58	2849	0.0875	0.101
Climb out	27.33	1	0.01	12.35	0.69	0.4	1.58	2849	0.0875	0.101
Approach	20.17	5	0.02	9.57	1.2	0.4	1.58	2849	0.0875	0.101
Idle (taxi in)	11	15	0.02	6.02	3.33	0.4	1.58	2849	0.0875	0.101
Idle (taxi out)	11	25	0.02	6.02	3.33	0.4	1.58	2849	0.0875	0.101

BAMS/Triton	Emissions per operation (lb)							
Mode	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	6.87E-04	1.03E+00	3.09E-02	2.75E-02	1.08E-01	1.96E+02	6.01E-03	6.93E-03
Climb out	2.73E-04	3.38E-01	1.89E-02	1.09E-02	4.32E-02	7.79E+01	2.39E-03	2.76E-03
Approach	2.02E-03	9.65E-01	1.21E-01	4.03E-02	1.59E-01	2.87E+02	8.82E-03	1.02E-02
Idle (taxi in)	3.30E-03	9.93E-01	5.49E-01	6.60E-02	2.61E-01	4.70E+02	1.44E-02	1.67E-02
Idle (taxi out)	5.50E-03	1.66E+00	9.16E-01	1.10E-01	4.35E-01	7.83E+02	2.41E-02	2.78E-02
TOTAL	1.18E-02	4.99E+00	1.64E+00	2.55E-01	1.01E+00	1.81E+03	5.57E-02	6.43E-02

Data source = USAF 2002

UCLASS			Emission Factors (lb/1000 lb fuel)							
Mode	Fuel flow (lb/min)	T.I.M (min)	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	162.94	1	2.3	29.26	0.86	0.4	1.01	2849	0.0875	0.101
Climb out	97.38	0.5	3.51	22.13	0.86	0.4	1.21	2849	0.0875	0.101
Approach	65.21	3	4.88	12.32	1.92	0.4	1.03	2849	0.0875	0.101
Idle (taxi in)	38.2	10	7.57	4.6	3.52	0.4	0.26	2849	0.0875	0.101
Idle (taxi out)	38.2	30	7.57	4.6	3.52	0.4	0.26	2849	0.0875	0.101

UCLASS	Emissions per operation (lb)							
Mode	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Take off	3.75E-01	4.77E+00	1.40E-01	6.52E-02	1.65E-01	4.64E+02	1.43E-02	1.65E-02
Climb out	1.71E-01	1.08E+00	4.19E-02	1.95E-02	5.89E-02	1.39E+02	4.26E-03	4.92E-03
Approach	9.55E-01	2.41E+00	3.76E-01	7.83E-02	2.02E-01	5.57E+02	1.71E-02	1.98E-02
Idle (taxi in)	2.89E+00	1.76E+00	1.34E+00	1.53E-01	9.93E-02	1.09E+03	3.34E-02	3.86E-02
Idle (taxi out)	8.67E+00	5.27E+00	4.03E+00	4.58E-01	2.98E-01	3.26E+03	1.00E-01	1.16E-01
TOTAL	1.31E+01	1.53E+01	5.94E+00	7.74E-01	8.22E-01	5.51E+03	1.69E-01	1.96E-01

Data source = USAF 2002 2 Lycoming Engines

AAFL			Emission Factors (lb/1000 lb fuel)							
Mode	Fuel flow (lb/min)	T.I.M (min)	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Idle	8.9	120	40.98	1.2	895.17	0.4	1.58	2849	0.0875	0.101
Pattern	37.31	240	10.18	8.08	689.59	0.4	1.58	2849	0.0875	0.101

AAFL	Emissions per operation							
Mode	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
Idle	43.767	1.282	956.042	0.427	1.687	3042.732	0.093	0.108
Pattern	91.156	72.352	6174.865	3.582	14.148	25511.086	0.784	0.904
TOTAL	134.922	73.633	7130.906	4.009	15.835	28553.818	0.877	1.012

Chase Helicopter for Fire Scout. Data Source = AESO Memo. No. 9929A

			Emission (lb)						
Mode	Total Fuel used (lb)	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
LTO	661	1.4	3.4	12.3	0.3	2.3	3000		
Cruise (1 hr)	1200	0.7	7.7	7.5	0.5	5	3864		
TOTAL		2.1	11.1	19.8	0.8	7.3	6864		

Chase F/A-18 for UCLASS. Data Source = AESO Memo. Nos. 9815G/9933D

			Emission (lb)						
Mode	Total Fuel used (lb)	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
LTO	2058	53.74	13.09	139.4	0.82	16.17	6101		
Terrain following (30 min)	Air	1.46	22.36	8.1	1.33	21.1	10465		
TOTAL		55.2	35.45	147.5	2.15	37.27	16566		

Aerial Vehicle	**Number of Sorties**	VOC	NOX	CO	SOX	PM	CO2	CH4	N2O
ScanEagle	18	1.38E+00	1.85E-02	8.65E-01	1.04E-01	6.74E-01	1.35E+02	4.16E-03	4.80E-03
SE >3000'		7.45E-01	9.97E-03	4.68E-01	5.62E-02	3.64E-01	7.31E+01	2.24E-03	2.58E-03
STUAS	9	4.62E-01	6.17E-03	2.89E-01	3.48E+01	2.25E-01	4.52E+01	1.39E-03	1.60E-03
STUAS >3000'		9.83E-01	1.31E-02	6.16E-01	7.40E+01	4.78E-01	9.61E+01	2.94E-03	3.40E-03
Aerolight	37	5.58E+00	4.09E+00	2.59E+00	2.20E-01	2.68E-01	4.01E+02	2.96E-02	3.42E-02
AL >3000'		4.18E+00	3.07E+00	1.94E+00	1.65E-01	2.01E-01	3.00E+02	4.19E-02	4.84E-02
Shadow	65	3.38E+01	2.48E+01	1.57E+01	1.33E+00	1.62E+00	2.43E+03	0.00E+00	0.00E+00
Shadow >3000'		2.54E+01	1.86E+01	1.18E+01	9.98E-01	1.22E+00	1.82E+03	0.00E+00	0.00E+00
Fire Scout	96	2.94E+02	6.20E+01	2.48E+02	5.71E+00	1.56E+01	4.07E+04	1.25E+00	1.44E+00
FS >3000'		1.14E+02	1.92E+01	2.87E+02	3.05E+00	2.25E+01	2.17E+04	6.67E-01	7.69E-01
Grey Eagle	24	5.37E+01	3.94E+01	2.49E+01	2.11E+00	2.58E+00	3.86E+03	0.00E+00	0.00E+00
Triton	128	1.51E+00	6.38E+02	2.09E+02	3.26E+01	1.29E+02	2.32E+05	7.13E+00	8.23E+00
UCLASS	104	1.36E+03	1.59E+03	6.17E+02	8.05E+01	8.55E+01	5.73E+05	1.76E+01	2.03E+01
	#/yr	1.90E+03	2.40E+03	1.42E+03	2.36E+02	2.60E+02	8.77E+05	2.67E+01	3.09E+01
	tpy	9.48E-01	1.20E+00	7.10E-01	1.18E-01	1.30E-01	4.39E+02	1.34E-02	1.54E-02

		VOC	NOX	CO	SOX	PM	CO2
Chase helo	10	2.10E+01	1.11E+02	1.98E+02	8.00E+00	7.30E+01	6.86E+04
F/A-18	20	1.10E+03	7.09E+02	2.95E+03	4.30E+01	7.45E+02	3.31E+05
	#/yr	1.13E+03	8.20E+02	3.15E+03	5.10E+01	8.18E+02	4.00E+05
	tpy	5.63E-01	4.10E-01	1.57E+00	2.55E-02	4.09E-01	2.00E+02

Maritime Vessel Emissions

Emission Factors (lb/hp-hr)

Vessel	Engine hp	Fuel type	IN/OB	VOC	NOX	CO	PM	CO2	Class
SPARTAN	2 x 470 hp	diesel	IN	6.66E-03	1.87E-02	1.58E-01	1.32E-04	1.79E+00	MS4D
USSV-HS	2 x 310 hp	diesel	IN	6.66E-03	1.87E-02	1.58E-01	1.32E-04	1.79E+00	MS4D
Protector	280 hp	diesel	IN	6.66E-03	1.87E-02	1.58E-01	1.32E-04	1.79E+00	MS4D
Odyssey	310 hp	diesel	IN	6.66E-03	1.87E-02	1.58E-01	1.32E-04	1.79E+00	MS4D
Sea Doo	250 hp	diesel	IN	6.66E-03	1.87E-02	1.58E-01	1.32E-04	1.79E+00	MS4D
Zodiac	260 hp	diesel	OB	7.78E-03	1.28E-02	2.65E-01	1.32E-05	1.85E+00	MO4D
MST	2 x 671 hp	diesel	IN	2.27E-02	1.12E-02	3.41E-01	6.00E-02	1.83E+00	MS4D
HSMST	2 x 200 hp	diesel	OB	7.78E-03	1.28E-02	2.65E-01	1.32E-05	1.85E+00	MO4D
FACT	2 x 310 hp	diesel	IN	6.66E-03	1.87E-02	1.58E-01	1.32E-04	1.79E+00	MS4D

Emission Factors (lb/hr)

Vessel	VOC	NOX	CO	PM	CO2
SPARTAN	3.13E+00	8.79E+00	7.44E+01	6.22E-02	8.40E+02
USSV-HS	2.06E+00	5.80E+00	4.91E+01	4.10E-02	5.54E+02
Protector	9.32E-01	2.62E+00	2.22E+01	1.85E-02	2.50E+02
Odyssey	1.03E+00	2.90E+00	2.45E+01	2.05E-02	2.77E+02
Sea Doo	8.32E-01	2.34E+00	1.98E+01	1.65E-02	2.23E+02
Zodiac	1.01E+00	1.67E+00	3.45E+01	1.72E-03	2.40E+02
MST	1.53E+01	7.50E+00	2.29E+02	4.03E+01	1.22E+03
HSMST	1.56E+00	2.57E+00	5.30E+01	2.65E-03	3.70E+02
FACT	2.06E+00	5.80E+00	4.91E+01	4.10E-02	5.54E+02

Proposed action 80 USV + 40 UUV (support vessel) ops

	Ops	hr/op	VOC	NOX	CO	PM	CO2
Odyssey	15	8	1.24E+02	3.48E+02	2.94E+03	2.46E+00	3.32E+04
Sea Doo	15	8	9.98E+01	2.81E+02	2.38E+03	1.98E+00	2.68E+04
Zodiac	10	8	8.08E+01	1.34E+02	2.76E+03	1.38E-01	1.92E+04
HSMST	10	8	1.25E+02	2.06E+02	4.24E+03	2.12E-01	2.96E+04
FACT	10	8	1.65E+02	4.64E+02	3.93E+03	3.28E+00	4.43E+04
USSV-HS	10	8	1.65E+02	4.64E+02	3.93E+03	3.28E+00	4.43E+04
SPARTAN	10	8	2.50E+02	7.03E+02	5.95E+03	4.98E+00	6.72E+04
		#/yr	1.01E+03	2.60E+03	2.61E+04	1.63E+01	2.65E+05
		tpy	5.05E-01	1.30E+00	1.31E+01	8.16E-03	1.32E+02

	Ops	hr/op	VOC	NOX	CO	PM	CO2
Support vessel	40	8	6.59E+02	1.86E+03	1.57E+04	1.31E+01	1.77E+05
			3.30E-01	9.28E-01	7.86E+00	6.56E-03	8.86E+01

Global warming potential

Pollutant	Emissions (tpy)	GWP*	CO2e (tpy)
CO2	859.6	1	859.6
CH4	0.0134	21	0.281
N2O	0.0154	310	4.77
		Total	864.7

*GWP = Global Warming Potential. 100-year horizon GWP values provided by United Nations Framework Convention on Climate Change. http://unfccc.int/ghg_data/items/3825.php

Appendix C

Interagency Correspondence

DEPARTMENT OF THE NAVY
NAVAL AIR SYSTEMS COMMAND
RADM WILLIAM A. MOFFETT BUILDING
47123 BUSE ROAD, BLDG 2272
PATUXENT RIVER, MARYLAND 20670-1547

IN REPLY REFER TO

5090
Ser 0318/52000ME
14 Aug 2013

Ms. Mary Colligan
Assistant Regional Administrator
NOAA Fisheries
Northeast Regional Office
1 Blackburn Drive
Gloucester, Massachusetts 01930

Dear Ms. Colligan:

This letter is to inform you of the Expansion of Unmanned Systems Operations proposed for the Atlantic Test Ranges (ATR) Inner Range, including Naval Air Station (NAS) Patuxent River, Webster Field Annex, the Bloodsworth Island Range, and the restricted airspace that overlays the Inner Range (see Enclosure 1). The Inner Range currently supports research, development, acquisition, test and evaluation (RDAT&E) of unmanned aircraft systems (UASs) as well as various categories of training activities. The Navy proposes to extend its UAS RDAT&E operations and training capability and to include Unmanned Maritime System (UMS) and Unmanned Ground Systems (UGS) operations on the Inner Range.

The proposed testing and training will occur adjacent to habitats of the following federally listed species:

- Atlantic sturgeon (*Acipenser oxyrinchus*)
- Shortnose sturgeon (*Acipenser brevirostrum*)
- Hawksbill turtle (*Eretmochelys imbricate*)
- Green sea turtle (*Chelonia mydas*)
- ((Loggerhead sea turtle (*Caretta caretta*)
- Kemp's ridley sea turtle (*Leipidochelys kempii*)
- Leatherback sea turtle (*Dermchelys coriacea*)
- Humpbacked whale (*Megaptera novaeangliae*)
- North Atlantic right whale (*Eubalaena glacialis*)
- West Indian manatee (*Trichechus manatus*)

The use of unmanned systems is not expected to have any adverse effect on listed species including those listed above or any other federally listed species present in the waters of the Inner Range.

An Environmental Assessment(EA) is being prepared for this expansion (Enclosure 2). This document provides the description of the expansion of Unmanned Systems Operations, pertinent

information on the activities proposed, and potential environmental impacts. The EA also provides protective measures we will be taking to prevent any adverse impacts to listed species.

Based upon the proposed operations and proposed protective measures, we ask that you concur (within 30 days) with our analysis that the Expansion of Unmanned Systems Operations may but will not likely have an adverse effect on federally listed species, and therefore a formal consultation will not be required.

If you have any questions or concerns, please contact Ms. Brandi Simpson at (301) 342-2265, or at the following address: Naval Air Warfare Center Aircraft Division; Attn: Ms. Brandi Simpson, 22347 Cedar Point Road, Building 2185, Patuxent River, Maryland, 20670-1183.

Sincerely,

T. K. CLARK
Director, NAVAIR Range Department

Enclosures:
(1) Overview Map of the ATR Inner Range
(2) Environmental Assessment for the Expansion of Unmanned Systems Operations

DEPARTMENT OF THE NAVY
NAVAL AIR SYSTEMS COMMAND
RADM WILLIAM A. MOFFETT BUILDING
47123 BUSE ROAD, BLDG 2272
PATUXENT RIVER, MARYLAND 20670-1547

IN REPLY REFER TO

5090
Ser 0319/52000ME
14 Aug 2013

Mr. Trevor Clark
U.S. Fish and Wildlife Service
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, Maryland 21401

Dear Mr. Clark:

This letter is to inform you of the Expansion of Unmanned Systems Operations proposed for the Atlantic Test Ranges (ATR) Inner Range, including Naval Air Station (NAS) Patuxent River, Webster Field Annex, the Bloodsworth Island Range, and the restricted airspace that overlays the Inner Range (see Enclosure 1). The Inner Range currently supports research, development, acquisition, test and evaluation (RDAT&E) of unmanned aircraft systems (UASs) as well as various categories of training activities. The Navy proposes to extend its UAS RDAT&E operations and training capability and to include unmanned maritime system (UMS) and unmanned ground systems (UGS) operations on the Inner Range.

An Environmental Assessment(EA) is being prepared for this expansion (Enclosure 2). This document provides the description of the expansion of unmanned systems operations, pertinent information on the activities proposed, and potential environmental impacts. The EA also provides protective measures we will be taking to prevent any adverse impacts to listed species.

Based upon the proposed operations and proposed protective measures, we ask that you concur (within 30 days) with our analysis that the Expansion of Unmanned Systems Operations may but will not likely have an adverse effect on federally listed species or their habitats, and therefore a formal consultation will not be required.

If you have any questions or concerns, please contact Ms. Brandi Simpson at (301) 342-2265, or at the following address: Naval Air Warfare Center Aircraft Division; Attn: Ms. Brandi Simpson, 22347 Cedar Point Road, Building 2185, Patuxent River, Maryland, 20670-1183.

Sincerely,

T. K. CLARK
Director, NAVAIR Range Department

Enclosures:

(1)Overview Map of the ATR Inner Range
(2)Environmental Assessment for the Expansion of Unmanned Systems Operations

DEPARTMENT OF THE NAVY
NAVAL AIR SYSTEMS COMMAND
RADM WILLIAM A. MOFFETT BUILDING
47123 BUSE ROAD, BLDG 2272
PATUXENT RIVER, MARYLAND 20670-1547

IN REPLY REFER TO

5090
Ser 0320/52000ME
14 Aug 2013

Ms. Sarah W. Cooksey
Administrator
Delaware Coastal Programs
5 East Reed Street, Suite 201
Dover, Delaware 19901

SUBJ: ATLANTIC TEST RANGES EXPANSION OF UNMANNED SYSTEMS OPERATIONS

Dear Ms. Cooksey:

In accordance with the Federal Coastal Zone Management Act of 1972 (CZMA) as amended, Section 307c(1), the United States Department of the Navy (U.S. Navy) has determined that the proposed project, located on the Atlantic Test Ranges (ATR) Inner Range, Naval Air Station (NAS) Patuxent River, Webster Field Annex, and the Bloodsworth Island Range (BIR) will not affect the coastal zone. The proposed project involves unmanned systems research, development, acquisition, test and evaluation (RDAT&E) activities and training.

Because this action will not affect the coastal zone, it does not require a Consistency Determination, and we request your concurrence on a Coastal Consistency Negative Determination (CCND) for this action. This Negative Determination is submitted in compliance with the Ocean and Coastal Resource Management regulations (15 CFR 930.35).

This CCND, in accordance with the CZMA, is submitted for Naval Air Weapons Center Aircraft Division (NAWCAD), located at Naval Air Station (NAS) Patuxent River, Maryland.

INTRODUCTION AND STATEMENT OF CONSISTENCY

The CZMA of 1972 (16 U.S.C. Section 1451 et seq., as amended) provides assistance to states, in cooperation with federal and local agencies, for developing land and water use programs in coastal zones. Section 307 of the CZMA stipulates that where a federal project initiates reasonably foreseeable effects on any coastal use or resource (land or water use or natural resource), the action must be consistent to the maximum extent practicable with the enforceable policies of the affected state's federally-approved coastal management plan.

Congress recognized the continuous challenge for coastal programs to adapt to the dynamic nature of Coastal Zone Management in 1990 when it re-authorized the CZMA. Congress recognized the need to build upon the highly successful program to improve coastal management nationwide and to "enhance" the coastal zone of each state through its coastal program. This led to Delaware's first Section 309 Enhancement Assessment in 1992, which for the first time took

an in-depth look at what had been accomplished in Delaware's Coastal Zone as well as what tasks remained to be done. This assessment continues to be updated periodically as part of ongoing efforts to improve the management of Delaware's coastal resources.

The Department of the Navy (the Navy) proposes to expand unmanned systems RDAT&E and training operations within the ATR Inner Range, which includes approximately 1,800 square nautical miles (2,384 sq mi, 6,174 sq km) of restricted airspace, underlying surface waters, and land test areas at NAS Patuxent River, Webster Field Annex, and the BIR. The proposed action has been evaluated for consistency with the Delaware Coastal Management Program (CMP) and the results of that evaluation are documented in this CCND. Based on this evaluation, the Department of the Navy has determined that the proposed action will be consistent to the maximum extent practicable with the relevant enforceable policies of the federally-approved Delaware CMP.

PROJECT LOCATION

NAS Patuxent River is located on 6,705 ac (2,713 ha) in St. Mary's County, Maryland, on a peninsula between the Patuxent River to the north, and the Chesapeake Bay to the east and south, approximately 65 mi (105 km) southeast of Washington, DC. The Station is host to over 50 tenant commands including the NAWCAD. NAWCAD is the Navy's primary RDAT&E, engineering, and Fleet support activity for Navy and Marine Corps air vehicle systems and is responsible for the scheduling and conduct of operations within the ATR. The proposed action would be conducted within the ATR Inner Range, which includes approximately 1,800 square nautical miles (2,384 sq mi, 6,174 sq km) of restricted airspace, underlying surface waters, and land test areas at NAS Patuxent River, Webster Field Annex, and BIR (see Enclosure 1).

BACKGROUND

In order to meet the purpose and need there are requirements for operationally realistic engagements in air, land, and maritime environments. In addition to restricted airspace, the infrastructure needed to meet this requirement includes the following:

- Maritime and land test ranges with environmental, range safety, explosive safety, laser safety, flight clearances, and frequency clearances
- Line-of-sight (LOS) and beyond line-of-sight (BLOS) capability to provide range surveillance of operating area and ability to relay data and communications
- LOS and BLOS time, space, and position information instrumentation, telemetry, and other associated RDAT&E instrumentation
- A system to predict the hazard pattern associated with the release of weapons and special sensors to measure the environment

The ATR Inner Range provides the combination of accessible environments and infrastructure, as well as separation from potential conflicts with other military or public uses, to readily accommodate the necessary air, land, and maritime testing and training of unmanned systems.

DESCRIPTION OF THE PROPOSED ACTION

The Proposed Action is to expand unmanned systems RDAT&E and training operations in the ATR Inner Range. This action includes multiple types of unmanned aircraft systems (UAS), unmanned ground systems (UGS), and unmanned maritime systems (UMS), either separately or as part of complex multi-system groups. Testing of unmanned systems would support the development of new generation unmanned platforms and their associated sensors and payloads. Operations may range from a single vehicle, to multiple vehicles, to integration testing between air, ground, and maritime platforms.

Most small UAS (Groups 1, 2, & 3) would be launched and recovered from Webster Field Annex, and larger UAS (Groups 4 & 5) would launch and land at NAS Patuxent River. However, some of the more portable Group 1 and 2 UAS may occasionally launch from more remote areas such as the waters surrounding the BIR that underlay restricted area R-4002 which extends from the surface to 20,000 ft (6,100 m). Groups 1 & 2 UAS landing in and around the BIR may do so in areas not subject to biological restrictions.

UGS interoperability tests would be conducted at Webster Field Annex. The UGS would be less than 700 lb (318 kg) in size and would be operated on previously disturbed sites, documented not to hold identified cultural resources, sensitive biological resources, or habitat of concern. There would be no ground disturbing activities associated with any unmanned systems operations associated with the proposed action.

The proposed action would involve UMS activities on the ATR Inner Range, including unmanned surface and underwater vehicle operations. All boats and UMS associated with the proposed action would use existing dock structures and would not conduct beach landings at Patuxent River, reducing potential impacts to near-shore resources. Unmanned underwater vehicles would be launched in the Chesapeake Bay and would not make contact with the Bay floor or articles resting on the Bay floor.

No UGS or UMS operations will be conducted within the boundaries of Delaware or its Coastal Zone. The proposed action would involve UAS overflights within the airspace over the southeastern corner of Sussex County, Delaware (see Enclosure 1).

NEGATIVE DETERMINATION ANALYSIS

The following analysis considers each of the articles in the CZMA, including public access, recreation, marine environment, land resources, development, and industrial development. Consistent with the CZMA, all public agencies carrying out activities outside of the coastal zone that could have a direct impact on resources within the coastal zone shall consider the effect of such actions on coastal zone resources in order to assure that these policies are achieved.

Article 2 – Public Access

The proposed action would include shoreline and offshore activities within the boundaries of the state of Maryland, consistent with ongoing operations. There would be no operations restricting public access to Delaware state lands. Therefore the proposed action would not reduce public

access, public safety, or result in overuse of the state of Delaware coastal area. The proposed action is consistent with the public access provisions found in Article 2 of the CZMA (Sections 30210-30214).

Article 3 – Recreation

The Nanticoke Wildlife Area is overlaid by the restricted airspace, R-4008; flights within this restricted area are subject to a minimum altitude of 25,000 ft (7,620 m). Overflights of this wildlife area at this minimum altitude would be 23,000 ft (7,010 m) greater than the minimum flight altitude allowed by a FAA interagency agreement with the U.S. Department of the Interior (FAA Advisory Circular 91-36D). This restriction would protect the wildlife area from annoyance and, during migratory season, minimize the potential for bird-aircraft strike hazard problems. Furthermore, the use and availability of this open space resource would not be anticipated to change under the proposed action, as increased flight operations would not affect users or uses of those open space resources. Consequently, there would be no significant impacts to these open space resources under the proposed action. Therefore, the overall impact on recreation would be minimal. The proposed action is consistent with the recreation provisions found in Article 3 of the CZMA (Sections 30220-30224).

Article 4 – Marine Environment

The proposed action would not involve operations within or over marine environments within the state of Delaware boundaries and is therefore consistent with the marine environment provisions found in Article 4 of the CZMA (Sections 30230-30233).

Article 5 – Land Resources

The proposed action will utilize existing airstrips, roadways, and other existing developed land for launching UAS, UMS, UGS, and conventional aircraft and vessels. There would be no construction or modification of land use within the project area. Therefore, the proposed action is consistent with the land resources provisions found in Article 5 of the CZMA (Sections 30240-30244).

Article 6 – Development

The proposed action does not involve development of new facilities or construction of infrastructure in the project area. Therefore the development provisions found in Article 6 of the CZMA (Sections 30250-30255) are not applicable to the proposed action.

Article 7 – Industrial Development

The proposed action does not involve the development or modification of industrial facilities. Therefore, the industrial development provisions of the CZMA (Sections 30260-30265.5) are not applicable to the proposed action.

STATE COASTAL CONSISTENCY PROVISIONS

Federal actions within the coastal zone must be compliant with relevant state and federal regulatory programs to the maximum extent practicable. The Delaware CMP constitutes federal

consistency through implementation of permits/approvals provided in *Delaware Coastal Management Program – Comprehensive Update and Routine Program Implementation* (June 2011). Table 1 provides a summary of these permits/approvals, applicable circumstances, and applicability to the proposed action.

Table 1. Enforceable Policies of the Delaware Coastal Management Program

[redacted]	[redacted]	[redacted]
State Coastal Zone Act	Proposal to conduct various activities within the Delaware Coastal Zone	Consistent
Beach Protection Act	Proposal to construct facilities or operate vehicles on beaches	Not Applicable
Erosion and Sediment Control Act	Proposal to conduct nonagricultural land-disturbing activities	Not Applicable
Minerals in Submerged Lands Act	Proposal to conduct mineral exploration or exploitation activities in submerged lands	Not Applicable
Wetlands Regulations	Proposal for construction or landscape modification activity that may encroach upon wetlands	Not Applicable
Subaqueous Lands Regulations	Proposal to deposit material upon or remove or extract materials from, or construct, modify, repair or reconstruct, or occupy any structure or facility upon submerged lands or tidelands	Not Applicable
Surface Water Quality Standards	Proposal to conduct activities involving the extraction of or discharge into surface water sources	Not Applicable
Water Pollution Control Regulations	Proposal to: 1. Construct, install, replace, modify, or operate a water pollution control facility; 2. Install or operate a surface water impoundment for the waste treatment or disposal of nonhazardous liquid wastes; 3. Physical, chemical, or biological alteration of surface waters; 4. Point discharge of pollutants governed by the NPDES program; 5. Discharges of pollutants to surface waters that are regulated under the General Permit Program; 6. Operation of aquaculture or aquatic animal production facilities that discharge to surface or	Not Applicable

	groundwaters; 7. Discharges from the clean up of gasoline and fuel oil released from underground storage tanks; 8. Discharges associated with car washes and other motor vehicle washing operations; 9. Discharges of pollutants associated with the operation and maintenance of swimming pools, spas, and similar facilities; or 10. Pollution prevention/compliance assurance at municipal wastewater treatment plants	

[illegible]	[illegible]	[illegible]
Regulations Governing the Design, Installation, and Operation of On-Site Wastewater Treatment and Disposal Systems	Proposal to install on-site wastewater treatment and disposal systems	Not Applicable
Public Drinking Water Systems Regulations	Proposal to install, modify, or operate a public drinking water system	Not Applicable
Sediment and Stormwater Regulations	Proposal to construct facilities or modify land use in a manner that would affect runoff and/or erosion	Not Applicable
Marina Regulations	Proposal to construct or operate marinas	Not Applicable
Oil, Gas, and Mineral Exploration Regulations	Proposals for the exploration and exploitation of gas, oil, and other minerals within the boundaries of Delaware. These regulations also apply to proposals for the exploration or operation of gas storage reservoirs	Not Applicable

SUBJ: ATLANTIC TEST RANGES EXPANSION OF UNMANNED SYSTEMS OPERATIONS

SUMMARY

Based upon the information, data, and analysis, as contained in the EA, the Navy finds that the proposed action is consistent to the maximum extent practicable with the enforceable policies of the Delaware Coastal Management Program. Pursuant to 15 CFR 930.41, Delaware Coastal Programs has 60 days from the receipt of this document in which to concur with or object to this Consistency Determination, or to request an extension under 15 CFR section 930.41(b). Delaware's concurrence will be presumed if its response is not received by the Navy on the 60th day from receipt of this determination. The State's response should be sent to the following: Naval Air Warfare Center Aircraft Division; Attn: Ms. Brandi Simpson, 22347 Cedar Point Road, Building 2185, Patuxent River, Maryland, 20670-1183.

Sincerely,

T. K. CLARK
Director, NAVAIR Range Department

Enclosures:
(1) Regional Location of the ATR Inner Range
(2) Environmental Assessment for Atlantic Test Ranges Expansion of Unmanned Systems Operations

DEPARTMENT OF THE NAVY
NAVAL AIR SYSTEMS COMMAND
RADM WILLIAM A. MOFFETT BUILDING
47123 BUSE ROAD, BLDG 2272
PATUXENT RIVER, MARYLAND 20670-1547

IN REPLY REFER TO

5090
Ser 0321/52000ME
14 Aug 2013

Mr. Elder Ghigiarelli
Federal Consistency Coordinator
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230-1718

SUBJECT: Atlantic Test Ranges Expansion of Unmanned Systems Operations

Dear Mr. Ghigiarelli:

In accordance with the Federal Coastal Zone Management Act of 1972 (CZMA) as amended, Section 307c(1), the United States Department of the Navy (U.S. Navy) has determined that the proposed project, located on the Atlantic Test Ranges (ATR) Inner Range, Naval Air Station (NAS) Patuxent River, Webster Field Annex, and the Bloodsworth Island Range (BIR) will not affect the coastal zone. The proposed project involves unmanned systems research, development, acquisition, test and evaluation (RDAT&E) activities and training.

Because this action will not affect the coastal zone, it does not require a Consistency Determination, and we request your concurrence on a Coastal Consistency Negative Determination (CCND) for this action. This Negative Determination is submitted in compliance with the Ocean and Coastal Resource Management regulations (15 CFR 930.35).

This CCND, in accordance with the CZMA, is submitted for Naval Air Weapons Center Aircraft Division (NAWCAD), located at Naval Air Station (NAS) Patuxent River, Maryland.

INTRODUCTION AND STATEMENT OF CONSISTENCY

The CZMA of 1972 (16 U.S.C. Section 1451 et seq., as amended) provides assistance to states, in cooperation with federal and local agencies, for developing land and water use programs in coastal zones. Section 307 of the CZMA stipulates that where a federal project initiates reasonably foreseeable effects on any coastal use or resource (land or water use or natural resource), the action must be consistent to the maximum extent practicable with the enforceable policies of the affected state's federally-approved coastal management plan.

Maryland has developed and implemented a federally-approved Coastal Resources Management Program (CRMP), which describes current coastal legislation and enforceable policies. The key components of this program depend on federal laws, such as Section 404 of the Clean Water Act of 1977, and state laws and authorities, including the Chesapeake Coastal 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 Department of the Navy (the Navy) proposes to expand unmanned systems RDAT&E and training operations within the ATR Inner Range, which includes approximately 1,800 square nautical miles (2,384 sq mi, 6,174 sq km) of restricted airspace, underlying surface waters, and land test areas at NAS Patuxent River, Webster Field Annex, and the BIR. The proposed action has been evaluated for consistency with the Maryland CRMP and the results of that evaluation are documented in this CCND. Based on this evaluation, the Department of the Navy has determined that the proposed action will be consistent to the maximum extent practicable with the relevant enforceable policies of the federally-approved Maryland CRMP.

PROJECT LOCATION

NAS Patuxent River is located on 6,705 ac (2,713 ha) in St. Mary's County, Maryland, on a peninsula between the Patuxent River to the north, and the Chesapeake Bay to the east and south, approximately 65 mi (105 km) southeast of Washington, DC. The Station is host to over 50 tenant commands including the Naval Air Warfare Center Aircraft Division (NAWCAD). NAWCAD is the Navy's primary RDAT&E, engineering, and Fleet support activity for Navy and Marine Corps air vehicle systems and is responsible for the scheduling and conduct of operations within the ATR. The proposed action would be conducted within the ATR Inner Range, which includes approximately 1,800 square nautical miles (2,384 sq mi, 6,174 sq km) of restricted airspace, underlying surface waters, and land test areas at NAS Patuxent River, Webster Field Annex, and BIR (see Enclosure 1).

BACKGROUND

In order to meet the purpose and need there are requirements for operationally realistic engagements in air, land, and maritime environments. In addition to restricted airspace, the infrastructure needed to meet this requirement includes the following:

- Maritime and land test ranges with environmental, range safety, explosive safety, laser safety, flight clearances, and frequency clearances
- Line-of-sight (LOS) and Beyond line-of-sight (BLOS) capability to provide range surveillance of operating area and ability to relay data and communications
- LOS and BLOS time, space, and position information instrumentation, telemetry, and other associated RDAT&E instrumentation
- A system to predict the hazard pattern associated with the release of weapons and special sensors to measure the environment

The ATR Inner Range provides the combination of accessible environments and infrastructure, as well as separation from potential conflicts with other military or public uses, to readily accommodate the necessary air, land, and maritime testing and training of unmanned systems.

DESCRIPTION OF THE PROPOSED ACTION

The Proposed Action is to expand unmanned systems RDAT&E and training operations in the ATR Inner Range. This action includes multiple types of Unmanned aircraft systems (UAS),

Unmanned ground systems (UGS), and Unmanned maritime systems (UMS), either separately or as part of complex multi-system groups. Testing of unmanned systems would support the development of new generation unmanned platforms and their associated sensors and payloads. Operations may range from a single vehicle, to multiple vehicles, to integration testing between air, ground, and maritime platforms.

Most small UAS (Groups 1, 2, & 3) would be launched and recovered from Webster Field Annex, and larger UAS (Groups 4 & 5) would launch and land at NAS Patuxent River. However, some of the more portable Group 1 and 2 UAS may occasionally launch from more remote areas such as the waters surrounding the BIR that underlay restricted area R-4002 which extends from the surface to 20,000 ft (6,100 m). Groups 1 & 2 UAS landing in and around the BIR may do so in areas not subject to biological restrictions.

UGS interoperability tests would be conducted at Webster Field Annex. The UGS would be less than 700 lb (318 kg) in size and would be operated on previously disturbed sites, documented not to hold identified cultural resources, sensitive biological resources, or habitat of concern. There would be no ground disturbing activities associated with any unmanned systems operations associated with the proposed action.

The proposed action would involve UMS activities on the ATR Inner Range, including unmanned surface and underwater vehicle operations. All boats and UMS associated with the proposed action would use existing dock structures and would not conduct beach landings at Patuxent River or BIR, reducing potential impacts to near-shore resources. Unmanned underwater vehicles would be launched in the Chesapeake Bay and would not make contact with the Bay floor or articles resting on the Bay floor.

NEGATIVE DETERMINATION ANALYSIS

The following analysis considers each of the articles in the CZMA, including public access, recreation, marine environment, land resources, development, and industrial development. Consistent with the CZMA, all public agencies carrying out activities outside of the coastal zone that could have a direct impact on resources within the coastal zone shall consider the effect of such actions on coastal zone resources in order to assure that these policies are achieved.

Article 2 – Public Access

The proposed action includes UAS, UGS, and UMS operations from NAS Patuxent River and Webster Field Annex. NAS Patuxent River and Webster Field Annex are designated as secure locations. As such, public admittance on the two stations is generally not allowed. Members of the public are allowed on the station or annex during certain occasions (e.g., air shows, bird-watching tours, and community relations tours). The station and annex are open to Department of Defense employees, contractors, and active, retired, or reserve personnel.

The proposed action would include shoreline and offshore activities, consistent with ongoing operations. For safety purposes, some shoreline and offshore areas could be cleared during testing or training operations. Such clearance would be consistent with ongoing operations at the

station, annex, or range and are expected to have minimal effect on public access. Only authorized personnel are permitted access on the BIR, and no public access is permitted. Therefore, testing and training activities would not reduce public access, public safety, or result in overuse of a coastal area. The proposed action is consistent with the public access provisions found in Article 2 of the CZMA (Sections 30210-30214).

Article 3 – Recreation

Open space resources located within the ATR include: National wildlife refuges (NWRs); state Wildlife management areas (WMAs); state- and locally-designated nature and historic parks; beaches; harbors and marinas; regional recreation areas; and dozens of landings and wharves. Under the proposed action, 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 proposed action, as increased flight operations would not affect users or uses of those open space resources.

The NWRs, the WMAs on Maryland's eastern shore are overlaid by the restricted airspaces, R-4006 and R-4008; flights within these restricted areas are subject to a minimum altitude of 3,500 ft (1,067 m) and 25,000 ft (7,620 m), respectively. Overflights of the NWRs and WMAs at this minimum altitude would be 1,500 ft (450 m) greater than the minimum flight altitude allowed by a FAA interagency agreement with the U.S. Department of the Interior (FAA Advisory Circular 91-36D). This restriction would protect the NWRs and WMAs from annoyance and, during migratory season, minimize the potential for bird-aircraft strike hazard problems. Consequently, there would be no significant impacts to these open space resources under the proposed action.

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 ATR impact areas is the Elms WMA, which is located about 2.6 nm (4.8 km) 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 proposed action.

The proposed action would require clearance of recreational boating and fishing activities within small portions of the Bay during RDAT&E and training activities. This clearance time would be similar to that provided in the Final Environmental Impact Statement (FEIS) for the Patuxent River Complex (December 1998) or approximately 16 hours per week for an FEIS-assumed 24,400 flight hours. This translates to approximately 16 percent of summer daylight hours. As determined in the FEIS, this period of restriction would not have significant impacts on either recreational boaters or fishermen. Therefore, the overall impact on recreation would be minimal. The proposed action is consistent with the recreation provisions found in Article 3 of the CZMA (Sections 30220-30224).

Article 4 – Marine Environment

Noise and visual stimuli from UAS, as well as support aircraft overflights, could disturb wildlife on land. However, operational constraints (provided below) would generally restrict UAS and supporting aircraft flights to a minimum of 1,000 ft (305 m) AGL. Lower altitude flights would only involve small and quiet UAS that would have minimal if any effects on terrestrial wildlife. At 1,000 ft (305 m) AGL, received sound exposure levels (SELs) from large manned or unmanned aircraft would range from 74.6 to 118.1 A-weighted decibels (dBA). As such, overflights by large aircraft could disturb wildlife, but any such disturbance would be brief. Additionally, all Group 4 and 5 UAS flights would follow established air operation procedures within the ATR Inner Range.

Group 1 and 2 UAS are expected to have little to no impact to wildlife from visual or noise stimuli due to their small size and limited range. Under the proposed action, Group 1 and 2 UAS flights would be conducted at Webster Field Annex and from boats in the BIR. These boat-launched UAS would be recovered via onboard systems or would land on Bloodsworth Island. Prior to Group 1 or 2 UAS operations on the BIR, environmental management personnel, would define primary and alternate UAS landing locations, avoiding identified biological resources. UAS recovery would be performed via foot traffic only (no motorized vehicles would be used). Boats would use existing dock structures and would not conduct beach landings on Bloodsworth Island. Other operational constraints would also minimize the potential for new ground disturbance. Under the proposed action, the cumulative flight tempo (manned and unmanned) would remain below the 1998 FEIS threshold of 24,400 flight hours on the Inner Range and would not significantly disrupt foraging, resting, or nesting behavior of terrestrial wildlife.

Under the proposed action, UGS interoperability tests would be conducted at NAS Patuxent River and Webster Field Annex. The UGS would be less than 700 lb (318 kg) in size and would be operated on previously disturbed sites, documented not to hold sensitive biological resources. Furthermore, UGS operations would follow seasonal operational constraints provided below, minimizing effects on bald eagles and peregrine falcons.

UAS launches, flights, and supporting aircraft would have no effect on marine habitats or invertebrates. Operation of UMS and manned vessels would maintain minimum distances from shore to include allowances for sufficient depth and swell conditions.

Prop wash from UMS and manned vessels could agitate and suspend bottom sediments, which could cause sedimentation of submerged aquatic vegetation (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 8.9 ft (2.7 m). Manned support craft 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 UMS and manned vessels is minimal, especially in comparison to overall boat or ship traffic within the Chesapeake Bay.

UMS and manned vessels would, whenever possible, operate at a minimum distance of 100 ft (30.5 m) from SAV beds.

The following operational constraints have been specifically developed for the proposed action and/or have been derived from conservation measures provided in the Integrated Natural Resources Management Plan (INRMP) documents for NAS Patuxent River/Webster Field Annex (February 2002) and the BIR (July 2009).

- Group 4 and 5 UAS would follow established air operation procedures within the ATR Inner Range.
- In general, UAS and supporting aircraft flights would be restricted to an elevation of 1,000 ft (305 m) AGL or greater over the BIR. Lower altitude flights would only involve small and quiet UAS and bird nesting areas would not, in any case, be overflown at lower than 500 ft (152 m). Other appropriate protective measures for flights below 1,000 ft (305 m) would be developed on an as-needed basis and coordinated with environmental management personnel prior to initiating operations.
- All UAS launches would occur from previously disturbed areas and boats to eliminate the potential for new ground disturbance impacts.
- Visual surveillance of target areas would be conducted prior to stores separation tests and training to ensure that marine mammals are not in the target vicinity.
- Visual surveillance and passive acoustic monitoring would be conducted prior to use of active underwater acoustic sources to ensure that marine mammals are not in the vicinity of the acoustic source locations.
- All UGS would operate on previously disturbed land areas, which have been surveyed for biological and cultural resources.
- Based on the most current information available, environmental personnel would provide guidance to project participants regarding the locations of nesting sites and seabird rookeries. These locations would be subject to seasonal restrictions. These seasonal restrictions include, but are not limited to the following:
    - NAS Patuxent River and Webster Field Annex
        - Occupied nesting areas would not in any case be overflown lower than 500 ft (152 m)
        - No overflights would be conducted in the vicinity of peregrine falcon nesting locations during the period of 15 February through 15 June.
        - No overflights in the vicinity of bald eagle nest sites during the period of 15 December through 15 June.
        - UGS, UMS, and manned support vessels would maintain a minimum distance of 1,320 ft (402 m) from the nesting areas during the seasonal restrictions described above.
    - Bloodsworth Island

- Occupied nesting areas would not in any case be overflown lower than 500 ft (152 m)
- No overflights would be conducted in the vicinity of peregrine falcon nesting locations during the period of 15 February through 15 June.
- No overflights in the vicinity of bald eagle nest sites during the period of 15 December through 15 June.
- No summertime operations near Fin Creek Ridge due to heron nesting (1 February through 15 August).
- No winter operations (15 November through 15 March) at the south end and west side of the island due to winter waterfowl.
    - UAS and support aircraft must maintain an elevation over 3,500 ft (1,067 m).
    - Flights may transect the island but cannot maintain pattern flight over the island or waterfowl areas during the winter months.
- Group 1 or 2 UAS may land on the island, away from sensitive biological and cultural resources.
- UMS and manned support vessels would maintain a minimum distance of 1,320 ft (402 m) from the nesting areas during the seasonal restrictions described above.

- Adam Island
    - Occupied nesting areas would not, in any case, be overflown lower than 500 ft (152 m)
    - No overflights in the vicinity of bald eagle nesting sites on the southern portion of the island. UAS must maintain a horizontal distance of 660 ft (201 m) from the nesting sites. The restrictions apply from 15 December to 15 June.
    - Overflights of the tower portion of the island are restricted from 15 May to 15 October due to pelican nesting season.
    - UMS and manned support vessels would maintain a minimum distance of 1,320 ft (402 m) from the nesting areas during the seasonal restrictions described above.

- UMS and manned vessels would, whenever possible, operate at a minimum distance of 100 ft (30.5 m) from SAV beds. All UMS and vessel operations would be coordinated with environmental personnel to provide locations of the known SAV beds.

The proposed action is consistent with the marine environment provisions found in Article 4 of the CZMA (Sections 30230-30233).

Article 5 – Land Resources

The proposed action will utilize existing airstrips, roadways, and other existing developed land for launching UAS, UMS, UGS, and conventional aircraft and vessels. There would be no construction or modification of land use within the project area. Therefore, the proposed action is consistent with the land resources provisions found in Article 5 of the CZMA (Sections 30240-30244).

Article 6 – Development

The proposed action does not involve development of new facilities or construction of infrastructure in the project area. Therefore the development provisions found in Article 6 of the CZMA (Sections 30250-30255) are not applicable to the proposed action.

Article 7 – Industrial Development

The proposed action does not involve the development or modification of industrial facilities. Therefore, the industrial development provisions of the CZMA (Sections 30260-30265.5) are not applicable to the proposed action.

STATE COASTAL CONSISTENCY PROVISIONS

Federal actions within the coastal zone must be compliant with relevant state and federal regulatory programs to the maximum extent practicable. The Maryland CRMP constitutes federal consistency through implementation of 14 permits/approvals provided in *A Guide to Maryland's Coastal Zone Management Program Federal Consistency Process*. Table 1 provides a summary of these permits/approvals, applicable circumstances, and applicability to the proposed action.

Two of the 14 permit/approvals comprising the Maryland CRMP enforceable policies pertain to the activities associated with the proposed action. These enforceable policies concern Air Quality and the Chesapeake and Atlantic Coastal Bays Critical Areas.

- **Air Quality** – Implementation of the proposed action would result in some air emissions from aircraft and watercraft operations and inert weapons firing. However, the Navy has determined that all emissions would be well below the *de minimis* thresholds established under the Clean Air Act General Conformity Rule. Therefore, the proposed action would have no significant impacts on local or regional air quality and; therefore, would be consistent with Maryland's air pollution control policy.
- **Chesapeake and Atlantic Coastal Bays Critical Areas** – According to the Critical Areas Act, all land within 1,000 feet of tidal waters or adjacent tidal wetlands are considered Critical Areas. Habitats of threatened and endangered species and species in need of conservation are designated as Habitat Protection Areas (HPAs) under the act. The heron rookery on the northern end of Bloodsworth Island is considered an HPA. Implementation of the proposed action would involve overflights of this HPA, with seasonal restrictions. In addition, landing and recovery of Group 1 or 2 UAS would be

conducted on portions of the island; however, no operations would be conducted in the No Fire Zone. Impacts on the heron rookery will be avoided by continued enforcement of the No Fire Area in the northern end of Bloodsworth Island.

Table 1 Enforceable Policies of the Maryland CRMP as Applicable to the Proposed Action

Air Quality Permit	Proposal to construct and operate an activity that discharges emissions to the outside air.	Consistent
Aquaculture Permit	Proposal to engage in aquaculture or related activities.	Not Applicable
Chesapeake and Atlantic Coastal Bays Critical Area Approval	Proposal to conduct various activities within the Chesapeake and Atlantic Coastal Bays Critical Area.	Consistent
Controlled Hazardous Substances Facility Permit	Proposal to treat, store, or dispose of hazardous waste.	Not Applicable
Erosion and Sediment Control and Stormwater Management Plan	Proposal by state or federal agencies for construction that disturbs 5,000 sq ft or more of land or results in 100 cu yd or more of earth movement	Not Applicable
Nontidal Wetlands and Waterways Permit	Proposal for work in a nontidal stream, 100-year floodplain, or nontidal wetland, including a 25-foot buffer.	Not Applicable
Oil and Gas Exploration and Production Permit	Proposal to drill and operate a gas or oil well.	Not Applicable
Oil Operations Permit	Proposal to store more than 10,000 gallons of oil in above-ground tanks, transport oil, or operate oil transfer facilities.	Not Applicable
Refuse Disposal Permit	Proposal to install, alter, or extend a refuse disposal system.	Not Applicable
Tidal Wetlands License or Permit	Proposal for any work that may change a tidal wetland.	Not Applicable
Water Appropriation and Use Permit	Proposal to appropriate or use any of the state's surface and/or underground waters.	Not Applicable
Water Quality Certification	Proposal to place, fill, or discharge pollutants in waters of the U.S. (including adjacent wetlands).	Not Applicable
Water Discharge Permit	Proposal to dispose of wastewater into the state's groundwater or surface waters.	Not Applicable
Wetlands Mitigation Plan	Accompanies Tidal Wetlands Permit.	Not Applicable

SUBJ: Atlantic Test Ranges Expansion of Unmanned Systems Operations

SUMMARY

Based upon the information, data, and analysis, as contained in the EA, the Navy finds that the proposed action is consistent to the maximum extent practicable with the enforceable policies of the Maryland Coastal Resources Management Program. Pursuant to 15 CFR 930.41, the Maryland Coastal Resources Management Program has 60 days from the receipt of this document in which to concur with or object to this Consistency Determination, or to request an extension under 15 CFR section 930.41(b). Maryland's concurrence will be presumed if its response is not received by the Navy on the 60th day from receipt of this determination. The State's response should be sent to the following: Naval Air Warfare Center Aircraft Division; Attn: Ms. Brandi Simpson, 22347 Cedar Point Road, Building 2185, Patuxent River, Maryland, 20670-1183.

Sincerely,

T. K. CLARK
Director, NAVAIR Range Department

Enclosures:
(1) Regional Location of the ATR Inner Range
(2) Environmental Assessment for Atlantic Test Ranges Expansion of Unmanned Systems Operations

DEPARTMENT OF THE NAVY
NAVAL AIR SYSTEMS COMMAND
RADM WILLIAM A. MOFFETT BUILDING
47123 BUSE ROAD, BLDG 2272
PATUXENT RIVER, MARYLAND 20670-1547

IN REPLY REFER TO

5090
Ser 0322/52000ME
14 Aug 2013

Ms. Ellie L. Irons
Program Manager
Virginia Department of Environmental Quality
Office of Environmental Impact Review
629 East Main Street, 6th Floor
Richmond, Virginia 23219

SUBJ: Atlantic Test Ranges Expansion of Unmanned Systems Operations

Dear Ms. Irons:

This document provides the Commonwealth of Virginia with the United States Department of the Navy's (the Navy's) Consistency Determination under the Federal Coastal Zone Management Act of 1972 (CZMA) as amended, Section 307c(1) and 15 CFR Part 930, subpart C for the Atlantic Test Ranges (ATR) Expansion of Unmanned Systems Operations. The information in this Consistency Determination is provided pursuant to 15 CFR § 930.39. This activity includes the expansion of unmanned systems research, development, acquisition, test and evaluation (RDAT&E) and training operations in the ATR Inner Range (see Enclosure 1). This action includes multiple types of unmanned aircraft systems (UAS), unmanned ground systems (UGS), and unmanned maritime systems (UMS), either separately or as part of complex multi-system groups. Testing of unmanned systems would support the development of new generation unmanned platforms and their associated sensors and payloads. Operations may range from a single vehicle, to multiple vehicles, to integration testing between air, ground, and maritime platforms.

As described in the Environmental Assessment (EA) for the proposed action (Enclosure 2), no UMS or UGS activities would be performed within the waters of the Commonwealth or on its lands. The proposed action would include UAS overflights within the restricted airspace over Virginia lands. Most small UAS (Groups 1, 2, & 3) would be launched and recovered from Webster Field Annex, and larger UAS (Groups 4 & 5) would launch and land at NAS Patuxent River.

COASTAL DETERMINATION

The Virginia Coastal Resources Management Program defines the applicable enforceable policies in its Federal Consistency Manual (dated 27 July 2011). Table 1 provides a summary of these policies in the left column. The Navy has determined that the implementation of the ATR Expansion of Unmanned Systems Operations would not affect the land or water uses or natural resources of Virginia, as described in the right column of the table.

Table 1. Enforceable Policies of the Virginia Coastal Resources Zone Management Program

[redacted]	[redacted]
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 Virginia Marine Resources Commission (VMRC) (Virginia Administrative Code (VAC) §28.2-200 to §28.2-713) and the Virginia Department of Game and Inland Fisheries (VDGIF) (VAC §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 VMRC, VDGIF, and Virginia Department of Agriculture and Consumer Services (VDACS) share enforcement responsibilities (VAC §3.1-249.59 to §3.1-249.62).	**NO EFFECT** The proposed action would not involve building, dumping, or otherwise trespassing on or over, encroaching on, taking or using any material from the beds of the bays, ocean, rivers, streams, or creeks within Virginia. The proposed action would not have a reasonably foreseeable effect on fish spawning, nursery, or feeding grounds, and therefore none on fisheries management. No paints containing TBT will be used under this proposed action.
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 Virginia Department of	**NO EFFECT** No subaqueous land use is proposed under this action. This project involves no encroachments in, on, or over state-owned submerged lands.

Environmental Quality (VDEQ), Water Division. The program is administered by VMRC (VAC §28.2-1200 to §28.2-1213).	

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. (i) The tidal wetlands program is administered by VMRC (VAC §28.2-1301 through §28.2-1320). (ii) The Virginia Water Protection Permit program administered by VDEQ includes protection of wetlands—both tidal and non-tidal. This program is authorized by VAC §62.1-44.15.5 and the Water Quality Certification requirements of Section 401 of the Clean Water Act of 1972.	**NO EFFECT** This project would not affect any tidal or non-tidal wetlands and would therefore not require a Virginia Water Protection Permit.
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 VMRC (VAC §28.2-1400 through §28.2-1420).	**NO EFFECT** No permanent alteration of or construction upon any coastal primary sand dune will take place under the proposed action
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 Virginia Department of Conservation and Recreation (VDCR) (VAC §10.1-560 et seq.).	**NO EFFECT** The project would require no ground disturbance and would not be subject to the Erosion and Sediment and control law.
Point Source Pollution Control The point source program is administered	**NO EFFECT** There would be no wastewater or storm

by the State Water Control Board pursuant to VAC §62.1-44.15. Point source pollution control is accomplished through the implementation of 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.	water discharges associated with the project.
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 Virginia Department of Health (VAC §32.1-164 through §32.1-165).	**NO EFFECT** The project would not involve the construction or use of septic systems.

Air Pollution Control The program implements the federal Clean Air Act to provide a legally enforceable State Implementation Plan (SIP) for the attainment and maintenance of the National Ambient Air Quality Standards (NAAQS). This program is administered by the State Air Pollution Control Board (VAC §10-1.1300).	**MINOR EFFECT** The ATR Inner Range covers portions of Westmoreland, Northumberland, and Lancaster counties in Virginia, which are in attainment for all NAAQS. The project would lead to minor increases in criteria air pollutants emissions. There is no applicable SIP for the area; however, criteria air pollutants emissions associated with the project would be below *de minimis* thresholds.
Coastal Lands Management A state–local cooperative program administered by the VDCR's Division of Chesapeake Bay Local Assistance and 84 localities in Tidewater, Virginia established pursuant to the Chesapeake Bay Preservation Act; VAC §10.1-2100 through §10.1-2114 and Chesapeake Bay Preservation Area Designation and Management Regulations; Virginia Administrative Code 9 VAC10-20-10 et seq.	**NO EFFECT** This project would not disturb any coastal zone lands within the Commonwealth of Virginia.

SUBJ: ATLANTIC TEST RANGES EXPANSION OF UNMANNED SYSTEMS OPERATIONS

SUMMARY

Based upon the information, data, and analysis, as contained in the EA, the Navy finds that the proposed action is consistent to the maximum extent practicable with the enforceable policies of the Virginia Coastal Resources Management Program. Pursuant to 15 CFR 930.41, the Virginia Coastal Resources Management Program has 60 days from the receipt of this document in which to concur with or object to this Consistency Determination, or to request an extension under 15 CFR section 930.41(b). Virginia's concurrence will be presumed if its response is not received by the Navy on the 60th day from receipt of this determination. The Commonwealth's response should be sent to the following: Naval Air Warfare Center Aircraft Division; Attn: Ms. Brandi Simpson, 22347 Cedar Point Road, Building 2185, Patuxent River, Maryland, 20670-1183.

Sincerely,

T. K. CLARK
Director, NAVAIR Range Department

Enclosures:
(1) Regional Location of the ATR Inner Range
(2) Environmental Assessment for Atlantic Test Ranges Expansion of Unmanned Systems Operations

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

Street address: 629 East Main Street, Richmond, Virginia 23219
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Douglas W. Domenech
Secretary of Natural Resources

David K. Paylor
Director

(804) 698-4000
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October 15, 2013

Ms. Brandi Simpson
Naval Air Warfare Center Aircraft Division
Atlantic Test Ranges
22347 Cedar Point Road
Building 2185
Patuxent River, MD 20670-1183

RE: Draft Environmental Assessment and Federal Consistency Determination: Atlantic Test Ranges Expansion of Unmanned Systems Operations (DEQ 13-160F)

Dear Ms. Simpson:

The Commonwealth of Virginia has completed its review of the draft Environmental Assessment (EA) for the above-referenced project. The Department of Environmental Quality (DEQ) is responsible for coordinating Virginia's review of federal environmental documents prepared pursuant to the National Environmental Policy Act (NEPA) and responding to appropriate federal officials on behalf of the Commonwealth. DEQ is also responsible for coordinating state reviews of federal consistency determinations (FCD) submitted under the Coastal Zone Management Act. The following agencies participated in this review:

Department of Environmental Quality
Department of Game and Inland Fisheries
Department of Conservation and Recreation
Department of Historic Resources
Department of Aviation

The counties of Westmoreland, Northumberland and Lancaster and the Northern Neck Planning District Commission also were invited to comment.

PROJECT DESCRIPTION

The Department of the Navy proposes to expand unmanned systems research, development, acquisition, test and evaluation, and training operations in the Atlantic Test Ranges (ATR), including unmanned aircraft systems, unmanned ground systems, and unmanned maritime systems. Specifically, the Proposed Action would be conducted within the ATR Inner Range, which includes approximately 1,800 square nautical miles of restricted airspace, underlying surface waters, and land test areas. All water- and land-based test areas are in Maryland. Only unmanned aircraft systems (UAS) would be used in the Commonwealth of Virginia. The ATR Inner Range airspace overlaps Westmoreland, Northumberland and Lancaster counties in Virginia. According to the FCD, the project would be consistent with the enforceable policies of the Virginia Coastal Zone Management Program (VCP).

ENVIRONMENTAL IMPACTS AND MITIGATION

1. Air Pollution Control. The FCD (page 4) states that the project would lead to minor increases in emissions.

1(a) Agency Jurisdiction. DEQ's Air Quality Division, on behalf of the State Air Pollution Control Board, is responsible for developing regulations that implement Virginia's Air Pollution Control Law. DEQ is charged with carrying out mandates of the state law and related regulations as well as Virginia's federal obligations under the Clean Air Act as amended in 1990. The objective is to protect and enhance public health and quality of life through control and mitigation of air pollution. The division ensures the safety and quality of air in Virginia by monitoring and analyzing air quality data, regulating sources of air pollution, and working with local, state and federal agencies to plan and implement strategies to protect Virginia's air quality. The appropriate regional office is directly responsible for the issuance of necessary permits to construct and operate all stationary sources in the region as well as monitoring emissions from these sources for compliance. As a part of this mandate, environmental impact reports of projects to be undertaken in the state are also reviewed. In the case of certain projects, additional evaluation and demonstration must be made under the general conformity provisions of state and federal law.

1(b) Ozone Attainment Area. The DEQ Division of Air Program Coordination states that the project area is in an ozone attainment area.

1(c) Agency Recommendation. The DEQ Piedmont Regional Office (PRO) recommends the proposed action operate in a manner consistent with air pollution control practices for minimizing emissions, especially during periods of high ozone.

2. Natural Heritage Resources. The EA (page 3-43) indicates that significant habitat would not be affected by UAS flights.

2(a) Agency Jurisdiction.

2(a)(i) Natural Heritage Resources. The mission of the DCR is to conserve Virginia's natural and recreational resources. DCR supports a variety of environmental programs organized within seven divisions including the Division of Natural Heritage (DNH). DNH's mission is conserving Virginia's biodiversity through inventory, protection, and stewardship. The Virginia Natural Area Preserves Act, 10.1-209 through 217 of the *Code of Virginia*, was passed in 1989 and codified DCR's powers and duties related to statewide biological inventory: maintaining a statewide database for conservation planning and project review, land protection for the conservation of biodiversity, and the protection and ecological management of natural heritage resources (the habitats of rare, threatened and endangered species, significant natural communities, geologic sites, and other natural features).

2(a)(ii) Threatened and Endangered Plant and Insect Species. The Endangered Plant and Insect Species Act of 1979, Chapter 39, §3.1-102- through 1030 of the *Code of Virginia*, as amended, authorizes the Virginia Department of Agriculture and Consumer Services (VDACS) to conserve, protect and manage endangered species of plants and insects. VDACS Virginia Endangered Plant and Insect Species Program personnel cooperates with the U.S. Fish and Wildlife Service (FWS), DCR DNH and other agencies and organizations on the recovery, protection or conservation of listed threatened or endangered species and designated plant and insect species that are rare throughout their worldwide ranges. In those instances where recovery plans, developed by FWS, are available, adherence to the order and tasks outlined in the plans should be followed to the extent possible. VDACS has regulatory authority to conserve rare and endangered plant and insect species through the Virginia Endangered Plant and Insect Species Act. Under a Memorandum of Agreement established between the VDACS and DCR, DCR has the authority to report for VDACS on state-listed plant and insect species.

2(b) Agency Findings. The DCR DNH states that the Biotics Data System documents the presence of natural heritage resources in the project area. However, due to the scope of the activity (no land activity in Virginia and only some unmanned aerial systems flying over Virginia land) and the distance to the resources, DCR DNH does not anticipate that this project will adversely impact these natural heritage resources.

2(c) State Natural Area Preserves. DCR DNH states that there are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

2(d) State-listed Plant and Insect Species. DCR DNH states that the current activity will not affect any documented state-listed plants or insects.

2(e) Agency Recommendations. Contact DCR DNH for an update on natural heritage information since new and updated information is continually added to Biotics if a significant time passes before the projects are implemented.

3. Wildlife Management. The EA (page 3-42) states that any disturbance to wildlife from UAS could be brief.

3(a) Jurisdiction. The Department of Game and Inland Fisheries (DGIF), as the Commonwealth's wildlife and freshwater fish management agency, exercises enforcement and regulatory jurisdiction over wildlife and freshwater fish, including state- or federally-listed endangered or threatened species, but excluding listed insects (Virginia Code Title 29.1). DGIF is a consulting agency under the U.S. Fish and Wildlife Coordination Act (16 U.S.C. sections 661 *et seq.*) and provides environmental analysis of projects or permit applications coordinated through DEQ and several other state and federal agencies. DGIF determines likely impacts upon fish and wildlife resources and habitat, and recommends appropriate measures to avoid, reduce or compensate for those impacts.

3(b) Agency Findings. Based on the scope of the project, DGIF does not anticipate this project to result in significant adverse impacts upon resources under its jurisdiction.

3(c) Additional Information. DGIF maintains a database (*http://vafwis.org/fwis/)* of wildlife locations, including threatened and endangered species, trout streams and anadromous fish waters.

4. Historic and Archaeological Resources. The EA (pages 3-58 and 3-59) does not indicate that historic resources would be affected by the project.

4(a) Agency Jurisdiction. The Department of Historic Resources (DHR) conducts reviews of projects to determine their effect on historic structures or cultural resources under its jurisdiction. DHR, as the designated State's Historic Preservation Office, ensures that federal actions comply with Section 106 of the National Historic Preservation Act of 1962 (NHPA), as amended, and its implementing regulation at 36 CFR Part 800. The NHPA requires federal agencies to consider the effects of federal projects on properties that are listed or eligible for listing on the National Register of Historic Places. Section 106 also applies if there are any federal involvements, such as licenses, permits, approvals or funding. DHR also provides comments to DEQ through the state environmental impact report review process.

4(b) Agency Comment. Given the scope of the proposed undertaking, DHR states that the Expansion of the Atlantic Test Ranges will have no effect to any known architectural or archaeological resource in Virginia.

4(c) Agency Recommendation. Consult with the Maryland Historical Trust, if necessary pursuant to Section 106 of the National Historic Preservation Act (as amended), to consider impacts to historic properties in Maryland.

5. Fisheries Management.

5(a) Agency Jurisdiction. Virginia Marine Resources Commission and Department of Game and Inland Fisheries. The fisheries management enforceable policy is administered by the Marine Resources Commission (Virginia Code Sections 28.2-200 to 28.2-713) and the Department of Game and Inland Fisheries (Virginia Code Sections 29.1-100 to 29.1-570).

5(b) Agency Finding. DGIF finds the proposed project consistent with the fisheries management enforceable policy.

6. Aviation Impacts. The EA (page 3-70) states that operations that have the potential to create hazards to aircraft would be coordinated with the Federal Aviation Administration.

6(a) Agency Jurisdiction. The Virginia Department of Aviation (DOAv) is a state agency that plans for the development of the state aviation system; promotes aviation; grants aircraft and airports licenses; and provides financial and technical assistance to cities, towns, counties and other governmental subdivisions for the planning, development, construction and operation of airports, and other aviation facilities.

6(b) Agency Comments. DOAv states that the bullet points in Section 2.1.5 Test and Training Location identify the boundaries of the inner range. However, the third bullet point should include a more three-dimensional identification of the airspace that will be used by the UAS. The terminology (restricted airspace and underlying surface areas) raises questions as to whether or not the test range will include the airspace from the surface of the water for use of unmanned maritime systems and the airspace within the existing top and bottom altitudes of the current restricted airspace. This issue is especially pertinent to the Restricted Airspace R-4006 with regards to the public use airport on Tangier Island. The same clarification should be noted in Section 3.5.1.3 on page 3-60.

Currently there are two instrument approaches to Tangier Island Airport. Both approaches originate from the south and direct the pilot east of Restricted Airspace R-6609 and under R-4006 to Runway 2. There are no instrument approaches in

development now directed toward Runway 20. However, DOAv is undertaking an initiative to develop an instrument approach to each runway end. Therefore, some consideration for this potential future impact should be given in better defining the airspace to be utilized by any unmanned aircraft.

The phrase "all UAS would be operated within their prescribed altitude limits" in the second bullet point in Section 3.7.2 Environmental Consequences on page 3-78 is confusing. Is the report referring to the operation limits of the individual UAS as identified in Table 2-1 on page 2-4 or the altitude limits of the existing restricted airspace?

The Tangier Island Airport is a public-use airport utilized almost entirely by transient traffic. It is also used frequently as a pick up point by a medi-vac helicopter transporting patients to and from Tangier Island and Salisbury Maryland. DOAv recommends lateral and vertical separation standards be established for UAS operations to prevent conflict between manned and unmanned aircraft from operation within the same vicinity.

6(c) Agency Recommendations. DOAV recommends the Navy make edits to the EA to clarify or explain the following:

- Modify the third bullet point in Section 2.1.5 Test and Training Location to include a more three-dimensional identification of the airspace that will be used by the UAS;
- Specify in Section 2.1.5 Test and Training Location and in Section 3.5.1.3 on page 3-60 whether the test range will include the airspace from the surface of the water for the use of unmanned maritime systems and the airspace within the existing top and bottom altitudes of the current restricted airspace;
- Include DOAv's initiative to develop an instrument approach to each runway end at Tangier Island Airport when providing a more detailed definition of the airspace to be used by the UAS;
- Define what the phrase "all UAS would be operated within their prescribed altitude limits" in the second bullet point in Section 3.7.2 Environmental Consequences on page 3-78 means in terms of operation limits of the individual UAS as identified in Table 2-1 on page 2-4 and the altitude limits of the existing restricted airspace; and
- Establish lateral and vertical separation standards for UAS operations to prevent conflict between manned and unmanned aircraft from operation within the same vicinity.

7. Regional and Local Comments. The counties of Westmoreland, Northumberland and Lancaster and the Northern Neck Planning District Commission were invited to comment.

7(a) Agency Jurisdiction. In accordance with the Code of Virginia, Section 15.2-4207, planning district commissions encourage and facilitate local government cooperation and state-local cooperation in addressing, on a regional basis, problems of greater than local significance. The cooperation resulting from this is intended to facilitate the recognition and analysis of regional opportunities and take account of regional influences in planning and implementing public policies and services. Planning district commissions promote the orderly and efficient development of the physical, social and economic elements of the districts by planning, and encouraging and assisting localities to plan, for the future.

7(b) Comments. The counties of Westmoreland, Northumberland and Lancaster and the Northern Neck Planning District Commission did not respond to DEQ's request for comment.

FEDERAL CONSISTENCY PURSUANT TO THE COASTAL ZONE MANAGEMENT ACT

Pursuant to the Coastal Zone Management Act of 1972, as amended, activities both within and outside of the Commonwealth's designated coastal zone with reasonably foreseeable effects on any coastal uses or resources resulting from a Federal agency activity (15 CFR Part 930, Subpart C) or Federal license or permit activity (15 CFR Part 930, Subpart D) must be consistent with Virginia's Coastal Zone Management Program. The Virginia Coastal Zone Management Program (VCP) (previously known as the Virginia Coastal Resources Management Program) consists of a network of programs administered by several agencies. DEQ coordinates the review of FCDs and federal consistency certifications (FCCs) with agencies administering the enforceable policies of the VCP.

PUBLIC PARTICIPATION

In accordance with 15 CFR §930.2, a public notice of this proposed action was published on the DEQ website from August 26, 2013 to September 19, 2013. No public comments were received in response to the notice.

FEDERAL CONSISTENCY CONCURRENCE

The FCD states that the project is consistent with the enforceable policies of the VCP. The reviewing agencies that are responsible for the administration of the enforceable policies generally agree with the FCD. Based on the review of the FCD and the

comments submitted by agencies administering the enforceable policies of the VCP, DEQ concurs that the proposed project is consistent with the VCP provided all applicable permits and approvals are obtained. However, other state approvals which may apply to this project are not included in this FCD. Therefore, the Navy must also ensure that this project is operated in accordance with all applicable federal, state and local laws and regulations.

REGULATORY AND COORDINATION NEEDS

1. Air Pollution Control. The following regulations may apply:

- fugitive dust and emissions control (9VAC5-50-60 *et seq.*); and
- open burning restrictions (9VAC5-130 *et seq.*).

2. Natural Heritage Resources. Contact the DCR DNH (804-371-2708) for an update on natural heritage information if a significant amount of time passes before projects resulting are implemented.

3. Historic Resources in Maryland. Consult with the Maryland Historical Trust, if necessary pursuant to Section 106 of the National Historic Preservation Act (as amended), to consider impacts to historic properties in Maryland.

4. Aviation Impacts. Coordinate with DOAv (Scott Denny at *Scott.Denny@deq.virginia.gov* or 804-236-3632) regarding its recommendations.

Thank you for the opportunity to comment on the draft EA and FCD. DEQ has no objection to the implementation of the proposed project. Detailed comments of reviewing agencies are attached for your review. If you have questions, please do not hesitate to call me at (804) 698-4325 or Julia Wellman at (804) 698-4326.

Sincerely,

Ellie Irons, Program Manager
Environmental Impact Review

Enclosures

cc: Jerry Davis, NNPDC
Norm Risavi, Westmoreland County

Kenneth D. Eades, Northumberland County
Frank Pleva, Lancaster County

ec: Amy Ewing, DGIF
Robbie Rhur, DCR
Kotur S. Narasimhan, DEQ DAPC
Kelley West, DEQ PRO
Roger Kirchen, DHR
Scott Denny, DOAv
Mark Dimsha, Epsilon Systems
Brandi Simpson, Navy

DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR PROGRAM COORDINATION

ENVIRONMENTAL REVIEW COMMENTS APPLICABLE TO AIR QUALITY

TO: Julia H. Wellman **DEQ - OEIA PROJECT NUMBER: 13 – 160F**

PROJECT TYPE: ☐ STATE EA / EIR **X FEDERAL EA / EIS** ☐ SCC

X CONSISTENCY DETERMINATION

PROJECT TITLE: ATLANTIC TEST RANGES EXPANSION OF UNMANNED SYSTEMS OPERATIONS

PROJECT SPONSOR: DOD /DEPARTMENT OF T HE NAVY

PROJECT LOCATION: **X OZONE ATTAINMENT AREA**

REGULATORY REQUIREMENTSMAY BE APPLICABLE TO: ☐ CONSTRUCTION ☐ OPERATION

STATE AIR POLLUTION CONTROL BOARD REGULATIONS THAT MAY APPLY:

1. ☐ 9 VAC 5-40-5200 C & 9 VAC 5-40-5220 E – STAGE I
2. ☐ 9 VAC 5-40-5200 C & 9 VAC 5-40-5220 F – STAGE II Vapor Recovery
3. ☐ 9 VAC 5-40-5490 et seq. – Asphalt Paving operations
4. ☐ 9 VAC 5-130 et seq. – Open Burning
5. ☐ 9 VAC 5-50-60 et seq. Fugitive Dust Emissions
6. ☐ 9 VAC 5-50-130 et seq. - Odorous Emissions; Applicable to_____
7. ☐ 9 VAC 5-50-160 et seq. – Standards of Performance for Toxic Pollutants
8. ☐ 9 VAC 5-50-400 Subpart_____, Standards of Performance for New Stationary Sources, designates standards of performance for the_____
9. ☐ 9 VAC 5-80-1100 et seq. of the regulations – Permits for Stationary Sources
10. ☐ 9 VAC 5-80-1700 et seq. Of the regulations – Major or Modified Sources located in PSD areas. This rule may be applicable to the _____
11. ☐ 9 VAC 5-80-2000 et seq. of the regulations – New and modified sources located in non-attainment areas
12. ☐ 9 VAC 5-80-800 et seq. Of the regulations – Operating Permits and exemptions. This rule may be applicable to _____

COMMENTS SPECIFIC TO THE PROJECT:

K. S. Narasimhan

(Kotur S. Narasimhan)
Office of Air Data Analysis

DATE: August 30, 2013

MEMORANDUM
DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office

4949-A Cox Road **Glen Allen, VA 23060** **804/527-5020**

TO: Julia Wellman
Environmental Program Planner

FROM: Kelley West
Environmental Planner

DATE: September 19, 2013

SUBJECT: Atlantic Test Ranges Expansion of Unmanned Systems Operations (13-160F)

The DEQ-Piedmont Regional Office has reviewed the Consistency Determination for the above referenced project, by which the Department of the Navy plans to expand the unmanned systems operations for the Atlantic Test Ranges. This includes the use of multiple types of unmanned aircraft systems, unmanned ground systems, and unmanned marine systems over an expanded testing area. This expansion would take place within Virginia, Maryland and Delaware.

Water: PRO recommends that the Navy should take every precaution to protect Clupeid Species and Marine Mammals from the SONAR frequencies. If any land impacts occur during the unmanned vehicle use please be aware that erosion and sediment controls should be properly implemented and maintained. Also follow all standards and specifications under the Virginia Erosion & Sediment Controls Handbook (1992, 3rd Edition).

Air: PRO recommends the proposed actions shall operate in a manner consistent with air pollution control practices for minimizing emissions, especially during periods of high ozone. Fugitive dust should be kept to a minimum, (9 VAC 5-50-60 *et seq*). For further questions, please contact James Kyle at (804) 527-5047.

Douglas W. Domenech
Secretary of Natural Resources

David A. Johnson
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

600 East Main Street, 24th Floor
Richmond, Virginia 23219
(804) 786-6124

MEMORANDUM

DATE: September 18, 2013

TO: Julia Wellman, DEQ

FROM: Roberta Rhur, Environmental Impact Review Coordinator

SUBJECT: DEQ 13-160F, Atlantic Test Ranges Expansion of Unmanned Systems Operations

Division of Natural Heritage

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System 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.

Biotics documents the presence of natural heritage resources in the project area. However, due to the scope of the activity (no land activity in Virginia and only some unmanned aerial systems flying over Virginia land) and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Gladys Cason (804-367-0909 or Gladys.Cason@dgif.virginia.gov).

The remaining DCR divisions have no comments regarding the scope of this project. Thank you for the opportunity to comment.

Wellman, Julia (DEQ)

From: Ewing, Amy (DGIF)
Sent: Friday, September 20, 2013 2:39 PM
To: Wellman, Julia (DEQ)
Cc: Cason, Gladys (DGIF)
Subject: ESSLog# 34134_13-160F_Atlantic Test Ranges - Unmanned systems

Based on the scope of the project, we do not anticipate this project to result in significant adverse impacts upon resources under our jurisdiction.

We find this project consistent with the Fisheries Management Section of the CZMA.

Thanks,
Amy Ewing

Environmental Services Biologist | VA Dept. of Game and Inland Fisheries | 4010 West Broad St. Richmond, VA 23230 | 804-367-2211 | www.dgif.virginia.gov

Wellman, Julia (DEQ)

From: Kirchen, Roger (DHR)
Sent: Thursday, September 19, 2013 10:57 AM
To: Wellman, Julia (DEQ)
Subject: Atlantic Test Ranges Expansion of Unmanned Systems Operations (DEQ#13-160F; DHR File No. 2013-1037)

Given the scope of the proposed undertaking, it is DHR's opinion that the Expansion of the Atlantic Test Ranges will have no effect to any known architectural or archaeological resource in Virginia; however, we recommend that the Navy continue to consult with the Maryland Historical Trust, as may be necessary pursuant to Section 106 of the National Historic Preservation Act (as amended), to consider impacts to historic properties in Maryland.

Roger

Roger W. Kirchen, Manager
Office of Review and Compliance
Division of Resource Services and Review
Department of Historic Resources
2801 Kensington Avenue
Richmond, VA 23221
phone: 804-482-6091 (NEW!)
fax: 804-367-2391
roger.kirchen@dhr.virginia.gov

COMMONWEALTH of VIRGINIA

Randall P Burdette
Director

Department of Aviation
5702 Gulfstream Road
Richmond, Virginia 23250-2422

V/TDD • (804) 236-3624
FAX • (804) 236-3635

August 27, 2013

Ms. Julia Wellman
Department of Environmental Quality
Office of Environmental Impact Review
629 East Main Street, 6th Floor
Richmond, Virginia 23219

RE: Atlantic Test Ranges, Expansion of Unmanned Systems Operations, **DEQ Project # 13-160F**

Dear Ms. Wellman:

The Virginia Department of Aviation has reviewed the Environmental Assessment you provided pertaining to the proposed expansion of Unmanned Systems operations at the Atlantic Test Range over the Chesapeake Bay. Staff has the following comments based on the information found within the document.

Comments

1. Section 2.1.5 Test and Training Location- The bullet points in this section identify the boundaries of the "Inner Range". However, the third bullet point should include a more three dimensional identification of the airspace that will be used by the aerial UAS. The terminology used, "Restricted airspace and underlying surface areas" raises questions as to whether or not the test range will include the airspace from the surface of the water up through to the tops of the restricted airspace or is it referring to the surface of the water for use of unmanned maritime systems and the airspace within the existing top and bottom altitudes of the current restricted airspace? This question is especially pertinent to Restricted Airspace R-4006 with regards to the public use airport on Tangier Island. The same clarification should be noted in Section 3.5.1.3 on page 3-60.

2. Currently there are two instrument approaches to Tangier Island Airport. Both approaches originate from the south and direct the pilot east of Restricted Airspace R-6609 and under R-4006 to Runway 2. There are no instrument approaches in development at this moment directed towards Runway 20. However, the Virginia Department of Aviation is undertaking an initiative to develop an instrument approach to each runway end. Therefore, some consideration for this potential future impact should be given in better defining the airspace to be utilized by any unmanned aircraft.

3. The phrase "All UAS would be operated within their prescribed altitude limits" in the second to last bullet point in Section 3.7.2 Environmental Consequences on page 3-78 is confusing. Is the report referring to the operation limits of the individual UAS as identified in Table 2-1 on page 2-4 or the altitude limits of the existing restricted airspace? Additional clarification would be beneficial.

4. The Tangier Island Airport is a public-use airport utilized almost entirely by transient traffic. It is also used frequently as a pick up point by a medi-vac helicopter transporting patients to and from Tangier Island and Salisbury Maryland. The Department of Aviation recommends lateral and vertical separation standards be established for UAS operations to prevent conflict between manned and unmanned aircraft from operating within the same vicinity.

The Virginia Department of Aviation reserves the right to offer additional comments pending the sponsor's response to the comments and questions above. If you have any questions regarding these comments or require additional clarification, please contact me at (804) 236-3632.

Sincerely,

S. Scott Denny
Senior Aviation Planner

COMMONWEALTH of VIRGINIA

Randall P Burdette
Director

Department of Aviation
5702 Gulfstream Road
Richmond, Virginia 23250-2422

V/TDD • (804) 236-3624
FAX • (804) 236-3635

August 27, 2013

Ms. Julia Wellman
Department of Environmental Quality
Office of Environmental Impact Review
629 East Main Street, 6th Floor
Richmond, Virginia 23219

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Senior Aviation Planner