Department of the Navy
Naval Air Station Patuxent River Complex's
Bloodsworth Island Range, Maryland
2024

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
NAVAL AIR STATION PATUXENT RIVER COMPLEX'S BLOODSWORTH ISLAND RANGE, MARYLAND

July 2024

FINAL

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

Naval Air Station Patuxent River Complex's
Bloodsworth Island Range, Maryland

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2024

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Naval Facilities Engineering Command - Washington Region

Document is Cleared for Public Release

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
Naval Air Station Patuxent River Complex
Bloodsworth Island Range, Maryland

APPROVAL

This Integrated Natural Resources Management Plan (INRMP) fulfills the requirements for the INRMP in accordance with the Sikes Act (16 U.S.C. 670a et seq.), as amended; Department of Defense Instruction 4715.03 – Natural Resources Conservation Program; Department of Defense Manual 4715.03 – Integrated Natural Resources Management Plan (INRMP) Implementation Manual; Chief of Naval Operations Operating Instruction 5090.1E – Environmental Readiness Program; and Chief of Naval Operations Operating Manual 5090.1 – Environmental Readiness Program Manual. This document was prepared and reviewed in coordination with U.S. Department of the Interior, Fish and Wildlife Service, and Maryland Department of Natural Resources in accordance with the 2013 Memorandum of Understanding for a Cooperative Integrated Natural Resource Management Program on Military Installations.

By their signatures below, or an enclosed letter of concurrence, all parties grant their concurrence with and acceptance of the following document.

For Plan Period: 2023-2028

Approving Official – U.S. Navy, Naval Air Station Patuxent River Complex

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For Plan Period: 2023-2028

Concurring Agency – U.S. Fish and Wildlife Service

GENEVIEVE PULLIS Digitally signed by GENEVIEVE PULLIS Date: 2024.01.04 11:46:25 -05'00'

Genevieve LaRouche
Field Supervisor
Chesapeake Bay Field Office
U.S. Fish and Wildlife Service
Annapolis, Maryland

Date

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
Naval Air Station Patuxent River Complex
Bloodsworth Island Range, Maryland

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By their signatures below, or an enclosed letter of concurrence, all parties grant their concurrence with and acceptance of the following document.

For Plan Period: 2023-2028

Concurring Agency – Maryland Department of Natural Resources

5/1/2024

Brian Eyler
Associate Director
Wildlife and Heritage Service
Maryland Department of Natural Resources
Annapolis, Maryland

Date

DEPARTMENT OF THE NAVY
NAVAL AIR STATION
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PATUXENT RIVER, MD 20670-1154

5090
Ser N4/309
28 Sep 22

From: Commanding Officer, Naval Air Station Patuxent River
To: Mr. James R. Swift, Planning and Conservation Branch Head, Environmental Division

Subj: APPOINTMENT AS INSTALLATION NATURAL RESOURCES MANAGER

Ref: (a) OPNAVINST 5090.1E – Environmental Readiness Program Manual
(b) Sikes Act, as amended through P.L. 111-84, 28 October 2009

1. Effective immediately, you are hereby designated authority and responsibilities as Installation Natural Resources Program Manager for the Naval Air Station (NAS) Patuxent River; Webster Field Annex (WFA), St Inigoes, Maryland; and Navy Recreation Center (NRC), Solomons, Maryland. For the purpose of this appointment, "NAS Complex" refers collectively to NAS Patuxent River, WFA, and NRC.

2. Per reference (a), your duties include ensuring that the Commanding Officer (CO) is informed of natural resources issues, conditions of objectives contained within the Integrated Natural Resources Management Plans (INRMPs) pertaining to the NAS Complex, and potential or actual conflicts between mission requirements and natural resources mandates.

3. In addition, you are responsible for the inherently governmental decisions made on behalf of the NAS Complex and CO with regards to compliance with reference (b) and INRMP implementation. This includes supervision of specific technical experts to manage and/or carry out natural resources programs/responsibilities such as:

a. Providing biological expertise to assist air operations and aviation safety officers in preparing and implementing bird/animal aircraft strike hazard (BASH) plans to reduce strikes and ensure consistency with the INRMPs.

b. Protecting listed species, species at risk and species of concern, and their habitats.

c. Managing installation lands to ensure, consistent with the military mission, wetlands protection, soil conservation, floodplain management, invasive species control, environmental and economically beneficial landscaping, and agricultural out leasing.

d. Managing installation forestlands by restoration, enhancement and improvement of forest resources and related ecosystems;

e. Protecting and managing fish and wildlife resources.

f. Providing and managing outdoor recreational opportunities (e.g., hunting and fishing) consistent with installation security, military mission, and sustainable natural resources management.

4. This appointment will remain in effect until your permanent transfer from this command, or it is rescinded in writing by the CO.

D. W. KINGSLEY

EXECUTIVE SUMMARY

The Department of Defense (DoD) owns and manages approximately 8.8 million acres of land in the United States (CRS 2020). Each military installation that has suitable habitat for conserving and managing natural ecosystems is required to prepare, maintain and implement an Integrated Natural Resources Management Plan (INRMP). This INRMP was prepared for Bloodsworth Island Range (BIR), under the command of Naval Air Station (NAS) Patuxent River, Maryland, in accordance with DoD Instruction 4715.03 (Natural Resources Conservation Program); DoD Manual 4715.03 (INRMP Implementation Manual); Chief of Naval Operations Operating Instruction (OPNAVINST) 5090.1 (series) (Environmental and Natural Resources Program Manual); and 16 U.S. Code (USC) §670 a-f (Sikes Act), as amended. The NAS Patuxent River Complex, which includes the Naval Air Station, Webster Outlying Field, Naval Recreation Center Solomons, and Bloodsworth Island Range, is referred to as the Complex or the Station throughout this document.

This INRMP is a long-term planning document that guides implementation of the natural resources program to help ensure support for the installation mission while protecting and enhancing natural resources for multiple use, sustainable yield and biological integrity. This plan documents the military mission, baseline condition of natural resources, impacts to natural resources due to the military mission, and management approaches to conserve and enhance natural resources; in addition, it lists specific projects aimed at protecting and enhancing natural resources.

In accordance with the Sikes Act, this INRMP was prepared in cooperation with the Secretary of the Department of Interior, acting through the Director of the U.S. Fish and Wildlife Service (USFWS), and the head of the Maryland Department of Natural Resources (MDNR). Because of this coordination effort, the INRMP reflects the mutual agreement of these parties concerning conservation, protection and management of fish and wildlife resources. Future involvement of the state and federal wildlife agencies will ensure continued mutual agreement and cooperation in managing the natural resources at BIR.

Each year, this INRMP and the projects contained within will be reviewed and rated against established Navy metrics by the installation natural resources staff and state and federal wildlife agencies. In addition, the INRMP will be updated as needed (at least annually) to provide ongoing management direction based on scientific data and a higher level of knowledge of the BIR ecosystems and their interrelationships. The long-term goal of the INRMP is to bring together and integrate all management activities (e.g., land, wildlife and rare species) in a way that sustains, promotes and restores the health and integrity of BIR ecosystems. Integrated ecosystem management is sound stewardship and will, over the long term, ensure the maximum return of biological diversity and habitat quality.

Resource-specific natural resources program elements have been developed to address relevant issues at BIR. Existing conditions, baseline survey data, current management practices, and recommended management actions have been described for each program element. Management program elements covered in this INRMP include:

- Rare, Threatened and Endangered Species Management

- Wetlands Management
- Fish and Wildlife Management
- Vegetative Management
- Migratory Bird Management
- Invasive Species Management
- Land Management
- Outdoor Recreation
- Bird/Animal Aircraft Strike Hazard
- Conservation Law Enforcement
- Training of Natural Resources Personnel
- Marine and Coastal Zone Management
- Cultural Resources Management
- Flight Operations and Management

Standard INRMP program elements that are not applicable to BIR (forestry, wildland fire and floodplains management, as well as agricultural outleasing) have not been included herein.

The management actions and projects identified for BIR are intended to help installation commanders manage natural resources effectively to ensure Station lands remain available and in good condition to support the military mission and to ensure compliance with relevant environmental laws and regulations. These actions incorporate the principles of ecosystem management and are consistent with Navy policy on sustainable, multiple use of natural resources on Navy property.

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ACRONYMS AND ABBREVIATIONS

AGL	above ground level
ATR	Atlantic Test Range
BASH	Bird/Animal Aircraft Strike Hazard
BGEPA	Bald and Golden Eagle Protection Act
BIR	Bloodsworth Island Range
CBF	Chesapeake Bay Foundation
CBP	Chesapeake Bay Program
CFR	Code of Federal Regulations
CN	Environmental Planning and Conservation
CNIC	Commander, Navy Installations Command
CNO	Chief of Naval Operations
CNRMA	Commander, Navy Region Mid-Atlantic
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
DoD	Department of Defense
DoDI	Department of Defense Instruction
DoN	Department of Navy
EAP	Encroachment Action Plan
EFH	essential fish habitat
EIS	environmental impact statement
EO	Executive Order
EPA	Environmental Protection Agency
EPRWeb	Environmental Readiness Program Requirements Web
ERL	Environmental Readiness Level
ERP	Environmental Restoration Program
ESA	Endangered Species Act
FR	Federal Register
GCN	greatest conservation need
GHG	Greenhouse Gas

GIS	Geographic Information System
GRX	GeoReadiness Explorer
HAPC	Habitat Area of Particular Concern
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
JLUS	Joint Land Use Study
MBTA	Migratory Bird Treaty Act
MDE	Maryland Department of Environment
MDNR	Maryland Department of Natural Resources
MMPA	Marine Mammal Protection Act
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
NAB	Naval Amphibious Base
NAS	Naval Air Station
NASPAXRIV	Naval Air Station Patuxent River
NAVAIR	Naval Air Systems Command
NAVFAC	Naval Facilities Engineering Systems Command
NAWCAD	Naval Air Warfare Center, Aircraft Division
NEFMC	New England Fisheries Management Council
NEPA	National Environment Policy Act
NOAA	National Oceanic and Atmospheric Administration
NR	Natural Resources (Program)
NRC	Naval Recreation Center
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory
NWR	National Wildlife Refuge
OMB	Office of Management and Budget
OPNAVINST	Chief of Naval Operations Operating Instruction
ppt	parts per thousand
RAICUZ	Range Air Installation Compatible Use Zone

RDAT&E	research, development, acquisition, testing and evaluation
RDT&E	research, development, testing and evaluation
REC	Regional Environmental Coordinators
RPM	Remedial Project Manager
SAV	submerged aquatic vegetation
STWG	Scientific Working Group
SUA	Special Use Airspace
SWAP	State Wildlife Action Plan
UAS	unmanned aircraft system
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VIMS	Virginia Institute of Marine Science
WMA	Wildlife Management Area

1. OVERVIEW

A. Purpose

In accordance with Department of Defense (DoD) Instruction (DoDI) 4715.03 (Natural Resources Conservation Program), Chief of Naval Operations Operating Instruction (OPNAVINST) 5090.1 (series) (Environmental and Natural Resources Program Manual), Naval Facilities Procedural Manual 73 (NAVFAC P-73), and 16 U.S. Code (USC) §670a-f (Sikes Act), the Department of the Navy (DoN) is required to develop and implement an Integrated Natural Resources Management Plan (INRMP) that ensures a balanced and integrated program for the management of natural resources. This INRMP was prepared to facilitate no net loss in the capability of Bloodsworth Island Range (BIR) lands to support the military mission of the Naval Air Station (NAS) Patuxent River Complex while protecting and enhancing installation resources for multiple use, sustainable yield and biological integrity. The purpose of this INRMP is to ensure consistency with the use of military installations to support military preparedness, and to ensure the conservation and rehabilitation of natural resources on military installations and the sustainable multipurpose use of the resources (Sikes Act). This INRMP must also ensure that natural resources management practices comply with all pertinent laws and regulations and are in accordance with Navy policy which, as summarized from OPNAVINST 5090.1 (series), is to incorporate ecosystem management as the basis for planning and management.

B. Scope

This INRMP addresses natural resources management on the federally owned lands and waters that comprise BIR. BIR has a total land area of 4,738 acres, which includes four islands; Adam, Bloodsworth, Northeast, and Pone islands; and is under the cognizance of Naval Air Station (NAS) Patuxent River. Other properties under the command of NAS Patuxent River include Webster Outlying Field (WOLF), NRC Solomons, Point Lookout Tracking Station, and other associated properties. Combined, these properties form the NAS Patuxent River Complex (also referred to as the Complex or the Station throughout this document). Natural resources management at the other NAS Patuxent River properties is addressed under separate INRMPs.

As funding becomes available for environmental projects or as mitigation is needed for future activities, this INRMP will serve as a priority list to better enable the Natural Resources Program to practice effective ecosystem management. This Plan is not meant as a definitive list of projects that will be automatically funded upon enactment. It provides guidance to the resource managers on strategies to employ for the next five years. The Navy will implement recommendations and projects in the INRMP within the framework of regulatory compliance, national Navy mission obligations, anti-terrorism/force-protection limitations, and funding constraints. Any requirement for the obligation of funds for projects in this INRMP shall be subject to the availability of funds appropriated by Congress, and none of the proposed projects shall be interpreted to require obligation or payment of funds in violation of any applicable federal law, including the Anti-Deficiency Act, 31 U.S.C. § 341, et seq.

C. Goals and Objectives

This INRMP is a long-term planning document that guides implementation of the natural resources program to ensure support of the installation mission, while protecting and enhancing installation resources for multiple use, sustainable yield and biological integrity. Goals of the INRMP are:

- Responsible parties and stakeholders concerned with natural resources management at BIR are identified.
- Current and future military mission and requirements, and resulting constraints on natural resources, are described.
- Policies, management philosophy and objectives of natural resources management at BIR are clearly stated.
- Information regarding the existing biological and physical conditions and the desired future conditions of the range and the surrounding area is provided.
- Key natural resources management issues and concerns at the range and in the surrounding area are identified.
- Projects and management actions required to meet the objectives of natural resources management and ensure no net loss in the capability of installation lands to support the military mission are identified and described.
- Scheduling priorities and funding opportunities for the implementation of natural resources projects and management actions are identified.

In an effort to meet these goals, objectives are established throughout this INRMP, specific to individual resources and/or programs. Subsequent management recommendations and projects are then linked to the objectives.

D. Responsibilities

Once they are designed and written, plans must then be implemented if goals and objectives are to be transferred from paper to the resources to which they apply. The first step in executing the BIR INRMP is to submit project summaries and cost estimates through the Environmental Readiness Program Requirements Web (EPRWeb) environmental budgeting program. This is done three to four years in advance of the fiscal year for which funding is being requested. The next step is to prepare an execution plan for each upcoming fiscal year, which is also completed in EPRWeb. DoD Instruction 4715.03, Enclosure 4, provides detailed guidance on natural resources management and project prioritization (DoD 2018a). Additional information is contained in the Implementation section of this INRMP.

The responsibility for the development, revision, and implementation of INRMPs is shared by several command elements. The roles and responsibilities for Navy natural resources management are described in OPNAVINST 5090.1 (series) and in the DoD guidance for INRMP development and implementation (DoD 2018b). A summary of responsibilities for natural resources management at the NAS Patuxent River Complex follows.

Chief of Naval Operations (CNO) is the Echelon I command and serves as the principal leader to provide policy, guidance and resources for the development, revision and implementation of

INRMPs. CNO also represents the Navy on issues and resolves high-level conflicts regarding development and implementation of INRMPs.

Commander, Navy Installations Command (CNIC) is the Echelon II command under CNO responsible for Navy-wide shore installation management. CNIC has overall shore installation management responsibility and authority as the budget submitting office for installation support and is the Navy point of contact for installation policy and program execution oversight (CNIC 2022). CNIC must ensure the programming of resources necessary to maintain and implement INRMPs; participate in the development and revision of INRMPs; and provide oversight for all natural resources program elements.

The DoD Regional Environmental Coordinators (REC) support the DoD/DoN mission through coordination, communication and facilitation of environmental issues and activities when these activities affect two or more DoD installations within an Environmental Protection Agency (EPA) region. Commander, Navy Region Mid-Atlantic (CNRMA) is the DoD/Navy REC for military installations within Delaware, Maryland, Pennsylvania, Virginia, West Virginia, and Washington, D.C. (CNRMA 2022).

Naval Facilities Engineering Command Washington (NAVFAC Washington) is the regional facilities command and supports the mission of CNRMA and CNIC with technical authority, project management, and contracts management as requested. NAVFAC Washington also facilitates agency review of and cooperative agreements supporting INRMPs, and reviews and signs INRMPs to ensure technical sufficiency.

The responsibilities of the Commanding Officer, NAS Patuxent River Complex are to ensure preparation, completion and implementation of the INRMP and to systematically apply conservation practices set forth in the plan. It is his/her responsibility to act as steward of installation natural resources and integrate natural resources requirements into the day-to-day decision-making process; involve appropriate operational and training commands in the INRMP review process to ensure no net loss of military mission; and endorse INRMPs via Commanding Officer signature.

The NAS Patuxent River Environmental Planning and Conservation (CN) Branch Manager, who is part of NAVFAC Washington, is primarily responsible for implementing this INRMP and coordinating with other personnel on the installation. Implementation responsibilities include identifying personnel, internal or external to the installation, with expertise to perform the work identified; creating EPRWeb project exhibits and identifying the appropriate funding source to accomplish the projects; and ensuring installation personnel are familiar with the contents of this INRMP. The CN Branch Manager is also responsible for ensuring this plan is reviewed in coordination with the U.S. Fish and Wildlife Service (USFWS) and the Maryland Department of Natural Resources (MDNR).

E. Staff Resources

The Station's Natural Resources (NR) Program, which is part of the CN Branch, has a full-time staff of five people. The professional staff, which includes one natural resources manager, two natural resources specialists, and two natural resources technicians, is an interdisciplinary team

with education, experience and training in fisheries, wildlife management, forestry, cultural resources management, zoology, geology, ecology, wetlands, and outdoor recreation. The responsibilities of the NR Program cover all properties of the Complex, including BIR.

F. Authority

DoD Instruction 4715.03 (Natural Resources Conservation Program); Navy Instruction OPNAVINST 5090.1 (series) (Environmental and Natural Resources Program Manual); Naval Facilities Procedural Manual 73 (NAVFAC P-73); 32 Code of Federal Regulations Part 190 (DoD Natural Resources Management); and 16 U.S. Code (USC) §670 a-f (Sikes Act), as amended are the main authorities for the development and implementation of this INRMP.

G. Stewardship and Compliance

This INRMP strives to ensure that natural resources management considers both compliance requirements and environmental stewardship objectives. Compliance requirements are those that are driven by state or federal regulations, such as the Clean Air Act, Clean Water Act (CWA), Coastal Zone Management Act (CZMA), Sikes Act, Endangered Species Act (ESA), National Environment Policy Act (NEPA), and Migratory Bird Treaty Act (MBTA); DoD instructions; Executive Orders (EOs); and Memoranda of Agreement (MOAs) or Understanding (MOUs). Environmental stewardship projects are those that enhance the installation's natural resources, promote proactive conservation measures, and support investments that demonstrate Navy environmental leadership and proactive environmental stewardship.

Natural resources stewardship is the management of natural resources with the goal of maintaining or increasing the resource's value indefinitely into the future. This INRMP identifies both stewardship and compliance projects that help meet natural resources management goals. However, funding priority will be given to projects that are required to meet compliance criteria. Stewardship efforts that rely on volunteer labor and have the support of the military community or have available alternate funding sources are also likely to be implemented.

H. Review and Revision Process

This INRMP is a long-term planning document that requires periodic reviews of management goals and practices in order to provide the opportunity to incorporate new science and information as well as assess the performance of management actions. Navy policy states that the INRMP must be reviewed annually by the installation with the cooperation of the appropriate field-level offices of the USFWS, state fish and wildlife agency and (where applicable) National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries). MDNR is the lead fish and wildlife agency in Maryland. Annual reviews enable project tracking and assessment and help facilitate adaptive management. These reviews may be accomplished via correspondence or in a meeting between appropriate parties. The annual review is to verify that:

- Current information on all conservation metrics is available.
- All "must fund" projects and activities have been budgeted for and implementation is on schedule.
- All natural resources positions are filled or are in the process of being filled.

- Projects and activities for the upcoming year have been identified and included in the INRMP (an updated project list does not necessitate revising the INRMP).
- All required coordination has occurred.
- All significant changes to the installation's mission requirements or its natural resources have been identified.

This evaluation is facilitated by the web-based Metrics Builder tool on the Natural Resources Data Call Station website. The Metrics Builder provides the means to evaluate performance in seven focus areas:

- Natural Resources Management (Ecosystem and Encroachment)
- Listed Species Critical Habitat (Threatened and Endangered Species; Proposed and Candidate Species; State, Local, and Other Species; Unoccupied Critical Habitat)
- Recreational Use and Access and Conservation Law Enforcement
- Sikes Act Cooperation
- Team Adequacy
- INRMP Implementation
- Support of the Installation Mission

Use of the Metrics Builder to conduct the INRMP annual reviews also generates Navy conservation program metrics to measure effects of the conservation program on the installation mission and the status of the Navy relationship with the USFWS, state fish and wildlife agencies and (where applicable) NOAA Fisheries.

Periodic assessment is a necessary part of the natural resources planning process that evaluates program status; measures progress; and identifies new management issues, concerns, goals and objectives. The natural resources planning framework, programs, issues, concerns, goals and objectives presented in this INRMP are based on an assessment of previous programs.

Additionally, the INRMP must be reviewed, and (if necessary) updated or revised at intervals of not more than five years. If necessary changes are minor (e.g., capturing regulatory updates, incorporating survey information), an update would be appropriate; however, significant changes to the installation's mission requirements or natural resources would warrant an INRMP revision.

I. Geographic Information Systems Management, Data Integration, Access, and Reporting

Geographic data and information are an integral part of natural resources and environmental protection and planning at NAS Patuxent River and BIR. All natural resources geographic information system (GIS) information for BIR is collected and maintained in coordination with the Natural Resources (NR) Program office at NAS Patuxent River.

Maps have been incorporated into the INRMP as a means of physically depicting information associated with the various management programs. These maps are a static display of spatial data contained in the Station's ever-changing GIS, called the GeoReadiness Explorer (GRX); as such, they are accurate only at the time the images were captured from GRX and a degree of error is inherent. These maps are distributed "AS-IS" without warranties of any kind, expressed or implied,

including (but not limited to) warranties of suitability to a particular purpose or use. No attempt has been made in either the design or production of the maps to define the limits or jurisdiction of any federal, state, or local government. The maps are intended for use only at the published scale; as such, detailed on-the-ground surveys and historical analyses of sites may differ from the maps. Individuals requiring geographic information for decision-making purposes should access GRX directly in order to view the desired data in its most up-to-date form.

J. Commitment of the United States Fish and Wildlife Service and Maryland Department of Natural Resources

Under the Sikes Act, INRMPs are required to reflect mutual agreement with the USFWS, appropriate state agencies and (where applicable) NOAA Fisheries concerning the management of fish and wildlife. Such mutual agreement and cooperation supports the principles of ecosystem management by improving the management of ecosystems that cross federal, state, and private boundaries.

Per Sikes Act requirements, the USFWS, MDNR and (where applicable) NOAA Fisheries agree to cooperate in the development and review of this INRMP as to operation and effect at least once every five years. In addition to the formal five-year review, Navy policy requires annual reviews be conducted in coordination with the Sikes Act partners to ensure that the INRMP continues to meet Sikes Act requirements and contributes to the conservation of natural resources in the applicable military properties.

K. Management Strategy

Navy policy on natural resources management, as summarized from OPNAVINST 5090.1 (series), is to manage natural resources to support and be consistent with the military mission, while protecting and enhancing those resources for multiple use, sustainable yield and biological integrity. Land-use practices and decisions must be based on scientifically sound conservation procedures and techniques, and use scientific methods and an ecosystem management approach.

Employing ecosystem management helps to maintain and improve the sustainability and biological diversity of terrestrial and aquatic ecosystems, while supporting sustainable economies, human use, and the environment required for realistic military training operations (DoD 2018a). The basic principles and guidelines of ecosystem management are to:

- Preserve the function and integrity of natural ecosystems;
- Integrate human social and economic interests with environmental considerations;
- Involve all interested parties (stakeholders) in identifying management goals; and,
- Adapt to changing conditions and requirements.

Ecosystem function is a result of interactions of its various components: geologic and soil features, climatic elements, plants, animals, humans, and current and past disturbances (including past management practices). The function and integrity of an ecosystem are measured in terms of diversity, nutrient availability (productivity), and structural complexity. Assessing ecosystem health and sustainability requires objectively measuring a set of parameters that can be used to describe conditions. Adaptive management is an iterative cycle of planning, monitoring,

evaluation and adjustment that is best used to assess ecosystem function and the effectiveness of management practices.

In accordance with the Sikes Act, the major components of this INRMP include managing natural resources for multiple use and sustainable yield, and to support the military mission; identifying natural resources inventory and monitoring needs; protecting, enhancing and restoring fish and wildlife habitat, including wetlands; and enforcing natural resources laws and regulations. Each of these components is essential to the success of an ecosystem management plan that aims to achieve sustainable use and promote biodiversity.

Resource-specific natural resources management areas have been developed to address relevant issues at BIR. The program structure has been developed based on the installation-specific management situation and is designed to facilitate issue identification and prioritization, as well as project funding, implementation and tracking. Due to the inherent interaction of natural resources, significant overlap exists among programs. Therefore, all programs are integrated with each other, as well as the overall land use and mission-planning processes at NAS Patuxent River.

Natural resources issues and concerns, which are discussed in detail for each management program element in Section 4, are defined as any action, process, activity, program, etc., that might present constraints to NAS Patuxent River operations and mission activities, readiness, and future planning at BIR. Land-use practices and decisions must use scientifically sound conservation procedures and techniques, scientific methods, and an ecosystem management approach.

2. CURRENT CONDITIONS AND USE

A. Installation Information

1. General Description

BIR is located in the north-central portion of the Chesapeake Bay within Dorchester County, Maryland (Figure 2-1). The island complex is approximately 75 miles southeast of Washington, D.C., 24 miles south of Cambridge, Maryland, and 27 miles southwest of Salisbury, Maryland. NAS Patuxent River is approximately 20 miles northwest of BIR. Bloodsworth Island is the northernmost of a chain of marsh islands terminating with Tangier Island. BIR consists of four main islands: Bloodsworth, Pone, Adam and Northeast, totaling approximately 4,738 acres. A fifth island, Great Cove, was formerly part of BIR but is now completely submerged.

BIR consists of a complex of islands that total approximately 34 miles of shoreline, therefore it is important to define the extent of Navy control over the nearshore environment. The State of Maryland owns the bottom of all tidal water bodies on or adjacent to the islands from the mean high tide line; however, NAS has security control on some of the submerged land. The islands have coastal security zones that extend 75 yards from their shorelines.

2. Military Mission

The Naval Air Systems Command (NAVAIR) mission directly supports the efforts of Navy forces to succeed in combat through the research, test, acquisition, and maintenance of aircraft and aircraft weapons systems. NAVAIR is supported in this mission by the Naval Air Warfare Center, Aircraft Division (NAWCAD), which conducts research, development, acquisition, testing and evaluation (RDAT&E) of aircraft platforms and all associated subsystems, including weapons delivery hardware/software, propulsion systems, avionics, flight controls, and radar. In carrying out its aviation-related RDAT&E responsibilities, NAWCAD uses the flight and ground test facilities that comprise the NAS Patuxent River Complex. The Atlantic Ranges & Targets Department schedules the Complex and maintains and operates the required range instrumentation and associated processes that are used to quantify and effectively provide decision-quality data to BIR users.

3. Constraints

Current and future land uses at BIR are limited by a number of factors. BIR is primarily constrained by public health and safety issues and has limited availability for training and mission activities. Natural resources constraints to land-use and potential future mission include wetlands and habitat for rare, threatened, and endangered species, which can be mitigated for if necessary. Other restrictions on mission and land use are due to operational, environmental, and safety constraints. When combined, 100 percent of BIR has some type of constraint on the future military missions and land use changes (Figure 2-2).

There is one outgrant host-tenant/use agreement in place for BIR. This agreement is for access and use by the U.S. Coast Guard to operate and maintain an aid to navigation (a pole topped by a

flashing light) located off of Bloodsworth Island's Okahaninkan Point (the westernmost point of the island).

4. Access

As BIR is an island complex, it is important to define the extent of Navy control over the nearshore environments. The islands have coastal security zones that extend 75 yards from their outer shorelines, and the water between the four islands is controlled by the Navy. Additional control is exerted with respect to the airspace above BIR – this is discussed further in the Operations and Activities section.

Per NASPAXRIV Instruction 9072.1 (2014), Bloodsworth Island Range Access Procedures, access to Bloodsworth and Pone islands is limited due to potential for contact with unexploded ordnance (UXO). The instruction requires that any party (DoD or non-DoD) accessing these islands include at least two persons who have completed UXO Awareness/Safety Training (required annually) and are on the current BIR Access Master List. Access to Adam Island does not require UXO Awareness/Safety Training; however, it does require a DoD escort. All access to BIR is to be scheduled through Atlantic Test Range Central Schedules. The NAS Explosives Safety Officer will determine appropriate procedures to be followed in the event that ground-disturbing activities are proposed on or adjacent to the islands.

5. Opportunities

Areas with little or no restrictions on training provide the best opportunities for mission growth and change. As shown in Figure 2-2, BIR is 100 percent constrained and has no unrestricted land areas. Figure 2-2 shows no areas of opportunity at BIR.

Figure 2-1. Regional Location of Bloodsworth Island Range, Maryland

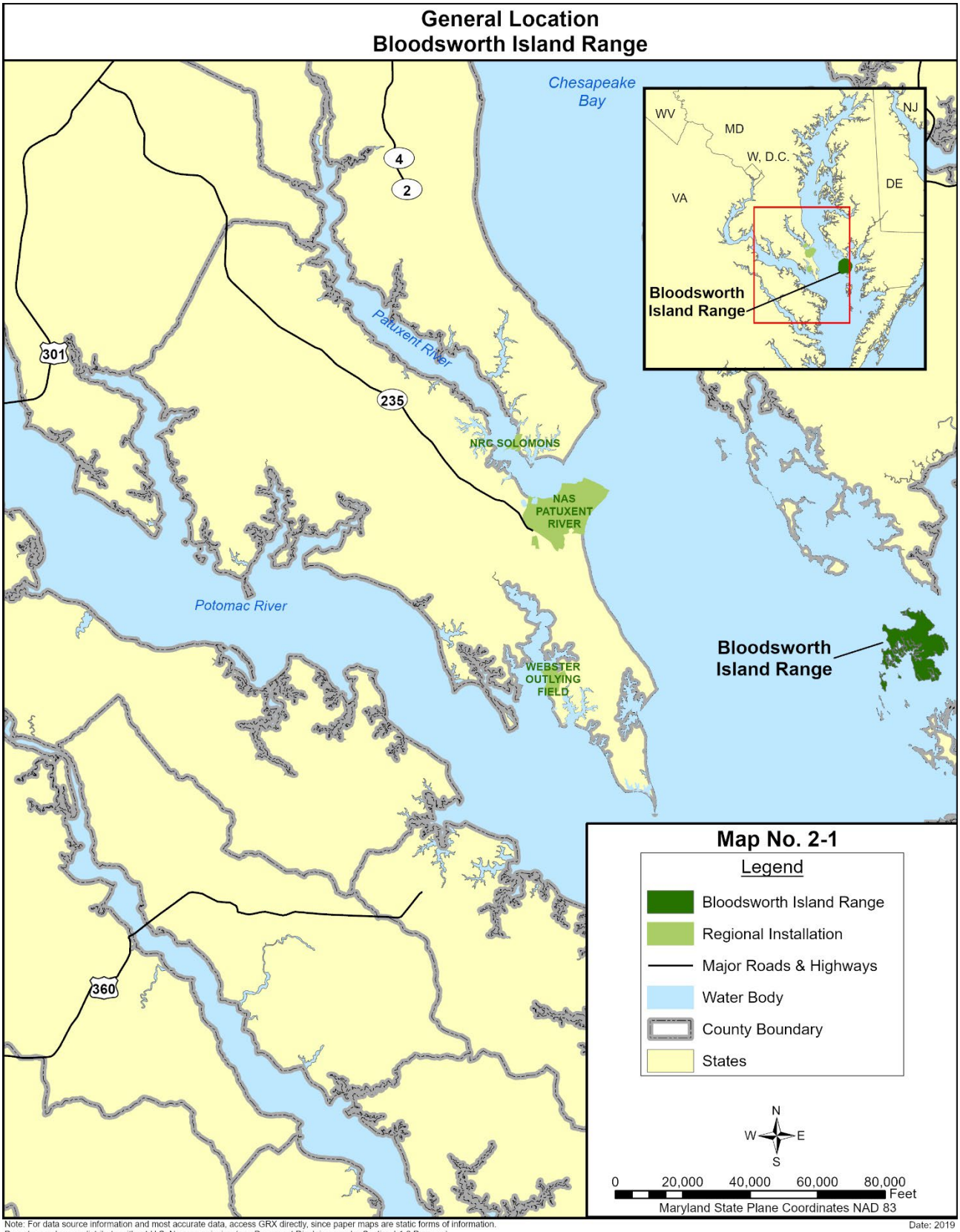
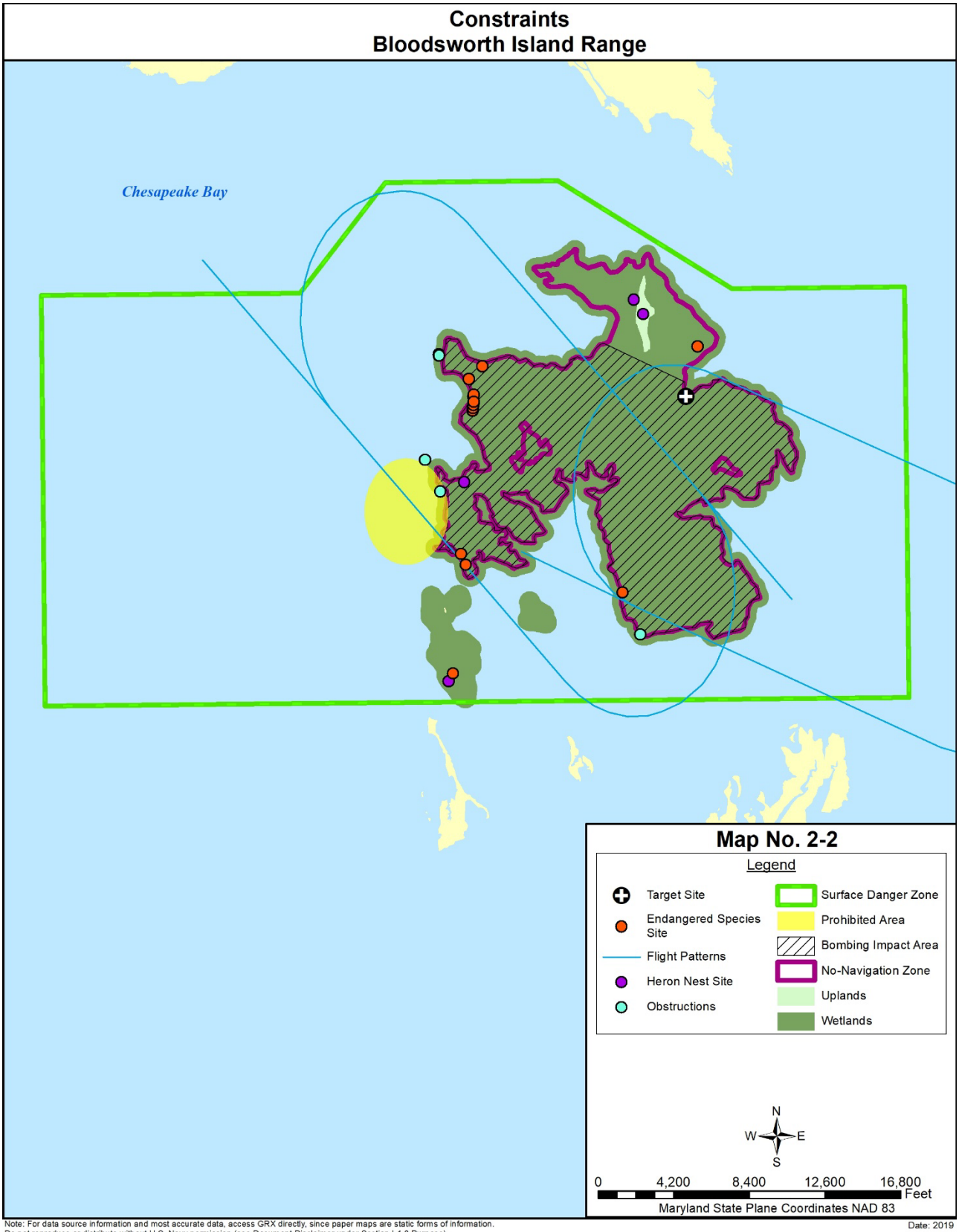


Figure 2-2. Bloodsworth Island Range Constraints



6. Operations and Activities

BIR was acquired by the Navy during World War II in 1942, and was in continuous operational use until 1996. During that period, test and training in air-to-ground weapons delivery by military aircraft (bombing and strafing) and weapons separation tests were performed on BIR. Both live and inert ordnance was fired or dropped on impact areas primarily on Bloodsworth and Pone Islands. Ordnance delivered by aircraft included nonexplosive training rounds, nonexplosive practice bombs, and explosive ordnance up to 500 pounds. In addition, illumination flares, 2.75-inch and 5-inch rockets, and machine guns were employed. Ground targets, including vehicles, metal structures, and a simulated portable surface-to-air missile site, provided realistic scenarios for aircraft targeting.

Training activities on BIR reached their peak during the early 1970s, in support of the Vietnam conflict. Through the late 1980s, BIR was also used for naval gunfire support exercises involving simulation of shore bombardments in support of amphibious landings. In 1996, all bombing activity ceased and the Navy restricted the use of BIR to Navy mission essential training and testing. The NAVAIR Range Department continued to use BIR as a visual target for non-impact operations in support of its research, development, testing and evaluation (RDT&E) activities and for operations conducted by the U.S. Navy Test Pilot School. In 2001, ownership of BIR was transferred from Naval Amphibious Base (NAB) Little Creek, Virginia, to NAVAIR. Management of BIR was then assigned to NAWCAD and NAS Patuxent River.

Current, non-impact operations at BIR involve the test and evaluation of aircraft, including flying qualities and performance, propulsion, aircrew, and missions systems; electronic warfare; search and rescue; flight crew proficiency; and evaluation of radar systems, unmanned aerial vehicle and unmanned combat aerial vehicle sensors, night vision systems, directed energy systems, and other electronic systems (DoN 2006).

Future operations at BIR could include the use of UAS as targets to determine the effectiveness of emerging counter-UAS (C-UAS) technologies. UAS targets are typically small commercial off-the-shelf systems, such as quadcopters, and may be engaged from static or mobile, air, land, or surface platforms using a variety of C-UAS technologies. The Navy would continue to support the expansion of unmanned systems including the testing of rapidly emerging C-UAS technologies. Unmanned air, ground, and maritime platforms would continue to operate within NAS Patuxent River Complex airspace, land areas, and water areas, respectively.

7. Regional Land Use

BIR is located along the western edge of Maryland's Eastern Shore in the Tangier Sound region. This region encompasses approximately 900 square miles and is roughly defined as the portion of the Chesapeake Bay between the Little Choptank River in the north and the Maryland/Virginia border in the south. Land areas in proximity to BIR consist primarily of undeveloped marsh wetlands. Federal and state natural areas are the dominant land use in the area. The 3,000-acre South Marsh Island Wildlife Management Area (WMA) lies approximately 1.5 miles south of Bloodsworth Island, across Holland Strait, and the 13,000-acre Deal Island WMA lies approximately 5 miles east of Bloodsworth Island on the mainland of Somerset County (MDNR 2022a). Nearby federal Blackwater National Wildlife Refuge (NWR) lands include Spring Island,

Bishops Head, and Barren Island, which are part of the Chesapeake Marshland NWR Complex (USFWS 2022a).

Other land uses within the area are primarily agricultural and residential. Low- and medium-density residential development, agriculture, and some interspersed commercial and institutional uses occur on Deal Island, Wenona, and Chance (approximately 4 miles to the east in Somerset County, Maryland), and 4.5 miles north in Bishops Head on mainland Dorchester County (MDP 2022). The Chesapeake Bay Foundation (CBF) operates the Karen E. Noonan Center of Environmental Education along the shoreline at Bishops Head. The Chesapeake Bay's main shipping channel is about 3 miles to the west of the BIR Surface Danger Zone.

B. General Physical Environment

BIR consists of four main islands: Bloodsworth, Pone, Adam and Northeast, totaling approximately 4,738 acres. A fifth island, Great Cove, was formerly part of BIR but is now completely submerged. Bloodsworth Island itself is about 4,000 acres in size. A study published by Downs et al in 1994 estimated that Bloodsworth Island lost approximately 26% of its land area between 1942 and 1992. Perimeter erosion has been the dominant cause of land loss and is responsible for the loss of approximately 7.5 acres per year. Loss of land area to interior ponding and channel widening is also occurring at a rate of approximately 4.5 acres per year. The rise in relative sea level, measured at 0.28 meters since 1849, is responsible for interior flooding as well as saltwater intrusion, which is changing the characteristics of vegetative composition at BIR and other marsh habitats in the Chesapeake Bay (Downs et al. 1994).

1. Topography

The Eastern Shore is an area of flat, low, nearly featureless topography with elevations generally at or near sea level. The shorelines of the islands comprising BIR are highly indented and are cut by numerous coves and inlets. These features are most pronounced on Bloodsworth Island. Nearly the entire land area of BIR consists of a tidal marsh that is bisected by a series of low ridges, the most prominent of which is Fin Creek Ridge in the northeast section of Bloodsworth Island. While Fin Creek Ridge lies approximately 3-4 feet above sea level, the majority of land area of BIR lies at or below 1 foot (Figure 2-3).

2. Geology

The underlying geology of the Atlantic Coastal Plain consists of a 2,000- to 4,200-foot-thick wedge-shaped mass of unconsolidated sand, gravel, silt, and clay ranging in age from the Triassic to Quaternary Period. The younger formations crop out successively to the southeast across Southern Maryland and the Eastern Shore. A thin layer of Quaternary gravel and sand covers the older formations throughout much of the area (Maryland Geological Survey 2022). Beneath BIR, these sedimentary deposits are known as the Kent Island Formation and are deposits of estuarine material consisting of loose, light-colored, cross-stratified sand that overlies dark-colored massive to thinly laminated clay silt. Directly beneath this layer are Precambrian and Cambrian metamorphic and igneous rocks.

3. Climate Change Impacts

The Maryland Commission on Climate Change (MCCC), made up of numerous state agency heads and General Assembly members, was established in 2007 by state executive order. In 2015, the MCCC was codified into law and is chaired by Maryland Department of the Environment (MDE). The main goal of the MCCC was to develop and maintain a Climate Action Plan (CAP) that addressed climate change drivers and potential state impacts, and established mitigative goals and recommendations. The executive order and subsequent CAP (completed in 2008) call attention to Maryland's specific susceptibility to sea level rise; increased storm intensity, wind and rainfall events; and extreme droughts and heat waves. Human activities such as coastal development, fossil fuels usage, and increasing greenhouse gas (GHG) emissions are all highlighted as contributing factors to climatic instability. From a natural resources perspective, Maryland will likely see impacts to terrestrial and aquatic ecosystems, forest resources, fisheries, agriculture, and the drinking water supply. The State already lists more than 600 species of plants and animals as endangered, threatened, in need of conservation, or in danger of extirpation – climate change will undoubtedly compound the existing habitat loss and degradation stressors that impact these species.

The CAP includes the *Comprehensive Assessment of Climate Change Impacts in Maryland* (Chapter 2), produced by the Commission's Scientific and Technical Working Group (STWG), which is based on extensive literature review and supercomputer model projections to estimate future climatic conditions in Maryland. Two GHG emission scenarios were used to project the degree of climate change – a higher rate that assumes unchecked increases, and a lower rate based on slower growth and eventual decline in emissions. The comprehensive assessment was revisited in 2016 to modify projections of future climactic conditions in Maryland based on new research findings. This assessment resulted in a number of key findings related to natural resources:

- Chesapeake Bay and coastal ecosystem restoration goals will likely be more difficult to achieve;
- Rising sea level will likely result in significant loss of tidal wetlands to inundation;
- Living resources will very likely change in species composition and abundance as warming continues;
- Aquatic ecosystems will likely be degraded by increased temperatures and flash-runoffs;
- Northern hardwood trees (maple, birch, beech) will likely disappear, replaced by oak, hickory and pines; and
- Biodiversity of Maryland's forests (both plants and animals) will likely decline.

The STWG also contributed the *Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change, Phase I: Sea-level rise and coastal storms* (Chapter 5) to the CAP, and later (Boicourt et al. 2011) produced *Phase II: Building societal, economic, and ecological resilience*.

Phase I provides recommendations for risk reduction through legislative and policy actions. One particular recommendation that should continue to be implemented at NAS is the protection of natural shorelines and associated resources, including tidal wetlands and vegetated buffers.

The Phase II strategy resulted from collaboration of governmental, non-profit and private sector experts. Two key points made in this document are that 1) climate change will alter distributions of species and habitats, exacerbating existing stressors at an uncertain rate and degree; and 2) strategically focused land management in "climate-sensitive" areas may increase ecosystem resilience and aid in maintaining biodiversity. The strategy outlines adaptation recommendations across a wide range of resource areas, including:

- Agriculture,
- Forests and Terrestrial Ecosystems,
- Bay and Aquatic Ecosystems, and
- Water Resources.

The approximately 8.8 million acres of land managed by DoD are integral to the military's mission of keeping our nation secure. As such, there is an operational need to ensure that current and future climatic changes do not compromise the ability of the installations to serve their essential operational, training, and testing functions. Understanding climate risks and vulnerabilities will greatly improve the chance for sustaining the capacity of ranges and bases to meet their mission now and into the future (Stein et al., 2019).

To address these risks, DoDM 4715.03 calls for installations to address climate considerations when updating or revising their INRMPs. When doing so, natural resources managers are required to incorporate climate adaptation into their management goals and actions. Adaptation actions are intended to reduce climate-related vulnerabilities or enhance resilience. Adaptation planning should be tailored to the particular mission, resources, and needs of an installation (Stein et al., 2019).

To ensure general principles and processes of climate adaptation are captured in all INRMPs, DoD developed the guide, Climate Adaptation for DoD Natural Resource Managers (Stein et al., 2019). The guide provides overarching adaptation concepts and principles for natural resources managers to incorporate into INRMPs.

Based on the DoD guide, NAS Patuxent River will develop a climate change management plan that will be included in the INRMP as an appendix. Climate change and climate adaptation principles and processes will be incorporated into future updates of other existing NAS Patuxent River management plans.

4. Soils

Based on the current soil survey for Dorchester County, three soils have been identified at BIR: Honga peat, Sunken mucky silt loam, and Beaches (Natural Resources Conservation Service [NRCS] 2022a) (Figure 2-4). Honga peat is the dominant soil on BIR; it is a very poorly drained soil comprised of up to 7 inches of peat with the water table at or near the surface and frequent flooding. Sunken mucky silt loam occurs along Fin Creek Ridge in the northeastern portion of Bloodsworth Island and in lesser amounts in other portions of the range. These soils are very poorly drained with the water table at or near the surface and occasional flooding. Sandy beaches comprise the remaining soils at BIR. All of these soils are listed as hydric by the NRCS (NRCS 2022b).

5. Hydrology and Aquatic Environment

a) Watersheds

BIR lies entirely within the Chesapeake Bay Watershed. The Chesapeake Bay is the largest estuary in North America, extending approximately 200 miles from the mouth of the Susquehanna River in northeast Maryland to Cape Henry in Virginia. The Chesapeake Bay Watershed encompasses more than 64,000 square miles and includes portions of Virginia, Maryland, Delaware, West Virginia, New York, Pennsylvania, and the District of Columbia (Chesapeake Bay Program [CBP] 2020a).

Salinity in the Chesapeake Bay generally decreases from the seawater zone at its mouth to the mixing zone in the central section to the tidal freshwater zone at the extreme northern portion of the Bay. Salinity also varies between the eastern and western portions of the Bay, with higher salinities occurring near the Eastern Shore and fresher surface waters flowing seaward near the western shore. Salinity levels in the middle portion of Chesapeake Bay are brackish waters which range between 0.5 and 25 parts per thousand (ppt) (CBP 2020b). Typical surface salinity in the vicinity of BIR ranges from 15 to 17 ppt, which characterizes the island as a moderately saline marsh community (Downs et al. 1994).

Threats to water quality in the Chesapeake Bay generally include excessive nutrient loading, which causes algal blooms and hypoxia; suspended solids from sediment in runoff; chemical contamination; air pollution; depleted shellfish and fish stocks; and outbreaks of the toxin-producing organism Pfiesteria. Habitat degradation, including the loss of forest buffers; sea level rise and the loss of wetlands; and the loss of sea grasses also contribute to overall reduction in watershed health. Long-term water quality data collected by the Chesapeake Bay Foundation, show that nitrogen, phosphorous, dissolved oxygen, and water clarity all improved slightly since the 2018 report (CBF 2020). Forest buffer and submerged aquatic vegetation (SAV) bed habitat indicators decreased. Rockfish and shad fisheries indicators also decreased (CBF 2020). The overall health index for 2020 is D+ (32 of possible score of 100). A 2001 study conducted by the Navy that tested surface water, sediment, and soils on and adjacent to BIR evaluated potential contamination from previous ordnance use on the range. Samples indicated that iron and manganese occurred in levels exceeding wildlife screening levels. Therefore, it was determined that concentrations of iron and manganese in the waters at the BIR pose a minimal potential risk to aquatic organisms. However, the study concluded no metals are present in the water column or in sediments that would pose an unacceptable risk to human health or the environment (DoN 2006).

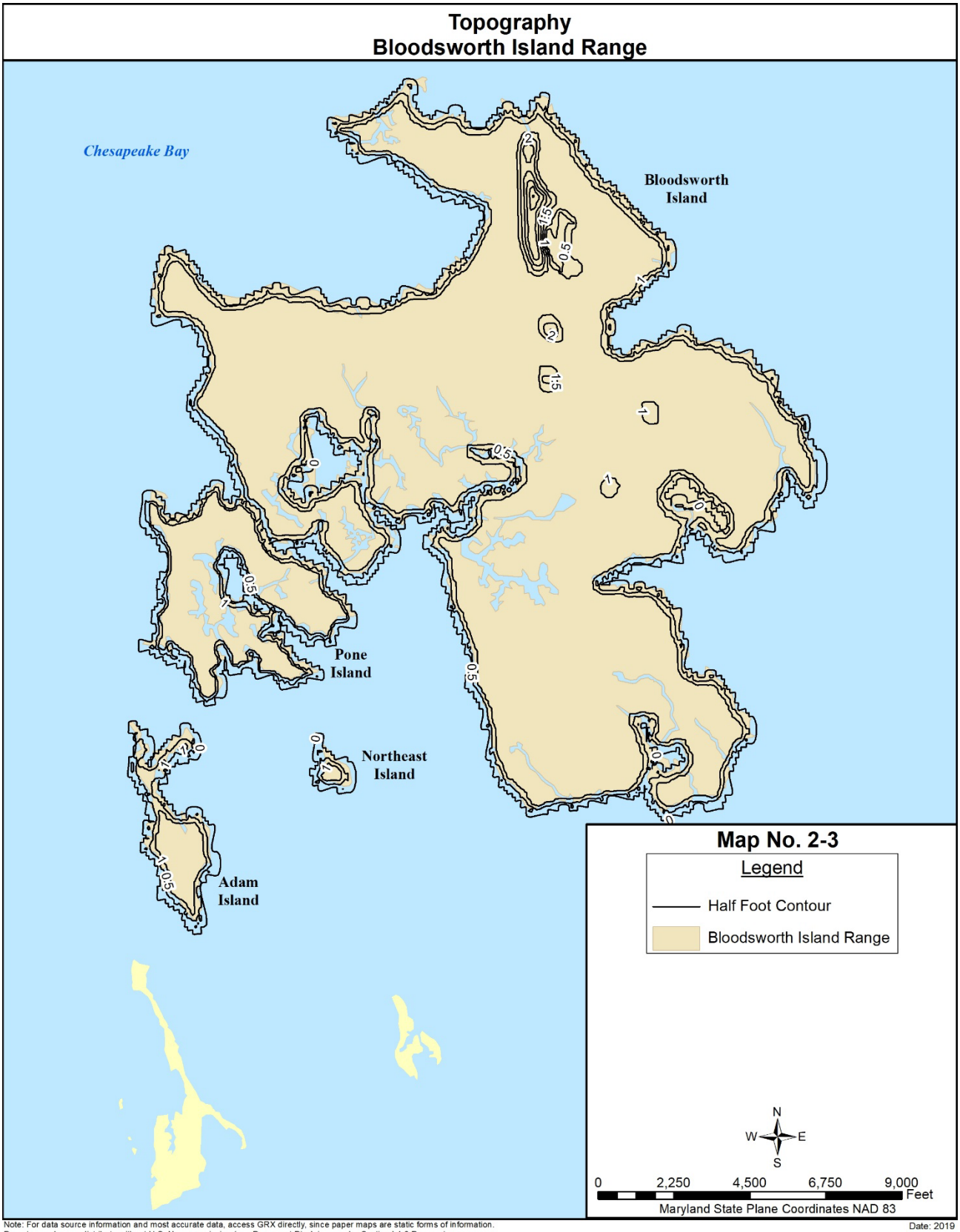
b) Surface Waters

Surface water features on BIR include the coves and tidal creeks that extend between and around Bloodsworth, Pone, Adam and Northeast islands (Figure 2-5). There are four named creeks on BIR - Long Creek, Muddy Creek, Fin Creek and Swan Pond Creek. Swan Pond Creek and Fin Creek are on Bloodsworth Island. Swan Pond Creek flows in and out of Swan Pond, the largest surface water feature on the island, and Fin Creek lies adjacent to Fin Creek Ridge on the northern portion of the island. Long Creek separates Bloodsworth and Pone Islands, whereas Muddy Creek is on Pone Island and nearly bisects it. The major coves include Okahanikan and Northeast Cove

on the western side of Bloodsworth Island; and Tigs Cove, Piney Island Cove, and Great Cove on the eastern side of the island. Waters surrounding the island are relatively shallow, having mean low water depths of 5 feet or less (U.S Geological Survey [USGS] 1973).

The normal tidal range is about 0.4 meters and much of the islands are at or near sea level. Due to the relatively low elevations, storm-induced tides, wind-driven tides, and spring tides can flood much of the islands at high tide. It is likely that the ponds now contain only brackish water, although a few may contain freshwater. Rainfall is the only source of freshwater to replenish these ponds.

Figure 2-3. Topography at Bloodsworth Island Range



Note: For data source information and most accurate data, access GRX directly, since paper maps are static forms of information.
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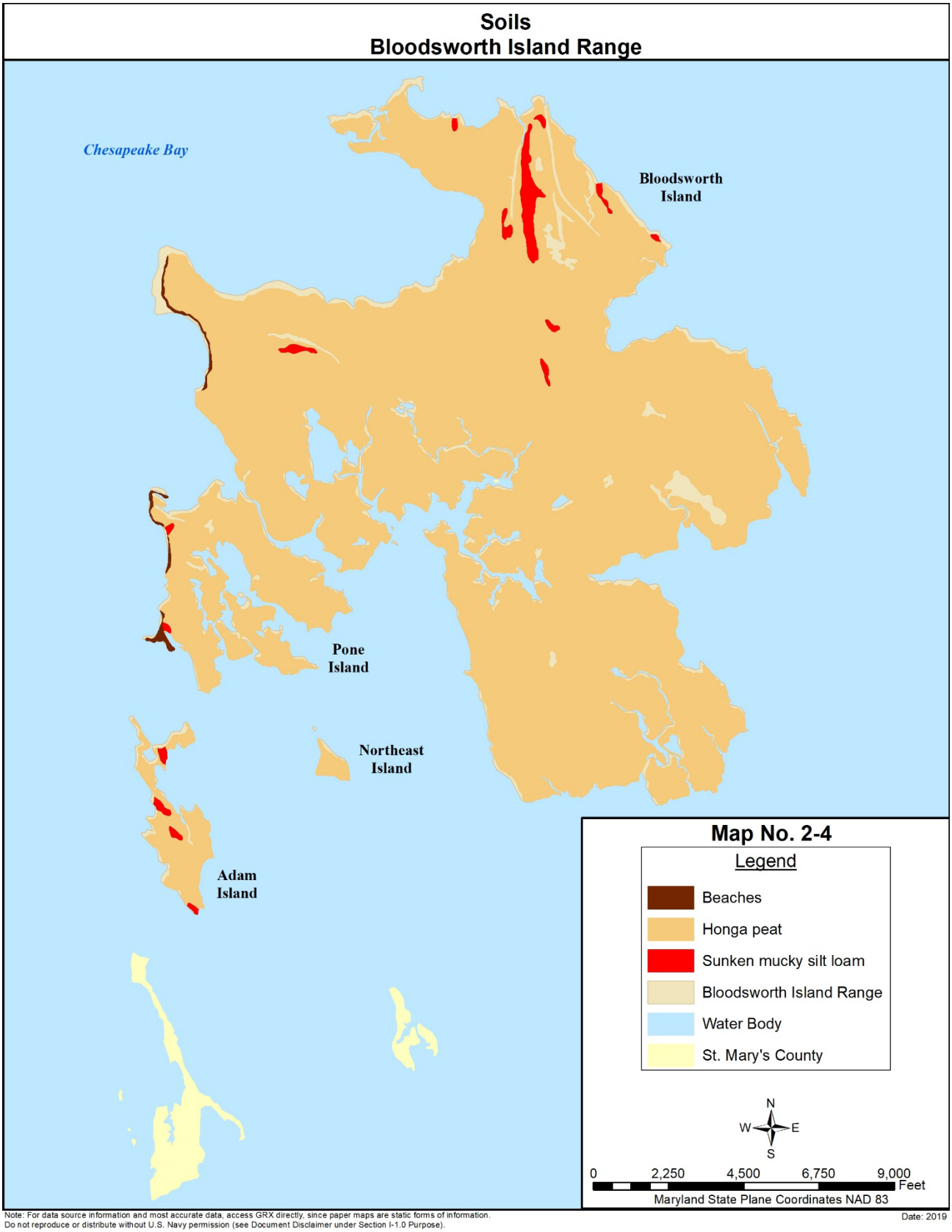
Figure 2-4. Soils at Bloodsworth Island Range



c) Groundwater

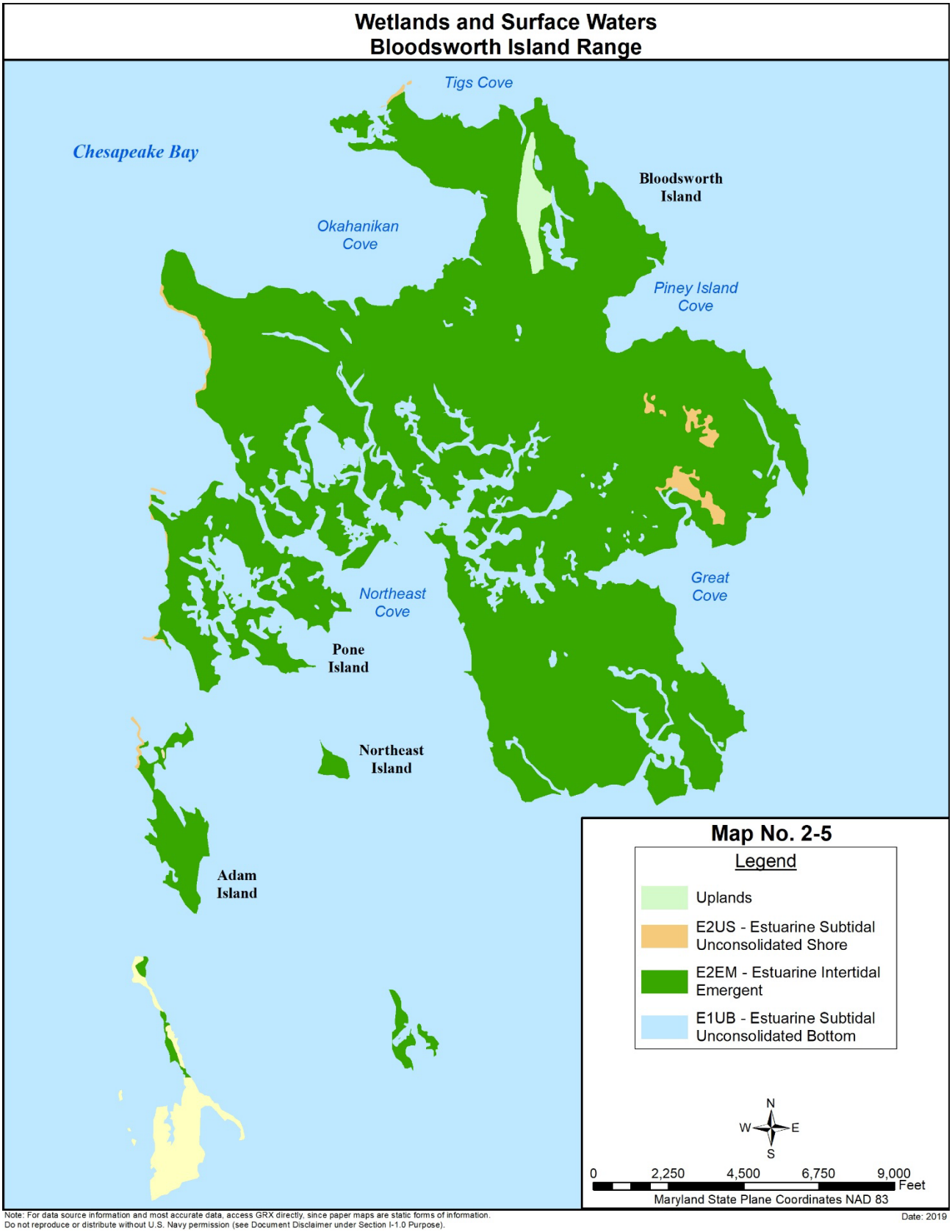
BIR lies above the Kent Island Formation, which consists of a relatively thin layer of interstratified gravel, sand, silt and clay with some organic matter (University of Delaware 2007). Aquifers underlying BIR are in the Chesapeake Bay group and include the Cheswold, Federalsburg and Frederica aquifers (DoN 2017a). Two shallow wells are located on Adam Island; however, water from these wells is not potable because of the high salinity levels of the groundwater.

d) Wetlands

Wetlands are defined as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (Environmental Laboratory 1987). Under the Cowardin system (Cowardin et al. 1979), wetlands are divided into five major systems: marine, estuarine, riverine, lacustrine and palustrine. Using this system, The USFWS, National Wetland Inventory (NWI) collects and maps surface waters, wetlands, and deep water habitats of the US and provides up to date maps based on aerial reconnaissance. The wetlands at BIR are classified as estuarine intertidal with persistent emergent vegetation that is irregularly flooded (E2EM1P), Estuarine intertidal unconsolidated shore mud with a water regime of irregularly exposed (E2US3M), estuarine subtidal with an unconsolidated substrate (E1UBL), or estuarine intertidal unconsolidated sandy shores that are irregularly flooded (E2US2P) (USFWS 2022b). Figure 2-5 shows the wetlands at BIR based on the system, subsystem, and class (E2EM, E2US, and E1UB) without additional classifiers.

The islands comprising BIR consist almost entirely (over 99 percent) of wetland habitats. Although early records indicate up to 145 acres of upland occurred, only about 30 acres remain (Downs et al. 1994). A low upland ridge (Fin Creek Ridge) still exists along the eastern edge of Fin Creek and is the only non-wetland feature on the range. Land loss and increases in wetland acreage at BIR are attributed to several geomorphic factors. Perimeter land loss due to a rise in sea level and erosion accounts for the largest area of land loss, whereas channel widening and ponding have contributed to increases in wetland area in the interior portions of the islands (Downs et al. 1994).

Figure 2-5. Wetlands and Surface Water at Bloodsworth Island Range



C. General Biotic Environment

1. Rare, Threatened and Endangered Species, and Species of Concern

The term "rare species" includes state- or federally listed threatened and endangered species, species of special conservation concern, species that are periodically reviewed for change in state or federal status, and species that are at the extreme of their distribution. BIR lies within the known range of several federal- and state-listed species, which may occur on or in the vicinity of the facility. Bald Eagles (*Haliaeetus leucocephalus*), which were removed from the federal list of threatened and endangered species in 2007 but remain a watch-list species in Maryland, have nested for several years on Bloodsworth and Adam Islands (Smith 2014). The Peregrine Falcon (*Falco peregrinus anatum*), a state-rare species, has been documented as nesting on Bloodsworth and Adam Islands and the state-endangered Sedge Wren (*Cistothorus stellaris*) was documented as present, but not breeding, in 2008 (DoN 2008, Smith 2014). Surveys for the Rufa Red Knot (*Calidris canutus rufa*) resulted in a "probable" sighting in 2015, but USFWS and MDNR agree that this species would be considered as "transient" for BIR. NAS Patuxent River conducts annual surveys for this species. The Eastern Black Rail (*Laterallus jamaicensis jamaicensis*) was listed as a threatened species under the ESA in 2020. High marsh habitat required for this species is limited on BIR however, NAS Patuxent River will perform nighttime surveys to determine if this species is present. 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. Table 2-1 lists the rare, threatened or endangered animal species known to occur or with potential to occur at BIR.

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 (DoN 2003). 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. Two state-listed species – Seaside Knotweed (*Polygonum glaucum*) and Slender Sea-purslane (*Sesuvium maritimum*) were documented during the 2002-2003 survey. Based on habitat suitability, 12 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 2-2. Specific locations of rare plants were recorded and are shown in Figure 2-6.

Table 2-1. Rare, Threatened, and Endangered Animal Species Occurring or Potentially Occurring at Bloodsworth Island Range

Species	Scientific Name	Federal Status	State Status	Rank
Birds				
Least Bittern*	*Ixobrychus exilis*		I	G4S2S3B
American Bittern*	*Botaurus lentiginosus*		T	G5S1B
Bald Eagle*	*Haliaeetus leucocephalus*			G5S3S4
Northern Harrier*	*Circus hudsonius*		I	G5S2B
Peregrine Falcon*	*Falco peregrinus*		I	G4T4S2B
Rufa Red Knot*	*Calidris canutus rufa*	T	T	G4T2S1M
Royal Tern*	*Thalasseus maximus*		E	G5S1B
Common Tern*	*Sterna hirundo*		E	G5S1B
Forster's Tern*	*Sterna fosteri*		I	G5S2B
Black Skimmer*	*Rynchops niger*		E	G5S1B
Barn Owl*	*Tyto alba*		I	G5S2B
Short-eared Owl*	*Asio flammeus*		E	G5S1B
Sedge Wren*	*Cistothorus platensis*		E	G5S1B
Saltmarsh Sparrow*	*Ammospiza caudacuta*		I	G2S2BS1N
Fish				
Shortnose Sturgeon	*Acipenser brevirostrum*	E	E	G3S1
Atlantic Sturgeon	*Acipenser oxyrhinchus*	E	E	G3S1
Reptiles				
Loggerhead Sea Turtle	*Caretta caretta*	T	T	G3S1B
Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	E	E	G1S1N
Green Sea Turtle	*Chelonia mydas*	T	T	G3S1N
Leatherback Sea Turtle	*Dermochelys coriacea*	E	E	G2S1N
Atlantic Hawksbill Sea Turtle	*Eretmochelys imbricata*	E	E	G3SNA
Marine Mammals				
Finback Whale	*Balaenoptera physalus*	E	E	G3G4S1S2
Humpback Whale	*Megaptera novaeangliae*	E	E	G4S1S2
Northern Atlantic Right Whale	*Eubalaena glacialis*	E	E	G1S1
West Indian Manatee	*Trichechus manatus*	T		G2

*Documented at BIR

T = Threatened; E = Endangered; I = In Need of Conservation

G1 = Highly globally rare; G2 = Globally rare; G3 = Very rare or distributed locally; G4 = Apparently secure globally, but rare in parts of range; G5 = Demonstrably secure globally, but rare in parts of range; G_T = Specific taxon ranked differently than the full species

S1 = Highly state rare; S2 = State rare; S3 = rare to uncommon; S4 = apparently secure; S_B = species is a migrant and rank applies to the status of the breeding population; S_M = species is a migrant and rank applies to the status of the transitional population; S_N = species is a migrant and rank applies to the status of the non-breeding population; SNA= no status rank

Table 2-2. Rare, Threatened, and Endangered Plant Species Occurring or Potentially Occurring at Bloodsworth Island Range

Species	Scientific Name	Federal Status	State Status	Rank
Seabeach Amaranth	*Amaranthus pumilus*	T	E	G2S1
Seabeach Orach	*Atriplex mucronata*			GNRS1S2
Pretty Dodder	*Cuscuta indecora*			G5T5S2?
White Spikerush	*Eleocharis albida*			G4G5S2S3
Salt-marsh Spikerush	*Eleocharis halophila*		E	G4S1
Sea Milkwort	*Lysimachia maritima*		X	G5SH
Seabeach Sandwort	*Honckenya peploides*		E	G5T5S1
Beach Pinweed	*Lechea maritima*			G5T3QS3
Seaside Knotweed*	*Polygonum glaucum*		E	G3S1
Slender Marsh Pink	*Sabatia campanulata*		E	G5S1
Sea-purslane*	*Sesuvium maritimum*		E	G5S1
Tall Sea-blite	*Suaeda Linearis*			G5S3

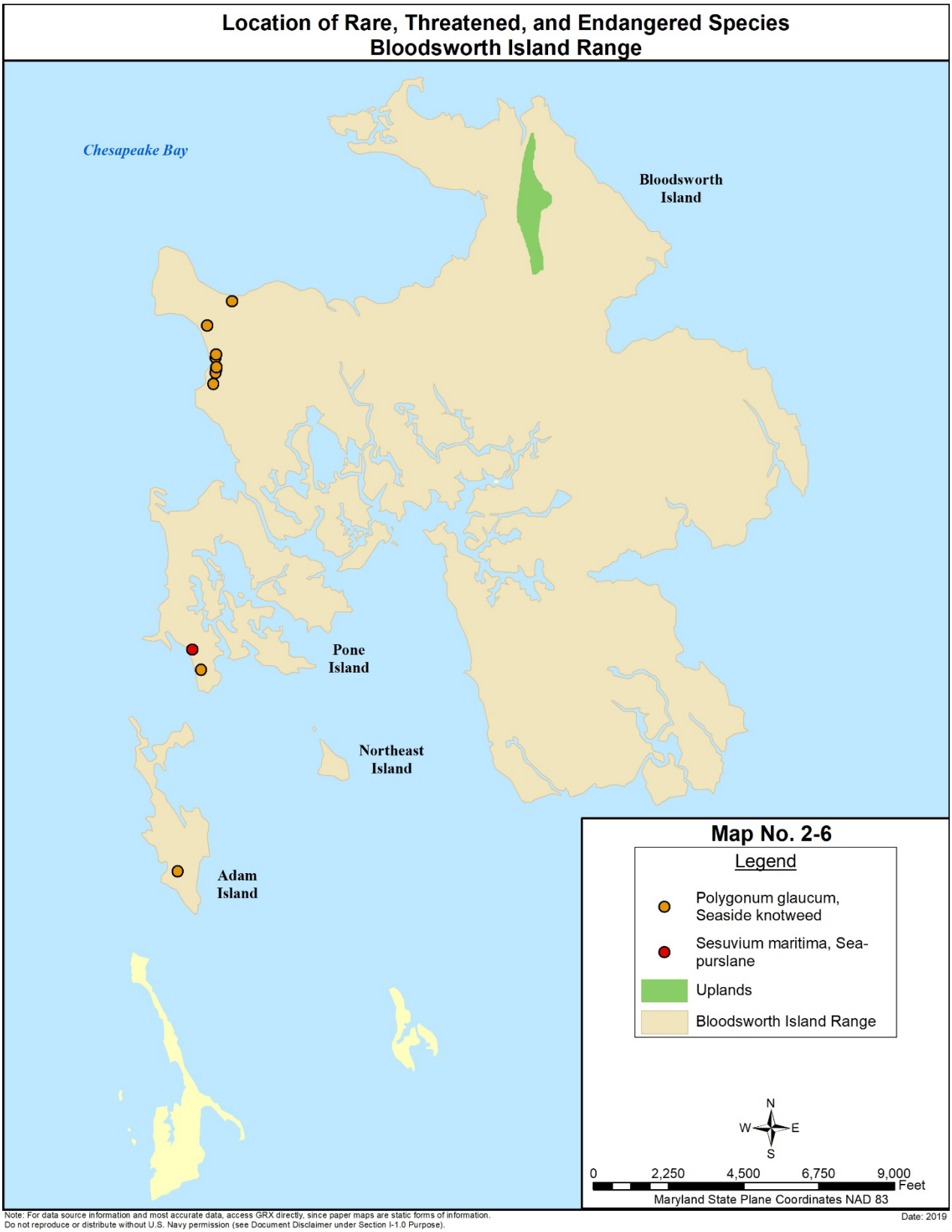
*Documented at BIR

T = Threatened; E = Endangered; X = Endangered Extirpated

G2 = Globally rare; G3 = Very rare or distributed locally; G4 = Apparently secure globally, but rare in parts of range; G5 = Demonstrably secure globally, but rare in parts of range; G_T = Specific taxon ranked differently than the full species; GNR = not ranked; Q = rank qualifier indicating the taxon has questionable, controversial, or uncertain taxonomic standing

S1 = Highly state rare; S2 = State rare; S3 = rare to uncommon; SH = historical (possibly extirpated); S_? = rank qualifier indicating uncertainty that may span 2-3 ranks

Figure 2-6. Location of Rare, Threatened, and Endangered Species at Bloodsworth Island Range



2. Fauna

a) Mammals

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 Sika Deer (*Cervus nippon*), Raccoon (*Procyon lotor*), River Otter (*Lontra canadensis*), Muskrat (*Ondatra zibethicus*), Eastern Cottontail Rabbit (*Sylvilagus floridanus*), Red Fox (*Vulpes vulpes*), Norway Rat (*Rattus norvegicus*), 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. White-tailed Deer (*Odocoileus virginianus*) are known from historical records and skeletal remains, as well as tracks observed in 2008 (DoN 2008). Nutria (*Myocaster coypus*) have not been detected on the islands, but have the potential to invade from the Dorchester County mainland, where MDNR and USFWS have been attempting to eradicate them for years. Their presence, if ever detected, should trigger an immediate control effort by the NR Program, in cooperation with MDNR and USFWS.

b) Herpetofauna

The diversity of herpetofauna on BIR is also very low. Reptile species known to inhabit the islands include Northern Diamondback Terrapin (*Malaclemys t. terrapin*), Northern Watersnake (*Nerodia g. sipedon*), Six-lined Racerunner (*Cnemidophorus sexlineatus*), Northern Rough Greensnake (*Opheodrys a. aestivus*), and Eastern Snapping Turtle (*Chelydra serpentina*). Remains of a Loggerhead Sea Turtle were found in 2019 (Rambo 2019) and the Eastern Box Turtle (*Terrapene c. carolina*) has occurred historically, based on the presence of skeletal remains (Rambo 2014). Based on available habitat and occurrence in nearby areas, the Eastern Mud Turtle (*Kinosternon s. subrubrum*) could potentially inhabit BIR. There are no known amphibian species inhabiting the island, due to the absence of fresh water for breeding.

c) Birds

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 east coast of the United States. Large numbers of birds are found in this corridor during the spring and fall migration periods. As a result, the range serves as an important stopover area during migration and as an overwintering area for waterfowl.

Osprey (*Pandion haliaetus*) are common in and around BIR. Osprey nest on the ground and on nesting platforms erected by the Navy. In addition, Osprey have been observed nesting on pyramid targets previously used by the NAVAIR Range Department, on the tail fins of inert rockets, and on old cars that have been placed as targets. Other raptors known to use BIR include Turkey Vulture (*Cathartes aura*), Black Vulture (*Coragyps atratus*), Sharp-shinned Hawk (*Accipiter striatus*), Red-tailed Hawk (*Buteo jamaicensis*), Cooper's Hawk (*Accipiter cooperii*), Red-shouldered Hawk (*Buteo lineatus*), Northern Harrier (*Circus cyaneus*), American Kestrel (*Falco sparverius*), Barn Owl (*Tyto alba*), Bald Eagle, and Peregrine Falcon.

Common breeding songbirds that occur at BIR include Red-winged Blackbird (*Agelaius phoeniceus*), Marsh Wren (*Cistothorus palustris*), Seaside Sparrow (*Ammodramus maritimus*), Saltmarsh Sparrow (*Ammodramus caudacutus*), Fish Crow (*Corvus ossifragus*), Barn Swallow

(*Hirundo rustica*), European Starling (*Sturnus vulgaris*), Gray Catbird (*Dumetella carolinensis*), Song Sparrow (*Melospiza melodia*), Common Grackle (*Quiscalus quiscula*), Boat-tailed Grackle (*Quiscalus major*), and Common Yellowthroat (*Geothlypis trichas*) (Rambo 2019, 2020, and 2014).

American Black Duck (*Anas rubripes*), Mallard (*Anas platyrhynchos*) and Canada Goose (*Branta canadensis*) are the primary waterfowl species that breed in the Chesapeake Bay region. In addition to Black Duck and Mallard, other breeding waterfowl species found on BIR include Blue-winged Teal (*Anas discors*), Wood Duck (*Axis sponsa*), and Mute Swan (*Cygnus olor*). 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 (DoN 2006).

Ten species of wading birds are known to nest on BIR, including large numbers of Great Blue Heron (*Ardea herodius*), Green Heron (*Butorides virescens*), Black-crowned Night Heron (*Nycticorax nycticorax*), and Yellow-crowned Night Heron (*Nyctanassa violacea*). Other wading birds that nest on BIR include Little Blue Heron (*Egretta caerulea*), Great Egret (*Ardea alba*), Tricolored Heron (*Egretta tricolor*), Glossy Ibis (*Plegadis falcinellus*), Snowy Egret (*Egretta thula*), and Cattle Egret (*Bubulcus ibis*).

The BIR supports nesting populations of rails and shorebirds, although their presence at BIR is more extensive during the migratory season. Clapper Rails (*Rallus crepitans*) are known to nest in relatively high numbers at BIR, with migrating King Rails (*Rallus elegans*), Virginia Rails (*Rallus limicola*), and Sora (*Porzana carolina*) also present during the fall, winter and spring months. Shorebird species known to use BIR include Willet (*Tringa semipalmata*), Greater Yellowlegs (*Tringa melanoleuca*), Black-bellied Plover (*Pluvialis squatarola*), Dunlin (*Calidris alpina*), Sanderling (*Calidris alba*), Ruddy Turnstone (*Arenaria interpres*), Least Sandpiper (*Calidris minutilla*), and Western Sandpiper (*Calidris mauri*). Of these, Willet are the most common and the only species that breeds at BIR. Spring shorebird nest surveys at BIR are conducted annually to track breeding data.

Various species of gulls and terns are common at BIR during the summer months. Species nesting on BIR include the Common Tern (*Sterna hirundo*), Forster's Tern (*Sterna forsteri*), Laughing Gull (*Leucophaeus atricilla*), Great Black-backed Gull (*Larus marinus*), Herring Gull (*Larus argentatus*), and Ring-billed Gull (*Larus delawarensis*). Laughing Gull, Herring Gull, Great Black-beaked Gull, Common Tern, Royal Tern (*Thalasseus maximus*), Caspian Tern (*Hydroprogne caspia*), are currently known to nest at BIR. Nesting activity by these species is likely limited to the sandy beaches and shoals at the southern end of BIR (DoN 2006). Brown Pelican (*Pelecanus occidentalis*), American Oystercatcher (*Haematopus palliatus*), and Double-crested Cormorant (*Phalacrocorax auritus*) also breed on Bloodsworth, Spring, and Adam islands.

d) Fish

Fish species utilizing the tidal creeks and adjacent bay waters were sampled in 1980 (DoN 1997) by the EPA's Environmental Monitoring and Assessment Program. Appendix C lists fish species collected during that survey effort and species which may reasonably be expected to occur within

four miles of BIR. The fish fauna is typical of the Chesapeake Bay estuarine system, with tidal creeks and SAV beds providing important nursery and refuge areas.

e) Marine Mammals and Sea Turtles

MDNR and NOAA Fisheries stranding and sighting data indicate that 21 species of marine mammals have been documented throughout the Maryland portion of the Chesapeake Bay (MDNR 2022b). With the exception of dolphins, marine mammal species may individually enter the Chesapeake Bay, but are generally present at very low densities. The Bottlenose Dolphin (*Tursiops truncates*) and Harbor Porpoise (*Phocoena phocoena*) are the most common marine mammals in the vicinity of BIR (DoN 2006). Several whale and seal species, including Humpback Whale (*Megaptera novaeangliae*) and Harbor Seal (*Phoca vituli*), are also known to occur, as well as the rare (but occasional) West Indian Manatee (*Trichechus manatus*).

Five species of sea turtles occur seasonally in the Chesapeake Bay. The Loggerhead (*Caretta caretta*) is the most common sea turtle followed by Kemp's Ridley (*Leipidochelys kempii*), which uses the Chesapeake as a seasonal feeding ground (VIMS 2022a). Leatherback (*Dermochelys coricea*) and Green Sea Turtles (*Chelonia mydas*) occur occasionally. The Atlantic Hawksbill Sea Turtle (*Eretmochelys imbricata*) is transient in the Chesapeake Bay but rare (VIMS 2022a, DoN 2006) and is the only sea turtle species for which no strandings have been recorded by the Maryland Stranding Network (MDNR 2022b).

3. Flora

Vegetative communities at BIR have been characterized by several historical surveys and 67 species of vascular plants have now been identified (see Appendix C). 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 DoN 2003). Subsequent field investigations conducted by biologists from MDNR and the NAS Patuxent River NR Program office indicate that there have been no significant changes to the vegetation communities at BIR since the 1970 assessment (DoN 2006). Figure 2-7 shows the distribution of vegetative communities at BIR using data from previous surveys.

Ecosystems of BIR are predominately comprised of low- and high-marsh habitats. The low marsh is dominated by Saltmarsh Cordgrass (*Spartina alterniflora*), which is typically found in areas located between mean sea level and high tide. The high marsh is dominated by Black Needlerush (*Juncus roemerianus*), with small areas of Saltmeadow Grass (*Spartina patens*) and Saltgrass (*Distichlis spicata*). Even smaller patches of Saltmarsh Bulrush (*Bolboschoenus robustus*) can be found in a few locations. Marsh Elder (*Iva frutescens*) and Groundsel Tree (*Baccharis halimifolia*) are the most common woody species that occur on the islands.

Beds of SAV are another important component of the BIR ecosystem. SAV is a diverse assembly of marine and bay grasses found in shoal areas of the Chesapeake Bay, from its mouth to the headwaters of its tributaries (DoN 2017). BIR is located in the Mesohaline region of the bay, with salinity ranging from 10 to 20 ppt. Five species are common in this medium-salinity zone including Widgeon Grass (*Ruppia maritima*), Eelgrass (*Zostra marina*), Redhead Grass (*Potamogeton*

perfoliatus), Sago Pondweed (*Stuckenia pectinata*), and Horned Pondweed (*Zannichelia palustris*) (Orth et.al. 2010). Widgeon Grass and Eelgrass are the most common species found near BIR (Orth et al 2010, Orth et al. 2002).

Historically, SAV was estimated to cover 600,000 acres of the Bay (VIMS 2022b), but by the 1970s less than 40,000 acres of SAV remained (Moore et al. 2004). VIMS has mapped SAV in different regions of the Chesapeake Bay regularly since 1971, using aerial photo-interpretation and ground verification. In 2020, 63,132 acres of SAV were mapped (Patrick et.al. 2020). Large-scale declines in SAV populations have occurred since the 1960s in response to increasing amounts of non-point inputs of nutrients and sediments into the Bay system (Moore et al. 2004). SAV coverage in the Tangier Sound is estimated to be less than 10% of the historic area (Orth et al. 2002). A study by Orth et.al. published in 2010 found that SAV in the Tangier study zone decreased as a result of both nutrient inputs (nitrogen and phosphorous) and increases in sediment load in years of heavy rainfall (Orth et.al. 2010). SAV coverage near BIR shows a decline over the past 3 years (Patrick et.al. 2020).

Figure 2-7. Ecological Communities at Bloodsworth Island Range

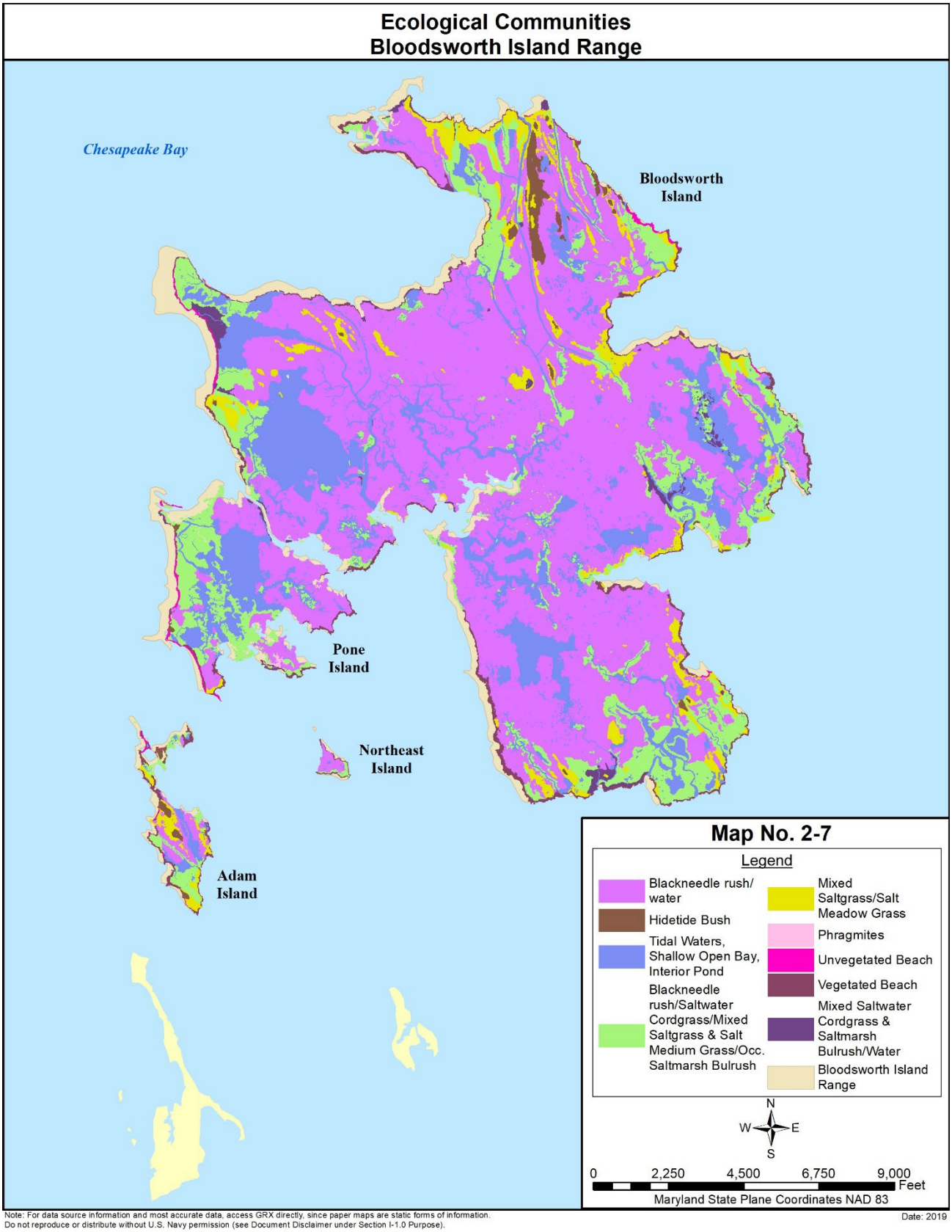
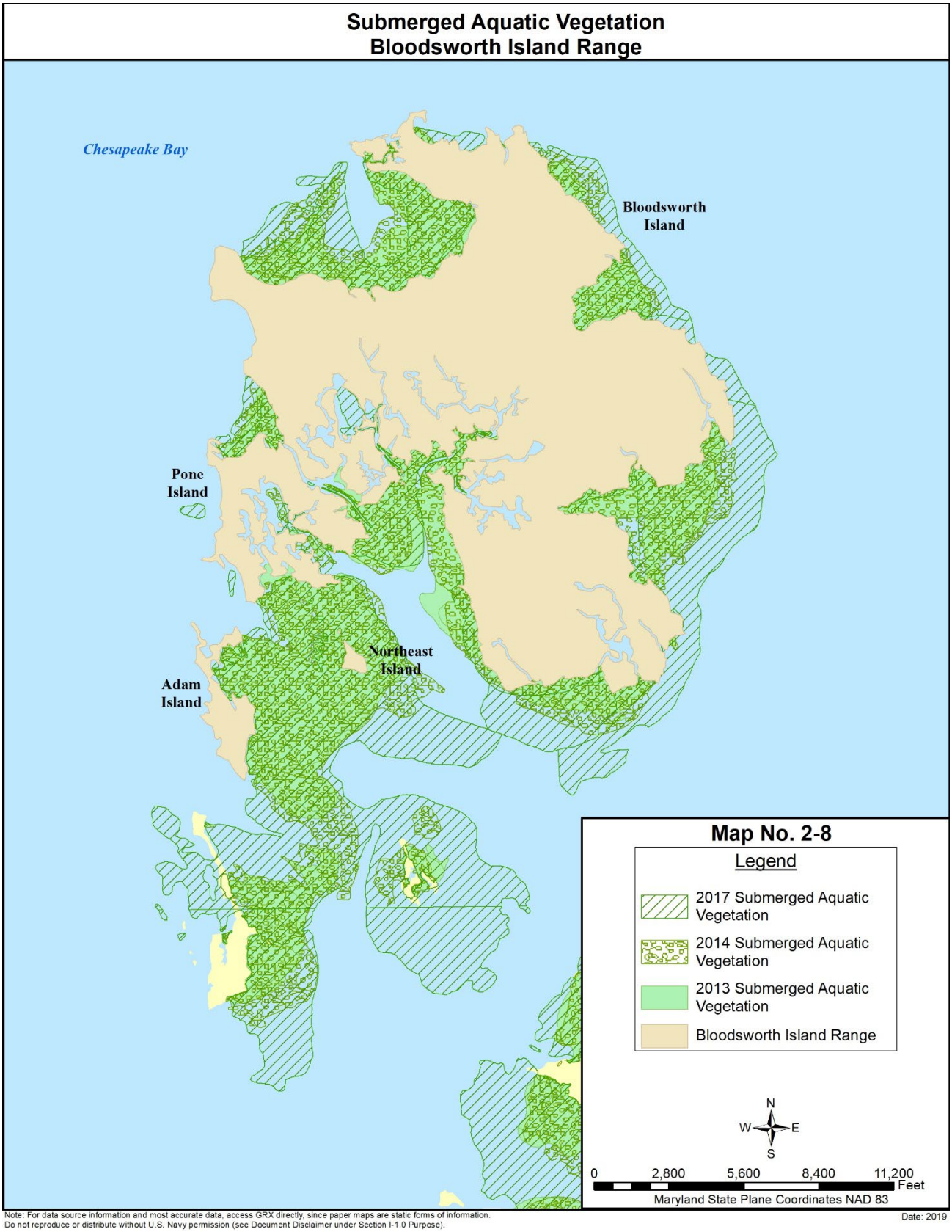


Figure 2-8. Submerged Aquatic Vegetation at Bloodsworth Island Range



3. ENVIRONMENTAL MANAGEMENT STRATEGY AND MISSION SUSTAINABILITY

A. Supporting Sustainability of the Military Mission and the Natural Environment

1. Military Mission and Sustainable Land Use

A primary goal of natural resources management at BIR is to preserve and sustain conditions that are compatible with the military mission. Mission requirements are met through the protection and enhancement of significant resources such as wetlands and habitat for migratory birds and other at-risk species. Sustainable management of these resources helps to ensure compliance with environmental laws and regulations and the continued availability of training lands.

2. Defining Impact to the Military Mission

The large number of migratory bird species that use BIR during migration or for nesting and overwintering, extensive wetland acreage, and the potential occurrence of marine mammals and sea turtles in the immediate vicinity are the primary natural resources with potential to impact the military mission at BIR. Potential impacts to the mission include avoiding scheduling RDT&E missions during bird-nesting seasons and migrations, and periods with relatively high densities of marine mammals and sea turtles; and continuing to enforce the no-impact area on the northern portion of Bloodsworth Island.

3. Relationship to Operational Area Plans

a) Encroachment Action Plan

Per OPNAVINST 11010.40 (Encroachment Management Program), encroachment is defined as "any action or condition that restricts or prohibits the attainment or sustainment of the Navy's statutory responsibilities to man, train, maintain, and equip a combat-ready force." The Patuxent River Complex Encroachment Action Plan (EAP), updated in 2016, identifies, quantifies, and provides mitigation strategies for the potential encroachment threats to all facilities in the Complex, including BIR (DoN 2016).

b) Range Air Installation Compatible Use Zones (RAICUZ)

The first RAICUZ study for the Atlantic Test Range (ATR) Inner Range was completed in November 2009 in accordance with OPNAVINST 3550.1A (Range Air Installation Compatible Use Zones [RAICUZ] Program) guidelines. The purpose of the study was to analyze current and future aircraft operations in the ATR Inner Range (including BIR) and to assess the impact of future RDT&E and training operations conducted within the ATR Inner Range on nearby development, uses and natural resources. The findings of the study were shared with counties and local community organizations as a planning tool (NAVFAC 2009).

The RAICUZ study was also used as a reference tool for the NAS Patuxent River Joint Land Use Study (JLUS) completed in January 2015. The JLUS is a cooperative land-use planning effort between military installations and surrounding communities, administered by the DoD Office of

Economic Adjustment. The goal of the NAS Patuxent River JLUS is to protect the viability of current and future military mission and operations, while simultaneously guiding community growth, sustaining the environmental and economic health of the region, and protecting public health, safety, and welfare. The NAS Patuxent River JLUS includes the participation of nine counties and three municipalities in Southern Maryland, as well as on Maryland's Eastern Shore and Virginia's Northern Neck. Participants in public meetings and technical groups have identified BIR as a topic of interest to be addressed in the JLUS process.

The Statewide Joint Land Use Study Response Implementation Strategy (SJRIS), completed in 2019, defines plans and goals for the state, military, and community partners to identify compatibility issues, address concerns, and access opportunities in areas surrounding military installations in Maryland. The strategy aims to identify where there are potential compatibility issues between Maryland military installations and their surrounding communities that may have statewide and/or regional impacts; and determine where there are opportunities for the State of Maryland to take policy actions or assist local jurisdictions with compatibility planning. This strategy is the result of a state iterative planning process involving stakeholders from the state, localities and communities, and the military. Twelve military installations in Maryland were evaluated, including NAS Patuxent River.

c) Environmental Restoration Program

The DoN Environmental Restoration Program (ERP) is responsible for identifying Comprehensive Environmental Response, Compensation, and Liability Act releases, Resource Conservation and Recovery Act releases, and releases under related provisions; considering risks and assessing impacts to human health and the environment, including impacts to endangered species, migratory birds, and biotic communities; and developing and selecting response actions when a release may result in an unacceptable risk to human health and the environment.

When appropriate, the regional or installation natural resources staff will help the ERP Remedial Project Manager (RPM) identify potential impacts to natural resources caused by the release of contaminants.

Regional or installation NR Program staff will also participate, as appropriate, in the ERP decision-making process by communicating natural resources issues on the installation to the RPM, attending Restoration Advisory Board meetings, reviewing and commenting on ERP documents (e.g., remedial investigation, ecological risk assessment), and ensuring that response actions, to the maximum extent practicable, are undertaken in a manner that minimizes impacts to natural resources on the installation.

When appropriate, the regional or installation natural resources staff will make recommendations to the ERP RPM regarding cleanup strategies and site restoration. During initial monitoring protocols, the natural resources manager has the opportunity to recommend site restoration practices that are outlined within the INRMP. Examples include landfill caps restored to grasslands, excavation areas restored to wetland/pond areas, and treated water located to enhance a pond area.

It should be noted that, because BIR is still active, it is not a part of the ERP. Its inclusion will be evaluated when/if it becomes a closed range.

B. Applicable Laws, Regulations, and Policies

The requirements underlying this INRMP arise from multiple environmental laws, regulations and policies. These include public laws; executive orders (EOs); United States codes (USCs); and DoD, DoN and installation-specific directives, instructions and notices.

As a general rule, the Federal government is protected from regulation by state governments by the principle of sovereign immunity. Sovereign immunity exists with respect to all state laws unless and until the Federal government has affirmatively waived it. Until such time as a waiver of sovereign immunity has occurred, Maryland's statutory authority over the Federal government, including Federal installations, is not binding.

The following paragraphs discuss the major legislation specifically applicable to the NAS mission to execute this INRMP.

1. Public Laws and Executive Orders

Conserving Programs on Military Installations (Sikes Act), as amended; Public Law 86-797, 16 USC 670(a) et seq., requires Federal military installations with adequate wildlife habitat to implement cooperative agreements with other agencies and develop long-range INRMPs. Thereby, it is appropriate to manage natural resources for multipurpose uses and provide the public access to those uses to the extent consistent with the military mission. This act sets guidelines for the collection of fees for the use of natural resources, such as hunting, fishing and trapping.

National Environmental Policy Act of 1969 (NEPA), as amended; Public Law 91-190, 42 USC 4321 et seq., requires Federal agencies to consider the environmental impacts of their proposed activities. NEPA promotes an interdisciplinary approach in decision-making designed to identify unacceptable or unnecessary impacts to the environment and avoid or mitigate them as much as possible. NEPA is further discussed in section 3.C.

Clean Water Act of 1972 (CWA), as amended; Public Law 92-500, 33 USC 1251 et seq., Section 404 establishes a program to regulate the discharge of dredged or fill material into waters of the U.S. (including wetlands) and establishes a permitting program administered by the U.S. Army Corps of Engineers (USACE).

Rivers and Harbors Act of 1899; 33 USC 403, Section 10 requires authorization from the Secretary of the Army, acting through the USACE, for the construction of any structure in or over any navigable water of the United States. Structures or work outside the limits defined for navigable waters of the United States require a Section 10 permit if the structure or work affects the course, location, or condition of the water body. The law applies to any dredging or disposal of dredged materials, excavation, filling, rechannelization, or any other modification of a navigable water of the United States and applies to all structures from the smallest floating dock to the largest commercial undertaking. Regulated activities include construction of wires and cables over the water and pipes; cables or tunnels under the water; any obstruction or alteration of navigable water; filling of wetland adjacent or contiguous to waters of the United States; construction of riprap,

revetments, groins, breakwaters, and levees; and transportation of dredged material for dumping into ocean waters.

Coastal Zone Management Act of 1972 (CZMA), Public Law 92-582, 16 USC 1451 et seq., along with the appropriate amendments (Coastal Zone Reauthorization Amendments of 1990 and Coastal Zone Protection Act of 1996) are designed to encourage coastal states to develop coastal area management programs to preserve, protect, develop, and, where possible, restore or enhance valuable natural coastal resources such as wetlands, floodplains, estuaries, beaches, dunes, barrier islands, and coral reefs, as well as the fish and wildlife supported by those habitats. Although federal lands and actions are exempt from state law jurisdiction, the CZMA requires activities on federal lands that are reasonably likely to affect use of lands or waters, or natural resources of the coastal zone beyond the boundaries of the federal property, to be conducted in a manner that is consistent with enforceable policies of a state's federally approved Coastal Zone Management Program (CZMP). Marine and coastal zone management is discussed in section 4.L.

Endangered Species Act of 1973 (ESA), as amended; Public Law 93-205, 16 USC 1531 et seq., protects threatened, endangered and candidate species of fish, wildlife and plants and the designated critical habitats. Under this law, no Federal action is allowed to jeopardize the continued existence of an endangered or threatened species. ESA also requires consultation with the U.S. Fish and Wildlife Service (USFWS) and NOAA Fisheries on any action that has the potential to affect a listed species. Rare, threatened, and endangered species occurring and potentially occurring in the vicinity of BIR are presented in Tables 2-1 and 2-2.

National Defense Authorization Act of 1989, Public Law 101-189; Volunteer and Partnership Cost-Share Program, amends two acts and establishes volunteer and partnership programs for natural and cultural resources management on DoD lands.

Defense Appropriations Act of 1991, Public Law 101-511; Legacy Resource Management Program, establishes a program for the stewardship of biological, geophysical, cultural and historic resources on DoD lands.

Exotic Organisms, EO 11987, requires agencies to restrict the introduction of exotic/non-native organisms into natural ecosystems on lands and waters that they own, lease or hold for purposes of administration.

Protection of Wetlands, EO 11990, requires Federal agencies to avoid undertaking or providing assistance for new construction located in wetlands unless there is no practical alternative and all practicable measures to minimize harm to wetlands have been implemented.

Invasive Species, EO 13112, requires Federal agencies to identify and prevent actions that are likely to cause or promote the introduction or proliferation of invasive species, and calls for the minimization of ecological, economic and human health impacts caused by invasive species.

Chesapeake Bay Protection and Restoration, EO 13508, recognizes the Chesapeake Bay as a national treasure and calls on the Federal government to lead a renewed effort to restore and protect the nation's largest estuary and its watershed.

Stewardship of our Ocean, the Coasts, and the Great Lakes, EO 13547, establishes a national policy to ensure the protection, maintenance, and restoration of the health of ocean, coastal, and Great Lakes ecosystems and resources.

Invasive Species, EO 13751, directs federal agencies to act to prevent the introduction and spread of invasive species, and to support efforts to eradicate and control invasive, non-native species that are established on federal lands.

2. United States Codes

Bald and Golden Eagle Protection Act (BGEPA), 16 USC 668a-d et seq., prohibits any form of possession or taking of Bald and Golden Eagles. The statute imposes criminal and civil sanctions as well as an enhanced penalty provision for subsequent offenses. This act is especially important from a compliance perspective because the NAS Complex supports several active Bald Eagle nests, including nests at both Bloodsworth and (historically) Adam Islands. In addition, BGEPA has become increasingly important since the delisting of the Bald Eagle and loss of federal ESA protections in July 2007. That same year, USFWS published a set of National Bald Eagle Management Guidelines that provide direction for landowners seeking to protect eagles while conducting activities on their properties. For example, the guidelines recommend buffers around nests to screen nesting eagles from noise and visual distractions caused by human activities.

While the Bald Eagle was listed under ESA, a permit was available under that act to take Bald Eagles incidental to an otherwise lawful activity. Because there were no regulations under the BGEPA to allow disturbance and other incidental take of either species of eagle, regulations were proposed to establish permits for activities or projects that result in such take. In April 2009, USFWS published a Final Environmental Assessment (FEA) for issuance of Bald and Golden Eagle permits. The FEA analyzes the proposal to permit take of eagles, their nests, eggs, or young that may result from otherwise legal activities, and considers take of nests where necessary to protect public health and welfare. In the FEA, USFWS considered three alternatives to address eagle permitting in the United States.

The Final Rule was published in September 2009, and the regulations took effect in November of that year. The regulation set forth in 50 CFR § 22.26 provides for issuance of permits to take Bald and Golden Eagles where the taking is associated with, but not the purpose of, the activity and cannot practicably be avoided. Most take authorized under this section will be in the form of disturbance; however, permits may authorize non-purposeful take that may result in mortality. The regulation at 50 CFR § 22.27 establishes permits for removing eagle nests where: (1) necessary to alleviate a safety emergency to people or eagles; (2) necessary to ensure public health and safety; (3) the nest prevents the use of a human-engineered structure; or (4) the activity or mitigation for the activity will provide a net benefit to eagles. Only inactive nests may be taken, except in the case of safety emergencies. Inactive nests are defined by the continuous absence of any adult, egg, or dependent young at the nest for at least 10 consecutive days leading up to the time of the take.

Migratory Bird Treaty Act (MBTA), 16 USC 703-712 et seq., protects migratory birds and their habitats, and establishes a regulatory permitting process for legal taking. Except as permitted, actions of the Navy may not intentionally result in pursuit, hunting, taking, capture, killing, possession, or transportation of any migratory bird, bird part, nest or egg thereof. The USFWS

issued a final rule in the Federal Register on October 4, 2021, effective December 3, 2021, returning the scope of the MBTA to prohibiting incidental take and applying enforcement discretion that was established prior to 2017. The Migratory Bird Treaty Reform Act of 1998 (Public Law 105-312) amended MBTA to make it unlawful to take migratory game birds by the aid of bait. These amendments also make it unlawful to place or direct the placement of bait on or adjacent to an area for the purpose of taking or attempting to take migratory game birds, and make these violations punishable with fines up to $100,000 for individuals and $200,000 for organizations, imprisonment for not more than 1 year, or both. The Act amendment also changed the fine structure for misdemeanor convictions to be up to $15,000 rather than $5,000 per count.

FY2003 National Defense Authorization Act – Military Readiness Activities. While some courts held that MBTA did not apply to Federal agencies, in July 2000, the U.S. Court of Appeals for the District of Columbia ruled that Federal agencies are subject to the take prohibitions of MBTA. In May 2002, the Center for Biological Diversity obtained an injunction prohibiting live-fire military training exercises by DoN that killed migratory birds on the island of Farallon de Medinilla in the Pacific Ocean. In December of that year, following a series of legal determinations on the case from the District Court for the District of Columbia and the Circuit Court, Congress authorized (in the FY2003 National Defense Authorization Act, section 315), an interim period during which the prohibitions on incidental take of migratory birds would not apply to otherwise authorized military readiness activities. Congress believed the authorization to be an appropriate balance between the needs of national security and those of bird conservation. The Final Rule was published in the Federal Register on February 28, 2007. The measure directs DoD to assess the effects of military readiness activities on migratory birds in accordance with NEPA. It also requires DoD to develop and implement appropriate conservation measures if a proposed action may have significant adverse effects on a migratory bird population. The rule also provides that, when conservation measures require monitoring of migratory bird populations, DoD retain the data for five years.

Memorandum of Understanding – Military Non-readiness Activities. On July 31, 2006, DoD and USFWS entered into a Memorandum of Understanding (MOU) to Promote the Conservation of Migratory Birds in accordance with EO 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds." The MOU was renewed September 5, 2014, and extended in 2022 while both parties work to revise the MOU. This MOU describes specific actions that should be taken by DoD to advance migratory bird conservation, avoid or minimize the take of migratory birds, and ensure DoD operations – other than military readiness activities – are consistent with MBTA. The MOU also describes how USFWS and DoD will work together cooperatively to achieve these ends. The MOU does not authorize the take of migratory birds; USFWS, however, may develop incidental take authorization for Federal agencies that complete an EO MOU. It strongly encourages all DoD personnel to work cooperatively with USFWS to implement the actions described in the MOU and to take steps to further migratory bird conservation. This MOU specifically pertains to the following categories of DoD activities that are applicable to BIR:

- Natural resources management activities, including (but not limited to) habitat management, erosion control, conservation law enforcement and invasive weed management;

- Installation support functions, including (but not limited to) storage facilities and nontactical equipment; and,
- Hazardous waste cleanup.

The MBTA statute, subsequent legal decisions and the MOU are significant for the Station because it is an essential migratory bird activity area. Full compliance with these has become an increasingly important oversight activity for the NAS NR Program. Development of season-specific surveys and migration planning for all projects in or adjacent to migratory bird nesting, feeding or roosting areas has become more significant for compliance documentation. The USFWS has identified bird strikes on buildings as adversely impacting migratory bird populations and through the MOU, installations have a responsibility to conserve migratory bird populations. The USFWS is developing recommendations for assessment protocol and mitigation strategies for structures to determine and address the risk for bird strikes. These changes will be captured in annual updates and addressed where practicable.

Marine Mammal Protection Act (MMPA), 16 USC 1364 et seq., protects marine mammals (cetaceans, pinnipeds, polar bears) and their habitats, and establishes a marine mammal commission. Federal agencies must not take (i.e., harass or kill) any marine mammal on the high seas, or in water or lands under U.S. jurisdiction. BIR's position in the Chesapeake Bay places associated Naval operations in potential juxtaposition to marine mammals, especially cetaceans (whales and dolphins), but occasionally pinnipeds (seals and walruses) as well.

Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), as amended, 16 USC 1801-1882, sets mandates for NOAA Fisheries, regional fishery management councils, and federal action agencies to identify and protect important marine and anadromous fish habitat. The councils, with assistance from NOAA Fisheries, are required to delineate essential fish habitat (EFH) in fishery management plans or fishery management plan amendments for all managed species. Authority to implement the MSFCMA is given to the Secretary of Commerce through NOAA Fisheries. The MSFCMA requires that the EFH be identified and described for each federally managed species. The MSFCMA requires federal agencies to consult with NOAA Fisheries on activities that may adversely affect EFH or when NOAA Fisheries independently learns of a federal activity that may adversely affect EFH. NOAA Fisheries, in return, must provide recommendations such as measures for impact avoidance/minimization or mitigation to conserve EFH.

The MSFCMA defines an adverse effect as "any impact which reduces quality and/or quantity of EFH [and] may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions" (50 CFR 600.810). Per OPNAVINST 5090.1 (series), temporary or minimal impacts 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.

Fish and Wildlife Coordination Act (FWCA), as amended in 1964, requires that all federal agencies consult with NOAA Fisheries when proposed actions might result in modifications to a natural

stream or body of water. Under this authority, NOAA Fisheries works to protect, conserve, and enhance species and habitats for a wide range of aquatic resources such as shellfish, diadromous species, and other commercially and recreationally important species that are not managed by the federal fishery management councils and do not have designated EFH.

3. Department of Defense (DoD) Directives/Instructions

DoDD 4700.4, Natural Resources Management Program, requires that the Department of the Navy implement and maintain a balanced and integrated program for the management of natural resources.

DoDD 4715.1, Environmental Security, establishes policy for protecting, preserving, and (when required) restoring and enhancing the quality of the environment. This directive also ensures that environmental factors are integrated into DoD decision-making processes that may impact the environment, and are given appropriate consideration along with other relevant factors.

DoDI 4715.03, Natural Resources Conservation Program, implements new Natural Resources Conservation metrics, develops new policy and updates policy, assigns responsibility, and prescribes procedures under DODDIR 4715.1 for the integrated management of natural and cultural resources on property under DoD control.

4. Secretary of the Navy (SECNAV)/Office of Naval Operations (OPNAV) Instructions

SECNAVINST 6240.6 (series), Environmental Protection and Natural Resources, assigns responsibility to the Chief of Naval Operations (CNO) and the Commandant of the Marine Corps for the development and implementation of natural resources programs on all land and water areas under the jurisdiction of the Department of the Navy.

SECNAVINST 5090.8 (series), Policy for Environmental Protection, Natural Resources, and Cultural Resources Programs, re-issues policy and assigns responsibilities within the Department of Navy concerning environmental protection, natural resources, and cultural resources programs.

OPNAVINST 5090.1 (series), Environmental and Natural Resources Program Manual, establishes broad policy and assigns responsibilities for the Naval Natural Resources Program. Naval Facilities Engineering Command is assigned overall program management responsibility with authority to establish, coordinate, and promulgate the program; to issue appropriate instructions to the Naval installations for implementation of the various natural resources programs; and to provide professional natural resources services and technical assistance, through the Facilities Engineering Commands (FECs), to Navy and Marine Corps installations. OPNAVINST 5090.1 (series) directs major claimants and intermediate commands to ensure that subordinate commands support natural resources programs on installations under their control. Installation Commanders/Commanding Officers are tasked with:

- Requesting and using technical assistance from the appropriate FEC in developing and maintaining an effective natural resources program;
- Requesting funding to ensure adequate support of the natural resources program;
- Applying practices set forth in approved natural resources management plans; and,

- Assigning specific responsibilities, centralized supervision, and qualified personnel to the natural resources program.

C. Planning for National Environmental Policy Act (NEPA) Compliance

NEPA is a procedural law that requires review and compliance with other laws. In addition, it requires all federal agencies to take into consideration the potential environmental consequences of proposed actions in their decision-making process. The objectives of NEPA are to ensure that the government makes informed decisions, the public is included in the decision-making process, and all reasonable alternatives for an action are considered.

OPNAVINST 5090.6 (series) and OPNAVINST 5090.1 (series) establish Navy policy, procedures, and responsibilities for NEPA documentation for Navy actions. It is Navy policy to initiate the NEPA process at the earliest possible time so that it may be an effective decision-making tool in the course of identifying a proposed action and to develop and carefully consider a reasonable range of alternatives for achieving the purpose of the proposed action.

The Council on Environmental Quality defines preparation and implementation of an INRMP as a major federal action requiring NEPA analysis. As a result, the Navy Office of General Counsel has determined that Sikes Act requirements for INRMP implementation necessitate the preparation of NEPA documentation prior to INRMP approval. It is expected that annual updates and revisions would be covered under the original NEPA documentation unless there has been a major change in installation mission or program scope.

Per Section 102 of NEPA, all agencies of the federal government must address the following environmental planning requirements:

- Utilize a systematic, interdisciplinary approach to ensure the consideration of natural resources and the environment in planning and decision making;
- Prepare a detailed statement (i.e., an environmental impact statement [EIS]) for major federal actions significantly affecting the quality of the environment;
- Study, develop, and describe appropriate alternatives to actions that use or impact natural resources or the environment;
- Recognize the worldwide and long-range character of environmental problems; and,
- Initiate and utilize ecological information in the planning and development of resource-oriented projects.

Any action at BIR requiring NEPA documentation is coordinated by the NEPA Program Manager in the Environmental Division at NAS Patuxent River. The installation's Project Planning Checklist ensures that planners and NR Program personnel are actively involved with and aware of the various projects at BIR that require environmental review and coordination.

D. Beneficial Partnerships and Collaborative Resource Planning

The development of partnerships with state and federal resource agencies as well as local conservation and academic institutions assists in identifying and implementing sound management practices. The following is a list of groups and agencies that could possibly form significant partnerships with NAS Patuxent River with respect to BIR management:

- USFWS, to provide assistance in matters that concern the conservation, protection, and management of fish and wildlife species.
- USFWS Chesapeake Bay Ecological Services Field Office, to provide assistance in the management of invasive species.
- MDNR Wildlife and Heritage Service, to provide assistance in matters that concern the conservation, protection, and management of fish and wildlife species.
- MDNR Natural Heritage Program, to provide information and guidance related to rare, threatened, and endangered species information.
- The Alliance for the Chesapeake Bay, to provide assistance in meeting the mandates of the Agreement of Federal Facilities on Ecosystem Management in the Chesapeake Bay.
- Ducks Unlimited, to coordinate with NR Program staff for waterfowl monitoring and habitat enhancement.

E. Public Access and Outreach

1. Public Access and Outdoor Recreation

Limited public access to the water around BIR is authorized for waterfowl hunting, boating, and fishing. To access BIR for waterfowl hunting, a prospective hunter must obtain an MDNR permit and abide by the rules therein (detailed further in Section 4.H. of this INRMP). Personnel from NAS Patuxent River conduct range-clearing operations prior to any range activity, and hunters must adhere to the directions given to them at all times and in a timely manner, as a condition of the permit. Public access is also authorized for boating and fishing within the designated Surface Danger Zone, but only in the absence of warnings that Range activities are, or soon will be, in progress. However, under no circumstances is the public allowed within the No Navigation Zone, the No Trespassing Zone, or the offshore Prohibited Area (Refer to Figure 2-2).

2. Public Outreach

The NAWCAD Range Sustainability Office developed a Public Outreach Plan to facilitate an effective transition of the BIR management from NAB Little Creek to NAS Patuxent River in April 2002. Several fact sheets were developed for these public outreach efforts. A public outreach plan was also implemented during the Draft release of BIR EA (DoN 2006). The plan included three Public Information Exchanges on Maryland's Eastern Shore in 2005.

Following the Navy's selection of the No-Action Alternative in the BIR EA (DoN 2006) and the decision to continue the policy implemented in 1996 to voluntarily cease land impact operations at BIR, public outreach efforts specific to BIR have been suspended.

F. Encroachment Management

The NAS Patuxent River Complex EAP includes a description of BIR, among other areas of operation (DoN 2016). An updated EAP was finalized in 2016. The Atlantic Test Range (ATR) Inner Range includes BIR as well as NAS Patuxent River, WOLF and NRC Solomons, extending over portions of Southern Maryland, the Eastern Shore of Maryland, Southern Delaware, and the Northern Neck of Virginia. The aerial firing range includes Hooper and Hannibal targets, but no longer includes BIR. The EAP states, "RDAT&E overflight of Bloodsworth Island, within SUA,

does not include the release of ordnance or expendables." The EAP recommends that future monitoring of UXO around BIR be conducted.

G. State Comprehensive Wildlife Plans

The Maryland State Wildlife Action Plan (SWAP was developed in 2005 and updated in 2015 and is implemented by the MDNR Wildlife and Heritage Service) (MDNR 2015). The SWAP is a 10-year strategic plan required for continued funding through the State Wildlife Grant Program (administered by USFWS). The SWAP was developed with extensive input from other state and federal agencies, nongovernmental organizations, and private citizens. A DoD representative served as the Conservation Team Leader on the External Steering Committee, which acted as an advisory board to ensure that a wide range of resource conservation interests was addressed in the development and implementation of the SWAP.

The SWAP addresses eight required elements, with corresponding conservation action organized by threat. A total of 610 species of greatest conservation need (SGCN) and 59 key wildlife habitats are assessed. The SWAP then identifies significant threats for each, including habitat loss, degradation, fragmentation, disturbances (both natural and anthropogenic), and pollution. Ultimately, the SWAP is used in conjunction with INRMPs to outline conservation actions for planning purposes and future project considerations.

Habitat management, land protection, and planning conservation actions directly addressed in this INRMP include the following:

- *Protect wetlands from drainage, ditching, filling, water withdrawal, and other damaging practices that alter hydrology.* Wetland protection and enhancement is discussed in section 4.B.
- *Incorporate wetland conservation actions into land use and land planning efforts.* Wetland protection and enhancement is discussed in section 4.B.
- *Develop habitat management guidelines for use by Natural Resources Program personnel.* Wildlife habitat management is discussed in section 4.C.

4. PROGRAM ELEMENTS

The following programs are not applicable to management at BIR and will not be discussed further: forestry, agricultural outlease, wildland fire and floodplains management.

A. Management of Rare, Threatened and Endangered Species, and Species of Concern

1. Program Description

Under the mandates of ESA, federal agencies must protect and conserve the applicable habitats under their control. Federal agencies must also conserve listed species and ensure that agency actions do not jeopardize the continued existence of those species.

The potential occurrence of threatened and endangered species in the vicinity of BIR was assessed in an ecological assessment (DoN 2006) and was based on a review of marine mammal and sea turtle sightings and stranding data provided by NOAA Fisheries. Federally listed threatened or endangered species potentially occurring within the vicinity of BIR are presented in Tables 2-1 and 2-2. In addition to these species, the Diamondback Terrapin, a SGCN in Maryland, is known to occur. Tidal marshes and beaches are important habitat for this species and the state's best populations of terrapins occur in the Tangier Sound region (Therres 2009).

2. Management Objectives

NAS Patuxent River is responsible for rare species management at BIR. NAS Patuxent River natural resources professionals coordinate the planning, budget controls, and general administrative functions of the program. The USFWS and the MDNR Wildlife and Heritage Division provide guidance on management issues and projects related to rare species and species of concern.

The overall objective of the program is to ensure compliance with ESA, BGEPA, DoD and DoN policies, and applicable state regulations; and to protect and enhance rare species populations and their habitats. All NEPA reviews will specifically document (in Categorical Exclusion records, Environmental Assessments and EISs) impacts to these species (or lack thereof). Management criteria for the program include the following:

- Avoid impacts to rare, threatened, and endangered species and their habitat; and,
- Maintain existing population levels and habitat; where feasible, increase populations and enhance habitat.

3. Bald Eagle

The Bald Eagle, which was formally delisted from the federal Endangered Species Act in 2007, retains protections afforded by BGEPA and MBTA. In addition, it remains a watch-list species at the state level in Maryland. The Bald Eagle is common throughout the Chesapeake Bay and has been documented as using BIR, as well as other NAS properties.

Annual aerial surveys begun in March of 2011 have documented near-constant nesting activity and success on Bloodsworth Island. Additionally, a field survey of Adam Island in May of 2012

noted a Bald Eagle nest there; as a result, Adam Island was added to the aerial survey route. The 2017 and 2018 surveys documented one active nest with the presence of young on Bloodsworth Island and one active nest with no young verified on Adam Island (DoN 2017b, DoN 2018). The 2019 and 2020 surveys found only one active nest on Bloodsworth Island, with inactive remnant nests on Bloodsworth and Adam islands (DoN 2019, DoN 2020). The single Bloodsworth Island nest failed in 2021 (DoN 2021). The NAS Natural Resources Program office continues to track nesting via the aerial or ground surveys annually (DoN 2020).

4. Peregrine Falcon

The Peregrine Falcon was federally de-listed in 1999, but is still listed as rare and in need of conservation by the state of Maryland (MDNR 2021), and is protected under the MBTA. In 1998, a Peregrine Falcon nest was relocated (in cooperation with USFWS) from an Adam Island tower to Spring Island in an attempt to discourage further nesting within BIR (DoN 2006). This pair nested successfully for 6 of 10 years immediately following the relocation (Therres 2009). Since then, however, Peregrine Falcon nests have been identified intermittently at Bloodsworth Island and on the Hannibal target. NAS Natural Resources Program personnel assist the Range Sustainability Office in monitoring falcon nests and establishing constraints related to them. As with Bald Eagles, the NAS Natural Resources Program office documents any nesting activity during annual falcon surveys at BIR and Hannibal Target. Prior to allowing flight operations at Hannibal Target, visual confirmation will be obtained that any nesting falcons have departed.

5. Rufa Red Knot

The Rufa Red Knot is a migratory shorebird that ranges throughout the western hemisphere. These shorebirds migrate annually between their breeding grounds in the central Canadian arctic tundra and four separate wintering grounds in the southern United States and South America. During migration they rely heavily on coastal and inland staging areas. The most important staging area during migration is the shores of Delaware Bay when they time their arrival with the breeding season of horseshoe crabs and feed heavily on the eggs. Their primary food source are snails, clams, and muscles. Rufa Red Knots require sparsely vegetated habitat such as beaches, mudflats, and shoals, foraging in intertidal areas. Threats to this species include loss of both breeding and wintering habitat due to sea level rise, coastal engineering and development, and climate warming in arctic wintering grounds. Reliability of food supply and mismatched timing of food availability and migratory timing due to climate change are also factors. Other factors include increased predation and human factors such as harmful algal blooms, oil spills, and coastal wind energy development (USFWS 2022c).

The Rufa Red Knot was added to the U.S. List of Endangered and Threatened Wildlife in 2015. It is also listed as Endangered in Canada with subspecies protected by law in several other countries. A recovery plan for the Rufa Red Knot was completed in 2019 that establishes criteria for removing the species from the list and outlines specific actions to reach that goal. Protecting beaches and shallow intertidal areas is an important part of the recovery plan (USFWS 2021). The Rufa Red Knot is known to exist in the vicinity of BIR but is considered “transient” in the Chesapeake Bay. NAS Patuxent River conducts annual surveys for Rufa Red Knot and

documented a "probable" sighting in 2015. These surveys will continue for the duration of this INRMP unless determined otherwise with USFWS and MDNR.

6. Eastern Black Rail

The Eastern Black Rail is one of four subspecies of Black Rail. It is a small, gray-black, secretive marsh bird that was federally listed as threatened in 2020. It is listed as endangered in Maryland and threatened or endangered in six other Mid-Atlantic states (USFWS 2019a). Habitat fragmentation and human-caused habitat loss, as well as increasing severe weather events and sea-level rise due to climate change, threaten this species. It is a wetland dependent species and uses a variety of wetlands including salt marshes, brackish marshes, and fresh marshes. Due to its secretive nature, surveys are usually conducted during the breeding season at dusk or early evening when the birds are more vocal. This species requires large areas of high-marsh habitat for successful nesting (USFWS 2019b). This type of habitat is limited on BIR; however, as requested by USFWS and MDNR, NAS Patuxent River will perform nighttime surveys to determine if this species is present.

7. Shortnose and Atlantic Sturgeons

The federally endangered Shortnose Sturgeon (*Acipenser brevirostrum*) and Atlantic Sturgeon (*Acipenser oxyrhyncus*) are amophidromous fish that inhabit slower moving coastal rivers, estuaries or nearshore marine waters, spending most of their time in fresh water (NOAA 2022a). In 1996, as part of the Maryland Sturgeon Reward Program, approximately 3,000 hatchery-produced Atlantic Sturgeon were released into the Bay. Fish captures were reported between 1996 and the end of the program in 2012. During this time, 462 hatchery-produced and 555 wild sturgeons were captured primarily within the upper Chesapeake Bay. A tag-and-release effort was conducted in the Marsheyhope, a tributary of the Nanticoke River, between 2012 and 2020. Captured fish were fitted with transmitters. There are current plans to continue this effort and expand to include the Choptank, Nanticoke/Marsheyhope, and Pocomoke rivers (MDNR 2022c). While sturgeon could transition through the waters adjacent to BIR, none have been documented there.

8. Sea Turtles

All species of sea turtles known to occur in the Chesapeake Bay are federally listed as threatened or endangered (see Table 2-2). Several species of sea turtles enter the Bay during the summer to feed, but there is no evidence that they use the beaches for nesting (DoN 2006). The Chesapeake Bay has been identified as a major seasonal developmental and foraging habitat for juvenile Loggerhead and Kemp's Ridley Sea Turtles (MDNR 2022b), which are the primary species known to be present, though Leatherback, Green, and Atlantic Hawksbill Sea Turtles also infrequently occur in the lower Chesapeake Bay (DoN 2006). Kemp's Ridley and Atlantic Green Sea Turtles feed in SAV beds and may therefore benefit from SAV enhancement projects undertaken at BIR. Loggerhead Sea Turtle remains have been found on BIR (Rambo 2019).

9. Diamondback Terrapin

Regional efforts to restore hundreds of acres of aquatic and wildlife island habitat in the Mid-Chesapeake Bay region through the beneficial use of dredged materials as well as Maryland state

laws regulating the harvest of the Diamondback Terrapin will likely have beneficial impacts on the species. In addition, the installation will consult with Diamondback Terrapin species experts if any future shoreline stabilization or erosion control efforts are undertaken at BIR.

10. Marine Mammals

Four federally listed threatened or endangered marine mammals have been observed within the Chesapeake Bay, although a review of stranding data suggests that they are rarely present in the shallow waters surrounding BIR (see Table 2-2; DoN 2006). As with sea turtles, coordination between operations and NR Program personnel helps ensure protection of marine mammals during RDT&E operations.

11. Plants

A comprehensive survey for protected plant species was conducted at BIR in 2002-2003. Seaside Knotweed and Sea-purslane are the only state-endangered plant species known to occur on BIR (see Table 2-1). A third rare plant, Pretty Dodder (*Cuscuta indecora*), is suspected to occur on the islands but was not confirmed during the 2003 rare plant survey (DoN 2003).

During the survey, 78 Seaside Knotweed plants at 10 separate sites were observed on Bloodsworth and Pone islands (see Figure 2-5). An individual Seaside Knotweed plant was also found on Adam Island in 2003. Sea-purslane was observed at only a single location on BIR. It was identified on the wetland edge of the overwash sands on the western shore of Pone Island (DoN 2003).

B. Wetlands Management

1. Program Description

The islands comprising BIR consist almost entirely of wetland habitats. The wetlands on BIR are predominantly estuarine-emergent marshes dominated by Black Needlerush. Areas comprising 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 BIR are restricted primarily to the perimeters of Bloodsworth Island and Adam Island, and consist of estuarine-emergent and scrub-shrub systems dominated by Saltmeadow Cordgrass (*Spartina patens*), Saltgrass, Marsh Elder, and Groundsel Tree.

2. Management Objectives

Wetlands management is applicable to all jurisdictional wetlands and is designed to ensure compliance with federal and state wetland regulations. NAS Patuxent River personnel oversee management of tidal and nontidal wetland areas and deepwater habitats at BIR.

The overall objective of wetlands management at BIR is to ensure compliance with Section 404 of the CWA; EO 11990, Protection of Wetlands; and applicable state regulations; as well as to protect and enhance wetland communities. Management criteria for the program include:

- Protect and enhance the biodiversity, functions, values, and habitat availability of wetland communities;
- Maintain no net loss of wetlands;
- Implement ecosystem management practices to achieve program goals; and,

- Comply with existing federal and state wetland regulations.

3. Submerged Aquatic Vegetation

SAV beds are considered Special Aquatic Sites, as defined in 40 CFR Part 230 (Section 404 (b) (1) Guidelines), Subpart E (230.4 through 240.45) and are an important resource that provides protection and nursery habitat for a broad range of aquatic organisms. SAV, or bay grass, is comprised of vascular plants that grow completely submerged below the low-tide line. In the murky waters of the Bay, they are often restricted to depths up to 3 feet. SAV is an important contributor to the primary and secondary production of the Chesapeake Bay as beds of SAV 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) (NOAA 2022b).

Concentrations of SAV in Chesapeake Bay showed steady decline from the late 1950s through the 1970s. The decrease of SAV in the Bay is the result of declining water quality, disturbance of SAV beds, and alteration of shallow water habitat. Over the last two decades, however, the trend in SAV decline has gradually been reversing as efforts have been made through the Chesapeake Bay Agreement and other initiatives to restore and manage the water quality of the Bay. The changes in SAV coverage have been mapped by VIMS, which conducts annual aerial surveys of the Chesapeake Bay. In 2003, SAV coverage in the Bay was nearly 90,000 acres (Moore et al. 2004). Unfortunately, SAV beds were dramatically impacted by hot summers in 2005 and 2010; these declines continued through 2012, reducing SAV abundance to mid-1980s levels. The 2014 survey showed a Bay-wide recovery, with more than 75,000 acres mapped within the Bay and its tributaries (VIMS 2015). In 2020, the survey mapped approximately 63,000 acres of SAV (Patrick et.al. 2020).

The area of SAV at BIR decreased from 1,437 acres mapped in 2002 (DoN 2006) to a low of 166 acres in 2004 (DoN 2017). VIMS survey records show significant SAV beds throughout BIR in 2013 (1,125.08 hectares), 2014 (1,385.55 hectares) and 2015 (2,101.78 hectares) (DoN 2017). In 2017, SAV surrounding BIR were mapped at approximately 2,722.85 hectares. Figure 2-8 shows the extent and relative density of SAV that was mapped at BIR in 2013, 2014, and 2017. 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 BIR in pockets of wetlands on Bloodsworth Island. The occurrence of SAV in these areas is inconsistent, with some wetlands consisting only of open water and others supporting dense concentrations of SAV. Eelgrass and Widgeon Grass are the primary species of SAV at BIR. Continued monitoring, protection, and restoration of SAV beds at BIR would be consistent with the goals of the Chesapeake Bay Agreements and the Navy's commitment to good stewardship of natural resources.

C. Fish and Wildlife Management

1. Program Description

Lack of upland habitat, dominance of the needlerush marsh vegetation, and the limited availability of freshwater effectively preclude widespread use of BIR by mammals, amphibians, and reptiles. Mammals known to occur on BIR in small populations include Muskrat, otter, mink, Red Fox, and Raccoon. White-tailed Deer have also historically been observed on BIR in low numbers. Three reptile species - Diamond Terrapin, Northern Watersnake, and Eastern Box Turtle - have also been documented (although box turtles are no longer present). Management of these species has generally been custodial in nature with little active involvement. More diverse types of wildlife at BIR and the surrounding area include migratory birds (discussed later), marine mammals and fish. These species guilds are more strictly regulated by federal and state wildlife agencies and require more active management and coordination by NR Program personnel.

2. Management Objectives

The overall objective of fish and wildlife management is to maintain and enhance ecosystem functions and values in a manner that is consistent with the military mission. NAS Patuxent River Natural Resources Program staff coordinates daily planning, budget controls, and general administrative functions of the program. The USFWS and MDNR are cooperating agencies and provide guidance on management issues and projects.

Management objectives for the program include:

- Maintain healthy fish, game, and non-game populations that are capable of supporting non-consumptive and consumptive uses;
- Balance wildlife population levels with habitat-carrying capacity;
- Maintain and enhance biodiversity; and,
- Ensure that wildlife populations do not conflict with the military mission.

3. Marine Mammals

MDNR and NOAA Fisheries stranding and sighting data indicate that individual marine mammals occasionally enter the Bay (MDNR 2022b). Stranding and sighting data indicate that Bottlenose Dolphins are prevalent in the Bay from April through November or December. In the lower Bay, Bottlenose Dolphin numbers peak in July and August (Barco et al. 1999), but they could potentially be sighted year-round. Humpback Whales have also been sighted in the lower Bay and are most likely to occur between January and March (DoN 2007). Pinnipeds (seals) are becoming increasingly common during the winter months (DoN 1998). However, based on the stranding data, the number and diversity of marine animals in the Bay are highest during the summer months.

In the decade spanning 1995 to 2004, 272 marine mammal strandings and sightings were reported within 30 miles of BIR. Stranding data indicate that the Bottlenose Dolphin and Harbor Porpoise are the most common marine mammals occurring in the vicinity of BIR, comprising 57.4 percent and 22.8 percent, respectively, of the 272 reported strandings and sightings. Marine mammal species that could potentially be present near BIR are listed in Appendix C.

4. 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 EPA 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 BIR are similar to those observed at other stations in the middle Chesapeake Bay. Recreational fish species common in the vicinity of BIR include Bluefish (*Pomatomus saltatrix*), Spot (*Leiostomus xanthurus*), Summer Flounder (*Paralichthys dentatus*), Speckled Trout (*Cynoscion nebulosus*), Weakfish (*Cynoscion regalis*), Atlantic Croaker (*Micropogonias undulatus*), Striped Bass (*Morone saxatilis*), Spanish Mackerel (*Scomberomorus maculatus*), 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*), Common Grass Shrimp (*Palaemonetes pugio*), and fiddler crabs (*Uca spp*.).

5. Essential Fish Habitat

EFH is defined under the MSFCMA (Public Law 94-265), 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 Mid-Atlantic and New England Fishery Management Councils have identified EFH in major estuaries, bays, and rivers along the northeastern coast of the U.S. In the portion of the Chesapeake Bay where BIR is located (Tangier Sound), EFH has been designated for the following species (NEFMC 2017; NOAA 2022c and 2022d):

- 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 adult stage of Little Skate (*Leucoraja erinacea*) and Winter Skate (*Leucoraja ocellata*), including sandy, gravelly, or mud substrates in the Chesapeake Bay. BIR contains bottom habitat suitable for the presence of these skate species.

- Windowpane Flounder (*Scophthalmus aquosus*). EFH for juvenile and adult Windowpane Flounder at BIR includes bottom habitats with a substrate of mud or fine-grained sand, extending from the intertidal zone to a depth of 70 meters. Windowpane Flounder could occur in the vicinity of BIR throughout the year.
- Summer Flounder (*Paralichthys dentatus*). EFH for larvae, juvenile and adult Summer Flounder includes demersal (i.e., bottom) waters surrounding BIR. 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.
- Atlantic Herring (*Clupea harengus*) are a pelagic species that distribute their eggs in mats on the sea floor. EFH for this species includes all habitat within the region that has the desired conditions of the species. EFH for juveniles includes bays and estuaries and EFH for adults includes sub-tidal areas into waters up to 300 meters deep. They are more common in bays and estuaries along the coast from Maine to the Outer Banks, but may also occur in the Chesapeake Bay.
- Red Hake (*Urophycis chuss*). EFH for eggs and larvae include pelagic habitats and in bays and estuaries, including the Chesapeake Bay. EFH for juveniles include intertidal and sub-tidal benthic habitats throughout the region on mud and sand substrates, to a maximum depth of 80 meters including bays and estuaries. EFH for adults includes benthic habitats as shallow as 20 meters in a number of inshore estuaries and embayments as far south as the Chesapeake Bay. Shell beds, soft sediments (mud and sand), and artificial reefs provide essential habitats for adult Red Hake.
- Bluefish (*Pomatomus saltatrix*) 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 BIR primarily from April through October.
- Atlantic Butterfish (*Peprilus triacanthus*). Other common names for this species include Dollarfish, Shiner, Skipjack, and Sheepshead. It ranges from the north Atlantic to North Carolina. In summer months it prefers warm, shallow waters migrating to colder deeper waters in in winter months. EFH for this species includes shallow waters with sandy bottom for egg, larvae, and adult. Unconsolidated sandy bottom and shallow waters are found near BIR.
- Scup (*Stenotomus chrysops*). EFH for juvenile and adult Scup include shallow estuarine waters with sand, mud, mussel, and Eelgrass and salinities greater than 15 ppt. Juvenile and adult use estuarine habitat in summer months. Adults winter offshore. Bottom habitat surrounding BIR includes Eelgrass, sand, and mud.
- Black Sea Bass (*Centropristis striata*). EFH for juvenile and adult Black Sea Bass includes estuarine tidal waters. Adults can mainly be found from May to October in areas with sand

or shell bottom. They generally winter offshore. Juvenile Black Sea Bass are found in estuarine waters in spring and summer and utilize areas with rough bottom, shellfish, eelgrass beds, and manmade structures. BIR provides potential habitat for both adult and juvenile Black Sea Bass.

- Sandbar Shark (*Carcharhinus plumbeus*). EFH is designated for neonates in the areas south of BIR that are defined as shallow coastal waters, inlets and estuaries.

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 BIR are considered HAPC for Summer Flounder.

D. Vegetative Management

Vegetation management would only take place as a secondary action or result of a specific project. No such project is proposed at this time.

E. Migratory Bird Management

1. Program Description

Migratory birds are a large, diverse group that utilize breeding grounds in the United States and Canada, and overwinter in southern North America, Central and South America, the West Indies, and the Caribbean. MBTA is the primary legislation enacted in the U.S. to conserve migratory birds. It prohibits the taking, killing, or possessing of migratory birds unless permitted by regulation. As of April 2020, 1,093 species are included on the list of migratory birds (85 FR 21282). Non-native species such as House Sparrow (*Passer domesticus*), European Starling, Rock Pigeon (*Columba livia*), and Mute Swan are not protected under 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 at BIR is proposed, a consultation with the USFWS to develop appropriate and reasonable conservation measures to minimize or mitigate identified significant adverse effects will 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.

In accordance with the MBTA and EO 13186, BIR employs operational and conservation measures that avoid, minimize, or mitigate any take of migratory birds. The primary threats to migratory birds at BIR are habitat loss and aircraft strike.

2. Management Objectives

The objectives of migratory bird management at BIR are to support the conservation of migratory birds through habitat conservation and enhancement and to avoid the incidental take of migratory

birds through military readiness actions in accordance with the MBTA to the greatest extent practicable.

3. Management Practices

Migratory bird management at BIR has primarily focused on habitat enhancement and protection. Habitat enhancement for waterbirds and raptors has included construction of nesting platforms for Great Blue Herons and egrets, Ospreys, and Peregrine Falcons. Natural nesting trees (potential) are now very limited, so artificial nesting platforms were installed by the Navy in the 1980s and 2002 to address an observed decline in the number of heron nesting pairs caused by the loss of large nesting trees due to rising sea levels and salinity. Currently, 67 poles with 4-6 nesting platforms per pole remain standing in the rookery on Bloodsworth Island (Figure 4-1). During an April 2008 survey conducted by NAS Patuxent River NR Program staff (DoN 2008), 136 nests were documented on the platforms, and another 5 nests were observed on top of Eastern Red Cedars in the nearby cemetery, for a total of 141 Great Blue Heron nests. A minimum of 282 breeding adults plus additional non-nesting birds (for an estimated total of 300-350) were expected to occur at BIR at that time. The most recent nesting survey, conducted in September 2014 by NR Program staff, identified 32 Great Blue Heron nests, all on platforms. Platform usage was diminished as early as 2011 when a Bald Eagle pair began nesting on a platform near the center of the rookery. This resulted in a ring of unused platforms around the eagles (Smith 2014). The NR program will continue to share this and other nesting data with the MDNR colonial waterbird biologist and report survey results to USFWS and MDNR during annual INRMP metrics meetings.

The 2014 nesting survey found that approximately a dozen platforms need to be repaired or replaced, including that used by the Bald Eagles. Constructing more platforms may benefit the rookery as well; in addition, natural nesting cover could be provided by planting trees and shrubs on natural elevated sites, such as Fin Creek Ridge, or on sites artificially elevated by spoil. Further investigation into these enhancement techniques and subsequent discussions with state and federal natural resources personnel is recommended.

Since 1965, the Navy (via letter notification) has voluntarily discontinued exercises at BIR during the migratory bird season in recognition of BIR as an important overwintering area for waterfowl. Closure has generally occurred from November 15 to March 15 to limit disturbance of overwintering waterfowl; during this period, the Navy has also suspended all overflights below 3,000 feet in order to minimize the potential for bird strike hazard to aircraft. These restrictions have effectively created a large, undisturbed refuge for waterfowl during the migration season.

In addition, the Navy entered into a cooperative agreement with the USFWS and MDNR in 1991 for waterfowl management on BIR as part of its commitment to the North American Waterfowl Management Plan. A variety of natural resources research has been conducted at BIR through this multi-agency partnership agreement. These studies examined a variety of migratory waterfowl and wading bird management issues. Recommendations developed as part of the plan that specifically address BIR include:

- Continued voluntary closure of BIR during the four-month Maryland migratory waterfowl season (typically mid-November to mid-March);

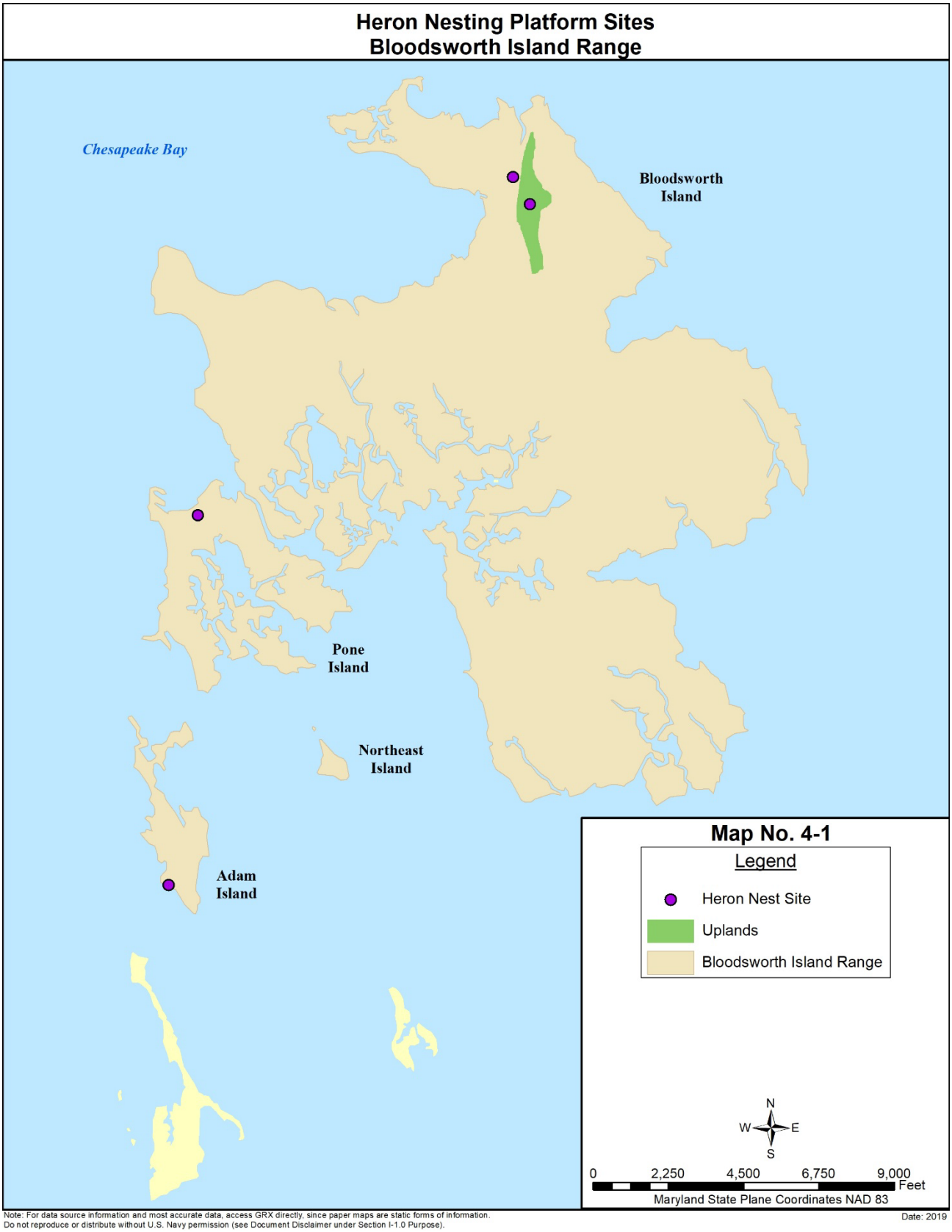
- Permitted access by MDNR to BIR to conduct annual aerial waterfowl surveys;
- Development of recommendations for habitat improvement, including the installation and maintenance of nesting platforms in the heron rookeries; and,
- Development and implementation of an INRMP for BIR.

Existing migratory bird management involves closing the range to training from November through March to limit disturbance of overwintering waterfowl and suspending overflights below 3,000 feet to reduce strike hazards. Currently, the NR Program is working with the Range Sustainability Office to define additional operational constraints related to waterbird and raptor nesting on BIR. Habitat enhancement for waterbirds and raptors has included construction of nesting platforms for Great Blue Herons and egrets, Ospreys and Peregrine Falcons. Additionally, the NR Program conducts spring shorebird nest surveys to track breeding data.

F. Invasive Species Management

An invasive species survey has not been conducted for BIR. However, in the 2003 rare plant survey, relatively few isolated pockets of introduced or invasive species were found to occur on the islands (DoN 2003). These species occur mainly on Bloodsworth Island's Fin Creek Ridge or, more commonly, on the eroding western shoreline where they may act to stabilize the dunes. The primary nonnative plant species documented include Japanese Honeysuckle (*Lonicera japonica*) and several grass species (*Poa annua* and *Poa pratensis*). Common reed (*Phragmites australis*) was also found in low numbers. Additional surveys for invasive species would be necessary to assess the extent and level of impact (if any) on native ecosystems and wildlife.

Figure 4-1. Heron Nesting Platform Sites



G. Land Management

Shoreline erosion is one of the most serious current natural resources issues for the islands of BIR. The islands are eroding rapidly, primarily due to natural processes, and the resulting land loss has been significant. Unchecked land loss, and the resulting habitat loss, is a serious threat to the maintenance of island biodiversity. Shoreline erosion and sea level rise over time have been cited for the loss of a variety of habitat types once found on BIR. Once moderately common, freshwater and upland habitats are now essentially gone from this ecosystem. Shoreline stabilization through engineered means offers one viable option to reverse or halt this process; and restoration action that slows shoreline erosion and restores historic vegetative communities is preferable. To determine the benefit of addressing shoreline erosion, NAS Patuxent River will conduct a feasibility study for shoreline stabilization to prevent further impacts from climate change and sea-level rise.

Another potential method of combating sea level rise and restoring land area to the island complex is through the addition of dredged material. In 2008, a study and associated EIS were prepared by the Maryland Department of Transportation and the USACE to assess the feasibility of restoring more than 2,100 acres of aquatic and wildlife island habitat in the Mid-Chesapeake Bay region through the beneficial use of dredged materials from the Port of Baltimore channel system (73 FR 56565). Restoring land area through the use of fill material would benefit terrestrial ecosystems and wildlife as well as provide protection for the remaining Navy real estate. The environmental impacts associated with this type of action would include filling existing wetlands, creating large areas of disturbed ground, and the potential introduction of additional invasive species and contaminants.

H. Outdoor Recreation

Public waterfowl hunting, fishing, and boating are authorized at BIR (to a limited extent) by the Commanding Officer of NAS Patuxent River. All state and federal licensing requirements apply while hunting within BIR. Ten waterfowl blinds are located on Bloodsworth Island and the adjacent islands (Figure 4-2). To access BIR for waterfowl hunting, a prospective hunter must obtain a permit from MDNR and abide by the following rules when hunting at any of the licensed waterfowl hunting sites within BIR:

- Licensed waterfowl hunting sites have been located below mean high tide and are accessible by boat. At no time shall hunters walk on any part of BIR. Doing so will be considered trespassing on government property, and all trespassers will be prosecuted to the fullest extent of the law.
- Boats shall be tied to the stake or anchored at the coordinates given for a particular site at all times.
- Each hunter must have a signed permit with them at all times while hunting.

In the event that BIR becomes active during the waterfowl hunting season, personnel from NAS Patuxent River will conduct range-clearing operations prior to any range activity. For safety reasons, hunters must adhere to the directions given to them by NAS personnel at all times and in a timely manner. This condition is part of the permit to hunt at BIR.

In addition to waterfowl hunting, the public is also allowed to boat and fish within the designated Surface Danger Zone in the absence of warnings that the range is or soon will become active. However, in no case is the public allowed (at any time) on the islands themselves, or within the No Navigation Zone or offshore Prohibited Area (see Figure 2-2). The MDNR Fisheries Service is responsible for managing commercial and recreational fishing off the shore of BIR; as such, anglers must comply with minimum size requirements, time of day restrictions, creel limits, special conditions for regulated species, and other regulations as specified by the MDNR. In addition, a state Tidal Sport Fishing License is required for all individuals 16 years and older to fish for finfish in the Chesapeake Bay and its tributaries.

I. Bird/Animal Aircraft Strike Hazard

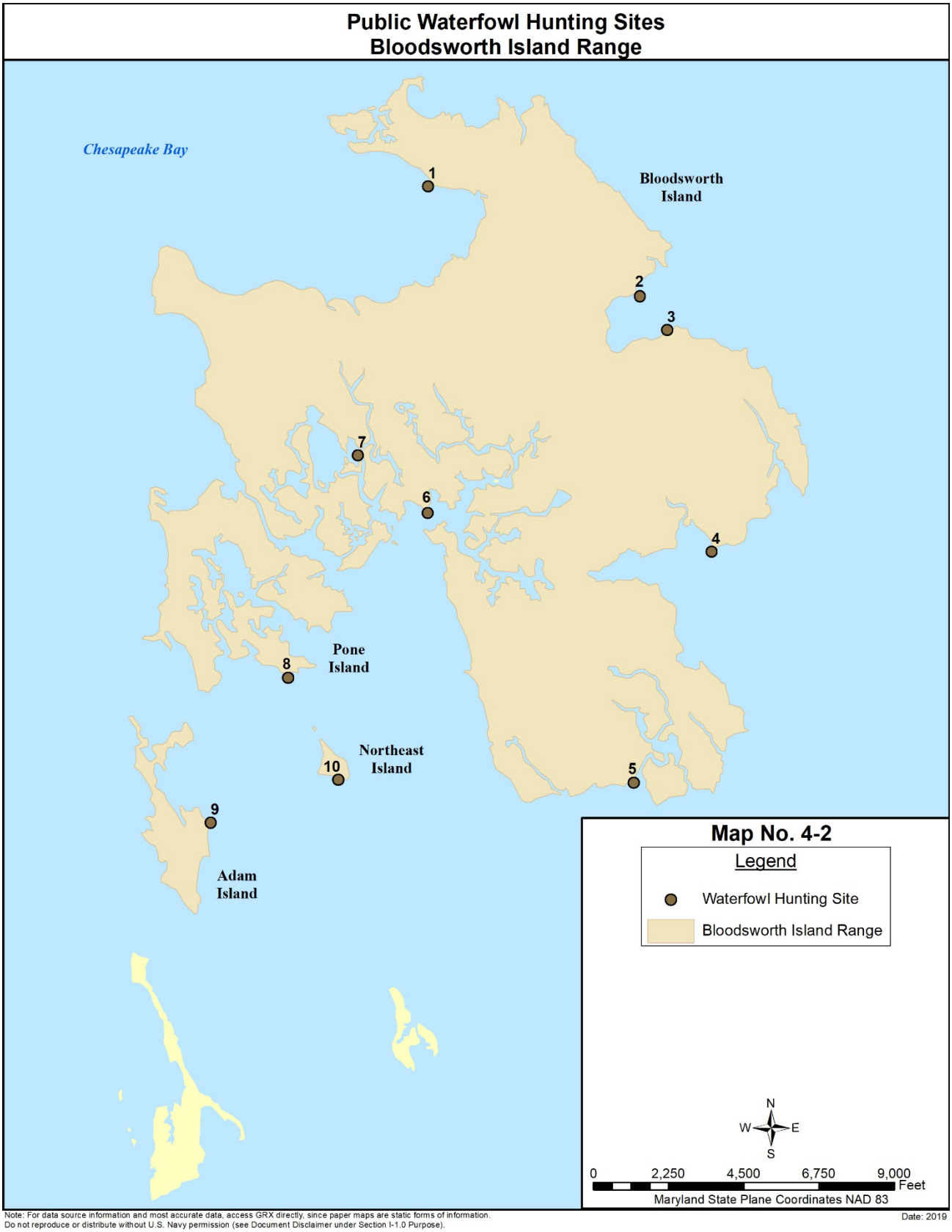
Bird/Animal Aircraft Strike Hazard (BASH) is a serious concern for military operations. Military aircraft are prone to strikes because they fly at high speeds and sometimes at lower altitudes where birds are most active. Aircraft collisions with birds in flight have the potential to cause damage to equipment or even to destroy an aircraft, resulting in injury or death to aircrews.

According to the U.S. Air Force Aviation Safety Division, 98 percent of wildlife collisions in both the airfield and low-level environments occur at or below an altitude of 3,000 feet above ground level (AGL). Approximately 50 percent of bird strikes happen at airfields, 25 percent of which occur during low-altitude flight. The locations with the greatest hazard are migration corridors and other areas where birds congregate, such as water bodies or marshy coastal areas. This is especially true during the winter months when birds are present in large numbers (DoN 2006).

NAS Patuxent River has prepared a BASH Plan that outlines procedures that can minimize the potential for bird/aircraft strikes during operations. The plan, which is included in the NAS Patuxent River INRMP, details the responsibilities of personnel who deal with the hazard and practices to reduce BASH potential at all NAS Patuxent River associated properties.

In order to minimize impacts to waterfowl and to reduce BASH risk, aircraft flying over BIR maintain a 3,000-foot minimum altitude restriction, as cited in Naval Air Training Operating Procedure Standardization General Flight and Operations Instructions (OPNAVINST 3710.7 [series]) and NAS Patuxent River Instruction 3710.5T, from November 15 to March 15. If test projects require a waiver from the 3000-foot restriction, aviation safety and natural resources specialists review project requirements to develop mitigation measures to ensure flight safety and minimize impacts to waterfowl. The Aviation Safety Officer must approve all requests for waivers, which is based on careful consideration of flight safety and BASH impacts.

Figure 4-2. Public Waterfowl Hunting Sites at Bloodsworth Island Range



Note: For data source information and most accurate data, access GRX directly, since paper maps are static forms of information.

J. Conservation Law Enforcement

Conservation law enforcement at BIR is managed through NAS Patuxent River and Station police respond to specific law enforcement incidents. MDNR and USFWS conduct conservation law enforcement of the waterfowl hunting sites at BIR.

K. Training of Natural Resources Personnel

Every person preparing, implementing, supervising and managing natural resources programs is required to receive environmental and natural resources training outlined in Chapter 12 (Natural Resources Conservation) of OPNAVINST 5090.1 (series). Personnel must receive comprehensive natural resources training specific to their job assignments, as well as more general environmental training. Course examples include basic environmental law, natural resources compliance, and NEPA. Continued professional training is further required to be an integral part of responsible natural resources management and BASH reduction. Additional official environmental training courses are listed in Chapter 3 (Environmental Readiness Training) of OPNAVINST 5090.1 (series).

L. Marine and Coastal Zone Management

CZMA 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 act stipulates that, where a federal action results in reasonably foreseeable effects on any coastal use or resource (land, 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 Zone Management Program (CZMP).

The Maryland CZMP is based on federal laws, such as Section 404 of the Clean Water Act, and incorporates a number of state laws and authorities, including the Chesapeake Bay Critical Area Law and Program, Tidal Wetlands Act, Nontidal Wetlands Protection Act, Stormwater Management Act, and state erosion and sediment control laws. Enforceable policies are given legal effect by state law and do not apply to Federal lands, waters or agencies, or other areas or entities outside of a state's jurisdiction, unless authorized by Federal law (CZMA does not confer such authority).

The Chesapeake Bay Critical Area Act, an enforceable policy of the Maryland CZMP, is a joint effort by state and local governments to address the impacts of land development on habitat and aquatic resources in the Bay. Land-use development standards and requirements established for the Chesapeake Bay Critical Area are intended to foster more sensitive development and land use activity for shoreline areas and minimize adverse impacts on water quality and natural resources. The state Critical Area includes all non-federal land within 1000' of the Bay and its tidal tributaries (MDE 2021).

While there is technically and legally no Critical Area on the NAS Complex, the spirit of the law is captured by designation of 1000-foot shoreline protection areas and 100-foot shoreline buffers. The entirety of BIR falls within the designated shoreline protection area.

Any actions within these areas are reviewed for impacts to state coastal resources such as wetlands, tidal waters and state-listed species. In an effort to streamline these reviews, the DoD Regional Environmental Counsel worked with the state and application installations to complete a Memorandum of Understanding (MOU) between DoD and Maryland concerning CZMA requirements and implementation of enforceable policies of Maryland's CZMP. Additionally, lists of de minimis and environmentally beneficial activities were prepared; as agreed to by both parties, activities on these lists may generally be carried out without further CZMA reviews or consultations. The CZMA MOU was signed by DoD and state representatives in May of 2013.

More information on Maryland's Chesapeake Coastal Services (which is responsible for maintaining and updating the state's enforceable coastal policies) is located at http://www.dnr.state.me.us/ccs/index.asp. The current list of enforceable policies was approved by NOAA in October of 2020 and can be found at https://mde.maryland.gov/programs/Water/WetlandsandWaterways/Pages/CZM.aspx (MDE 2022).

M. Cultural Resources Management

The National Historic Preservation Act and its implementing regulations (36 CFR 60, 63, and 800) established the policy of the federal government to protect significant cultural properties, including archaeological sites, historic structures, landscapes, and districts. The Navy completed a range-wide cultural resources survey in 1980 as part of an assessment of the ongoing effects of operations at BIR (DoN 2006). Additional cultural resources surveys have subsequently been completed at sites identified during the initial survey.

An Integrated Cultural Resources Management Plan (ICRMP) for the NAS Patuxent River Complex was completed in September 2002 and updated in 2018 for the years 2018-2021. While this section briefly discusses historic and prehistoric resources at BIR, the ICRMP is the primary reference document for the cultural resources program.

The BIR archaeological survey (Phase I) completed in 1980 focused on two major areas most likely to contain resources - uplands and shorelines. As a result, 4 historic sites and 52 non-site find spots were identified. Phase II investigations conducted in 1981 and 1997 identified three additional sites.

The site inventory for BIR consists of seven historic sites with occupations going back 5,000 years. Three sites have been determined eligible for listing in the National Register for Historic Places, while three others were determined not eligible. Eligibility for the seventh site has not yet been determined (LBGI 2018).

N. Flight Operations

The NAVAIR mission is supported by NAWCAD, which carries out its aviation-related RDT&E responsibilities using the flight and ground test facilities that comprise the Complex. Flight operations are conducted in the SUA located directly above BIR, which contains three restricted areas (R-4002, R-4006 and R-4008) that cover a continuous altitude band from the ground/water surface to 85,000 feet. R-4002 extends from the surface to 20,000 feet; R-4006 extends from 3,500

to 25,000 feet; and R-4008 extends from 25,000 to 85,000 feet. The restricted areas are established in this manner, including the overlap in altitudes, to contain the unique activities of NAWCAD aircraft within the range. These range operations include the following RDT&E flight test activities:

- **Aircraft flying qualities and performance** - Includes flight tests on all aircraft, including unmanned systems, to evaluate and measure rate of climb/descent, acceleration, turn performance, range, and other similar aircraft maneuvers to demonstrate the ability of the test aircraft to meet mission and specification requirements. Operations involving unmanned systems would include feasibility, new concept joint service/agency integration and interoperability testing.
- **Propulsion systems** - Includes inflight measurement of thrust, stall margin acceleration and deceleration performance, fuel consumption, airstart capability and other specifics related to mission and specifications requirements. Unmanned systems also conduct aero-mechanical flight tests that 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/prevention, environmental control); and structural loads (dynamic and static, flutter, launch and recovery, rotor systems).
- **Human factors (aircrew systems)** - Includes flight tests to evaluate aircrew survival systems, cockpit lighting, night vision systems, cockpit visibility and other human-machine interface factors.
- **Mission systems** - Includes flight tests to evaluate radar systems, directed energy systems (laser designators, microwave communications and other low energy systems), navigation systems, mapping systems, and other electronic systems. Mission systems testing also includes unmanned aircraft system (UAS) operations which covers 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 vehicles. Tests focus on communication; navigation; armament control; sensors; electromagnetic effects; mission computers; information and electronic warfare; laser designators, rangefinders and communication; interoperability between unmanned platforms; manned and unmanned systems teaming; and autonomy testing.
- **Electronic warfare** - Includes flight test of systems designed to detect, classify and provide countermeasures against various enemy threat systems such as missiles, radars and gun control systems. This would include utilizing and testing unmanned systems to assist with both land and maritime tests (providing range surveillance, data collection and communications for line-of-sight and beyond-line-of-site time, space and position information instrumentation, telemetry and other associated RDAT&E instrumentation). Electronic warfare test events evaluate unmanned electronic combat systems that represent real-world threat scenarios. Tests focus on electronic countermeasures, radar warning receivers, radar cross section, anti-radiation mission 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.

- **Flight crew proficiency** - Includes flight tests to maintain pilot and aircrew proficiency for navigation, target recognition, tracking and other aviation-related skills. There is also a level of UAS crew proficiency in which 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; strike; and anti-submarine 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. 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. 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.

O. Flight Operation Management

The Navy continues to voluntarily cease land impact operations at BIR, including the dropping of live or inert ordnance. The existence of targets on BIR allows aircrews to learn how to sight and recognize ground-based threats. The targets currently at BIR consist of billboard-type signs, radar reflectors, simulated weapons platforms (e.g., full-size molded plastic tanks), discarded military and civilian vehicles (after removal of oil and gas), and other equipment. This equipment will continue to be maintained, including the replacement and/or relocation of targets on BIR to meet specific RDT&E requirements.

RDT&E flight test operations that involve overflights of BIR, but do not include the release of ordnance or other expendables from the test aircraft, were analyzed in the Patuxent River Complex EIS (DoN 1998). During the migratory waterfowl season (typically November 15 to March 15), range operations would avoid overflight of BIR below 3,000 feet for fixed-wing aircraft and 1,000 feet for rotary-wing aircraft.

Safety during all testing and training operations is a top priority of the Complex. ATR prepares and periodically updates NAWCAD Instruction 3710.1 (series) (Range and Safety Manual) that governs operations conducted within the Complex and associated airspace. Unique safety and security measures for flight operations are addressed in this manual. Range hazard patterns, areas that must be cleared to provide safety to the public and Navy test participants, are developed by the ATR Safety Office.

Bloodsworth and Pone Islands contain unexploded ordnance (UXO) as a result of military activities conducted on the islands between 1942 and 1996. UXO is a safety hazard; therefore, access to Bloodsworth and Pone Islands (for operation support requirements, biological surveys, etc.) must be scheduled through ATR Central Schedules and requestors must meet and follow the

requirements and procedures detailed in NASPAXRIV Instruction 9072.1 (NASPAXRIV 2014). Additionally, safety oversight is applied through a wide range of other policies and procedures issued by the NAS Patuxent River Air Operations and Weapons Departments, NAVAIR, NAWCAD, Test Wing Atlantic, and others.

5. IMPLEMENTATION

A. Preparing Prescriptions that Drive the Projects

During development (and subsequent update) of this INRMP, the working group members have defined goals, identified legal drivers, and collaborated to develop natural resources management objectives. A list of projects necessary to meet these goals and objectives was also developed. Detailed prescriptions including management actions, cost estimates, funding classification, and an implementation schedule are in Appendix A; a tabular list of projects is in Appendix B.

The INRMP is considered implemented if the installation:

- Actively requests, receives, and uses funds for all Level 4 projects and activities;
- Ensures that sufficient numbers of professionally trained natural resources management staff are available to perform the tasks required by the INRMP;
- Coordinates annually with all cooperating offices; and,
- Documents specific INRMP action accomplishments undertaken each year.

B. Achieving No Net Loss

The Sikes Act states that an INRMP shall provide for no net loss in the capability of military installation lands to support the military mission of the installation. Therefore, mission requirements and considerations have been integrated into this INRMP, and the capability to support the mission is an NR Program priority.

C. Use of Cooperative Agreements

A cooperative agreement is used to acquire goods or services or stimulate an activity undertaken for the public good. Use of cooperative agreements requires substantial involvement between the federal agency and recipient during performance of the activity. Sikes Act cooperative agreements may be used to accomplish work identified in the INRMP and may be entered into with states, local governments, nongovernmental organizations, and individuals to provide for the maintenance and improvement of natural resources or to benefit natural resources research on DoD installations. Cooperative agreements authorized by the Sikes Act are not subject to the provisions of the Federal Grant and Cooperative Agreement Act, but must comply with the procedural requirements of the DoD Grant and Cooperative Agreement Regulations. Funds approved for a particular fiscal year may be obligated during any 18-month period beginning in that fiscal year in accordance with the Sikes Act to cover the costs of goods and services provided under a cooperative agreement. Using cooperative agreements to accomplish projects is an efficient means to implement INRMPs and can be administered through the NAVFAC Washington regional office.

D. Funding

The Office of Management and Budget (OMB) and EPA require federal agencies to classify natural resources projects based in part on compliance requirements. DoDI 4715.03, Enclosure 4, provides detailed guidance on programming and budgeting for natural resources projects. The priority classifications (highest to lowest) are summarized below.

Recurring Natural Resources Conservation Management Requirements. Includes activities needed to cover the recurring administrative, personnel, and other costs associated with managing the DoD natural resources conservation program. Recurring costs consist of manpower, training, supplies, permits, fees, testing and monitoring, sampling and analysis, reporting and record keeping, maintenance of natural resources conservation equipment, and compliance self-assessments.

Current Compliance. Includes projects and activities needed because an installation is currently out of compliance; has a signed compliance agreement or consent order; has not met requirements of applicable federal or state laws, regulations, standards, EOs, or DoD policies; and/or are immediate and essential to maintain operational integrity or sustain readiness of the military mission.

Maintenance Requirements. Includes projects and activities not currently out of compliance, but which will be out of compliance if projects or activities are not implemented in time to meet an established deadline beyond the current program year.

Enhancement Actions Beyond Compliance. Includes those projects and activities that enhance conservation resources or the integrity of the installation mission, or are needed to address overall environmental goals and objectives; but are not specifically required by law, regulation or EO and are not of an immediate nature.

An additional Navy funding classification consists of four Environmental Readiness Levels (ERLs):

Environmental Readiness Level 4. Includes "must fund" conservation requirements that are required to meet recurring natural resources conservation management requirements or current legal compliance needs, including EOs.

Environmental Readiness Level 3. Includes requirements of DoD and DoN policies, proactive efforts towards future compliance, or initiatives that could result in a positive return on investments for the Navy. ERL 3 projects could also support critical readiness activities by decreasing encumbrances of statutory compliance requirements.

Environmental Readiness Level 2. Includes requirements derived from pending federal, state or local legal requirements, laws, regulations, or EOs that could aid in future compliance but provide less certainty with respect to returns on investments for or benefits to the Navy.

Environmental Readiness Level 1. Is for investments in conservation leadership and general proactive natural resources stewardship.

All conservation, compliance, and stewardship projects must be entered into EPRWeb and receive approval up the chain of command prior to soliciting any signatures on the INRMP. CNO N45 is the final authority for designating the appropriate ERL for each project. A list of proposed projects necessary to implement this INRMP, implementation schedule, funding level, and proposed funding source are in Appendices A and B. All actions contemplated in this INRMP are subject to the availability of funds properly authorized and appropriated under federal law. Nothing in this

INRMP is intended to be nor must be construed to be a violation of the Anti-Deficiency Act (31 USC 1341 et seq.).

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APPENDIX A
Project Descriptions

RARE, THREATENED, AND ENDANGERED SPECIES MANAGEMENT

Project Title

Rare, Threatened, and Endangered Species Surveys

Project Description

Conduct surveys for 1) rare, threatened and endangered species (as well as species of concern) identified as having a high probability of occurring, and 2) listed species and species of concern known to occur. All inventoried species would be delineated by Global Positioning System (GPS) and numbers recorded. Update GIS data layers to reflect any new species information collected either as part of this project or by government biologists (e.g., NAS, MDNR or USFWS) as part of in-house survey efforts. NAS NR staff will use survey results to update associated management recommendations and INRMPs, as applicable.

Impact to Mission

Noncompliance with ESA, Sikes Act and Lacey Act.

Regulatory Drivers

Federal agencies are required to ensure that their actions will not adversely impact endangered species. Updates to past surveys to substantiate the presence or absence of listed species are necessary to ensure compliance and monitor population health. Monitoring or follow-up surveys of endangered species are also necessary to review military actions to determine effect on species populations so that actions can be modified to prevent taking or harming of these species. Specific regulatory drivers are: ESA, MMPA, Sikes Act, OPNAVINST 5090.1 (series).

Implementation Schedule: 2028 (and every 10 years thereafter)

Priority: OMB/EPA Class I, ERL 4, Navy Level 1

Funding Sources: O&MN

Cost Estimate: ---

RARE, THREATENED, AND ENDANGERED SPECIES MANAGEMENT

Project Title

Bald Eagle Nests – Aerial Surveys

Project Description

Conduct twice-annual aerial surveys for Bald Eagle nests on applicable NAS properties, including Bloodsworth Island Range. Flights would be conducted 1-1.5 months apart in order to determine nest occupancy and age of chicks (if present). All nests would be delineated by Global Positioning System (GPS) and numbers recorded. NAS NR staff will use survey results when reviewing proposed projects/operations and to update associated management recommendations and INRMPs, as applicable.

Impact to Mission

Noncompliance with BGEPA and Sikes Act.

Regulatory Drivers

Federal agencies are required to ensure that their actions will not adversely impact Bald Eagles and their nests. Updates to past surveys to substantiate the nest occupancy are necessary to ensure compliance and population health. Monitoring or follow-up surveys of Bald Eagles are also necessary to review military actions to determine effect on species populations so that actions can be modified to prevent taking or harming. Specific regulatory drivers are: BGEPA, Sikes Act, OPNAVINST 5090.1 (series).

Implementation Schedule: Annual

Priority: OMB/EPA Class I, ERL 4, Navy Level 1

Funding Sources: O&MN

Cost Estimate: ---

RARE, THREATENED, AND ENDANGERED SPECIES MANAGEMENT

Project Title

Rufa Red Knot Surveys

Project Description

Conduct annual surveys for Rufa Red Knots on Bloodsworth Island Range. As part of the BIR INRMP review and subsequent metrics meetings, USFWS and MDNR requested that NAS monitor and report on Rufa Red Knot at BIR. Any observations would be documented by GPS and numbers recorded. NAS NR staff will use survey results when reviewing proposed projects/operations and to update associated management recommendations and INRMPs, as applicable.

Impact to Mission

Noncompliance with ESA and Sikes Act. Noncompliance with survey requests made directly by partner agencies during INRMP/metrics review.

Regulatory Drivers

Federal agencies are required to ensure that their actions will not adversely impact endangered species. Updates to past surveys to substantiate the presence or absence of listed species are necessary to ensure compliance and population health. Monitoring or follow-up surveys of endangered species are also necessary to review military actions to determine effect on species populations so that actions can be modified to prevent taking or harming of these species. Specific regulatory drivers are: ESA, Sikes Act, OPNAVINST 5090.1 (series).

Implementation Schedule: Annual

Priority: OMB/EPA Class I, ERL 4, Navy Level 1

Funding Sources: O&MN

Cost Estimate: ---

RARE, THREATENED, AND ENDANGERED SPECIES MANAGEMENT

Project Title

Eastern Black Rail Surveys

Project Description

Conduct nocturnal surveys for Eastern Black Rail on Bloodsworth Island Range. As part of the BIR INRMP review and subsequent metrics meetings, USFWS and MDNR requested that NAS survey for and report on Eastern Black Rail at BIR. Any observations would be documented by GPS and numbers recorded. NAS NR staff will use survey results when reviewing proposed projects/operations and to update associated management recommendations and INRMPs, as applicable. If the species is determined to be present, additional surveys will be conducted per USFWS guidance.

Impact to Mission

Noncompliance with ESA and Sikes Act. Noncompliance with survey requests made directly by partner agencies during INRMP/metrics review.

Regulatory Drivers

Federal agencies are required to ensure that their actions will not adversely impact endangered species. Updates to past surveys to substantiate the presence or absence of listed species are necessary to ensure compliance and population health. Monitoring or follow-up surveys of endangered species are also necessary to review military actions to determine effect on species populations so that actions can be modified to prevent taking or harming of these species. Specific regulatory drivers are: ESA, Sikes Act, OPNAVINST 5090.1 (series).

Implementation Schedule: 2022

Priority: OMB/EPA Class I, ERL 4, Navy Level 1

Funding Sources: O&MN

Cost Estimate: ---

WETLANDS MANAGEMENT

Project Title

Submerged Aquatic Vegetation Site Assessment, Restoration, and Monitoring

Project Description

Conduct water quality and habitat assessment in areas with potential for SAV restoration, based on historic locations, at BIR. If conditions are appropriate, install 1m2 test plots at selected sites to assess site suitability. Establish and monitor survival of SAV beds on up to 30 acres (approximately 10 percent of the current area) via planting and/or seeding. Subsequent monitoring may be accomplished via access to VIMS SAV survey results.

Impact to Mission

SAV is a sensitive water-quality indicator, as well as a regulated wetland plant. A sharp decline in SAV populations in Installation water bodies may indicate an unchecked pollution source on or adjacent to the Installation.

Regulatory Drivers

Studies and implementation work for natural resources projects prescribed in the INRMP are required to ensure that activities conducted are in compliance. Specific regulatory drivers are: CZMA, CWA, EO 11988 Floodplain Management, EO 11990 Wetland Protection, OPNAVINST 5090.1 (series).

Implementation Schedule: 2028 (assessment) and 2030 (restoration)

Priority: OMB/EPA Class II, ERL 3, Navy Level 1

Funding Sources: O&MN, Alliance for the Chesapeake Bay, CBP, Legacy

Cost Estimate: ---

LAND AND WATERSHED MANAGEMENT

Project Title

Shoreline Erosion GIS Delineation and Analysis

Project Description

GIS delineation of current shorelines of BIR would establish the current conditions as baseline. Shorelines would be delineated by GPS or photointerpretation. Also, guidance for control and/or mitigation of the identified erosion areas would be provided. Habitat requirements of the state-endangered *Polygonum glaucum* (Seaside Knotweed) must be taken into account to avoid detrimental effects to BIR population.

Impact to Mission

Erosion along the west and northwest shores of Bloodsworth Island is pushing the shoreline eastward. Lack of action will lead to increasing areas of exposed peat and loss of additional land area.

Regulatory Drivers

Sikes Act, Energy Independence and Security Act of 2007 (Section 438), Chesapeake Bay Agreements, EO 13508 Chesapeake Bay Protection and Restoration.

Implementation Schedule: 2025

Priority: OMB/EPA Class I, ERL 4, Navy Level 1

Funding Sources: O&MN (Conservation and/or Compliance)

Cost Estimate: ---

LAND AND WATERSHED MANAGEMENT

Project Title

Shoreline Erosion Stabilization

Project Description

Following GIS delineation and analysis of current shorelines of BIR, develop a shoreline stabilization feasibility study. Based on the results of the feasibility study plan, design and implement shoreline erosion stabilization. As part of the BIR INRMP review and subsequent metrics meetings, USFWS requested that NAS Patuxent River determine the feasibility of shoreline stabilization.

Impact to Mission

Erosion along the west and northwest shores of Bloodsworth Island is pushing the shoreline eastward. Lack of action will lead to increasing areas of exposed peat and loss of additional land area. Noncompliance with survey requests made directly by partner agencies during INRMP/metrics review.

Regulatory Drivers

Sikes Act, Energy Independence and Security Act of 2007 (Section 438), Chesapeake Bay Agreements, EO 13508 Chesapeake Bay Protection and Restoration.

Implementation Schedule: To be determined by results of GIS survey and analysis, as well as availability of dredge material

Priority: OMB/EPA Class II, ERL 3, Navy Level 1

Funding Sources: O&MN (Conservation and/or Compliance)

Cost Estimate: ---

INVASIVE SPECIES MANAGEMENT

Project Title

Invasive Species GIS Delineation and Inventory

Project Description

The delineation and inventory would address nuisance and invasive flora and fauna species at BIR. The site would be surveyed during the growing season and revisited after ten years. All inventoried species would be delineated by GPS and numbers recorded. Also, guidance for control and/or eradication of the identified nuisance/invasive species would be provided. NR staff will use this information to determine if nuisance/invasive species pose a direct threat to any listed species or species of concern on the islands. NR staff will also work with NAVAIR's Sustainability Office to determine if any nuisance/invasive species have the potential to impact the military mission at BIR.

Impact to Mission

Invasive/nuisance species compete for habitat with native/endemic species and, in many cases, take over the habitat and change or alter the ecosystem. The result is a decrease in wildlife habitat and decreased habitat for rare, threatened, and endangered species. Nuisance/invasive species can also negatively impact military operations and training grounds.

Regulatory Drivers

Federal agencies are required to identify invasive species currently existing on federal lands, and to ensure that no new invasive species are introduced onto federal lands. In addition, federal agencies are to ensure that invasive species will not impact federally listed threatened or endangered species. Specific regulatory drivers are: ESA, Sikes Act; EO 13112 Invasive Species; OPNAVINST 5090.1 (series).

Implementation Schedule: 2028 (and every 10 years thereafter)

Priority: OMB/EPA Class II, ERL 4, Navy Level 1

Funding Sources: O&MN

Cost Estimate: ---

INVASIVE SPECIES MANAGEMENT

Project Title

Invasive Species Control

Project Description

Eradicate exotic, invasive plant species found on the installation, focusing primarily on species that directly threaten known rare species or species of concern, or that have the potential to impact military missions at BIR. Invasive species are manageable if control efforts are undertaken early and management efforts maintained. Replace invasive species with native species in areas where they were providing shoreline stabilization functions. Control techniques will take in to account information from the invasive species survey.

Impact to Mission

Noncompliance with the ESA, Sikes Act, INRMP, and other stated regulatory drivers. Invasive/nuisance species compete for habitat with native/endemic species and, in many cases, take over the habitat and change or alter the ecosystem. The result is a decrease in wildlife habitat and decreased habitat for rare, threatened, and endangered species. Nuisance/invasive species can also negatively impact military operations and training grounds.

Regulatory Drivers

Federal agencies are required to identify invasive species currently existing on federal lands, and to ensure that no new invasive species are introduced onto federal lands. In addition, federal agencies are to ensure that invasive species will not impact federally listed threatened or endangered species. Specific regulatory drivers are: ESA, Sikes Act; EO 13112 Invasive Species; OPNAVINST 5090.1 (series).

Implementation Schedule: Annual (following completion of invasive species inventory)

Priority: OMB/EPA Class II, ERL 4, Navy Level 1

Funding Sources: O&MN

Cost Estimate: ---

MIRGATORY BIRD MANAGEMENT

Project Title

Heron Rookery and other Avian Species Survey

Project Description

Conduct twice-yearly breeding surveys of Great Blue Heron population, Peregrine Falcon and other migratory bird species at BIR and Hannibal Target. As part of the original BIR INRMP review and subsequent metrics meetings, USFWS and MDNR requested that NAS monitor and report on numerous species that are known (or have the potential) to occur at BIR. Based on survey data, design and implement management guidance to protect these bird populations and their respective habitats on the installation. In addition, monitor nesting platforms themselves to determine if/when repair or replacement is needed. Project costs are kept low by using in-house NR staff to conduct the projects; funding is needed only for boat transport to and from BIR.

Impact to Mission

Noncompliance with ESA, MBTA, Sikes Act and INRMP. Noncompliance with survey requests made directly by partner agencies during INRMP/metrics review.

Regulatory Drivers

MBTA, Sikes Act, ESA, BGEPA.

Implementation Schedule: Annual

Priority: OMB/EPA Class I, ERL 4, Navy Level 1

Funding Sources: O&MN

Cost Estimate: ---

MIGRATORY BIRD MANAGEMENT

Project Title

Shorebird Nest Surveys

Project Description

Conduct spring shorebird nest surveys on Bloodsworth Island Range. As part of the BIR INRMP review and subsequent metrics meetings, USFWS and MDNR requested that NAS monitor and report on numerous species that are known (or have the potential) to occur at BIR. Based on survey data, design and implement management guidance to protect these bird populations and their respective habitats on the installation. Observations would be documented by GPS and numbers recorded. NAS NR staff will use survey results when reviewing proposed projects/operations and to update associated management recommendations and INRMPs, as applicable.

Impact to Mission

Noncompliance with ESA, MBTA, and Sikes Act. Noncompliance with survey requests made directly by partner agencies during INRMP/metrics review.

Regulatory Drivers

Federal agencies are required to ensure that their actions will not adversely impact migratory birds. Updates to past surveys to substantiate the breeding of migratory bird species are necessary to ensure compliance and population health. Monitoring or follow-up surveys of migratory bird species are also necessary to review military actions to determine effect on species populations so that actions can be modified to prevent taking or harming of these species. Specific regulatory drivers are: MBTA, ESA, Sikes Act, OPNAVINST 5090.1 (series).

Implementation Schedule: Annual

Priority: OMB/EPA Class I, ERL 4, Navy Level 1

Funding Sources: O&MN

Cost Estimate: ---

APPENDIX B
List of Projects

EPR #	Project Description	Schedule (FY)	Prime Legal Driver/ Initiative	Class ERL Navy Level	Cost Estimate ($)	Fund Sources	NEPA/ CCD	Date Complete
Rare, Threatened, and Endangered Species Management								
	Conduct surveys for rare, threatened and endangered species and species of concern known or likely to occur	2028	ESA, MMPA, Sikes Act	OMB/EPA Class I, ERL 4, Navy Level 1		O&MN	no	
	Bald Eagle Nests – Aerial Surveys	Annual	BGEPA, Sikes Act	OMB/EPA Class I, ERL 4, Navy Level 1		O&MN	no	
	Rufa Red Knot Surveys*	Annual	ESA, Sikes Act	OMB/EPA Class I, ERL 4, Navy Level 1		O&MN	no	
	Eastern Black Rail Survey	Annual	ESA, Sikes Act	OMB/EPA Class I, ERL 4, Navy Level 1		O&MN	no	
Wetlands Management								
	Submerged Aquatic Vegetation (a) Assessment and (b) Restoration	a) 2028 b) 2030	CZMZ, CWA	OMB/EPA Class II, ERL 3, Navy Level 1		O&MN, CBP, Legacy	a) no b) yes	
Land and Watershed Management								
	Shoreline Erosion GIS Delineation and Analysis	2025	Chesapeake Bay Agreements	OMB/EPA Class I, ERL 4, Navy Level 1		O&MN	no	
	Shoreline Erosion Stabilization	TBD	EO 13508, EISA 438	OMB/EPA Class I, ERL 4, Navy Level 1		O&MN	yes	
Invasive Species Management								
	Invasive Species GIS Delineation and Inventory	2028	Sikes Act, EO 13112, EO 13751	OMB/EPA Class II, ERL 4, Navy Level 1		O&MN	no	
	Invasive Species Control	Annual	Sikes Act, EO 13112, EO 13751	OMB/EPA Class II, ERL 4, Navy Level 1		O&MN	no	

Migratory Bird Management								
	Heron Rookery and other Avian Species Survey*	Annual	MBTA, Sikes Act, ESA	OMB/EPA Class I, ERL 4, Navy Level 1		O&MN	no	
	Spring Shorebird Nest Surveys*	Annual	MBTA, Sikes Act, ESA	OMB/EPA Class I, ERL 4, Navy Level 1		O&MN	no	

* These surveys are all captured under a single EPR.

APPENDIX C
Bloodsworth Island Range Species Lists

Table C-1. Plant Species Known to Occur at Bloodsworth Island Range

Scientific Name	Common Name	Habitat	Origin*
Agalinis maritima	Saltmarsh False Foxglove	Saltgrass meadow	N
Agalinis maritima forma alba	Saltmarsh White False Foxglove	Saltgrass meadow	N
Allium vineale	Wild Garlic	Upland thicket	I
Amaranthus cannabinus	Tidalmarsh Amaranth	Saltgrass meadow	N
Apocynum cannabinum	Indianhemp, Dogbane	Sand Beaches	N
Asparagus officinalis	Garden Asparagus	Marshelder thicket	I
Atriplex prostrata	Triangle Orache	Sand Beaches	N
Baccharis halimifolia	Eastern Baccharis, Groundseltree	Upland thicket	N
Cakile edentula	American Searocket	Sand Beaches	N
Calystegia sepium	Hedge False Bindweed	Sand Beaches	N/I
Celtis occidentalis	Common Hackberry	Upland thicket	N
Cenchrus tribuloides	Sanddune Sandbur	Sand Beaches	N
Centaurium spicatum	Spiked Centaury	Marshelder thicket	N
Chamaesyce polygonifolia	Seaside Sandmat	Sand Beaches	N
Chenopodium berlandieri	Pitseed Goosefoot	Sand Beaches	N
Conyza canadensis	Canadian Horseweed	Upland thicket	N
Cuscuta indecora	Bigseed Alfalfa Dodder	Marshelder thicket	N
Cyperus esculentus	Yellow Nutsedge	Sand Beaches	N
Distichlis spicata	Saltgrass	Saltgrass meadow	N
Eupatoriun capillifolium	Dogfennel	Sand Beaches	N
Festuca sp.	a fescue	Upland thicket	I
Fimbristylis castanea	Marsh Fimbry	Saltmeadow cordgrass meadow	N
Hibiscus moscheutos	Crimsoneyed Rosemallow	Smooth cordgrass meadow	N
Ilex opaca	American Holly	Upland thicket	N
Iva frutescens	Jesuit's Bark, Marshelder	Upland thicket	N
Juncus dudleyi	Dudley's Rush	Marshelder thicket	N
Juncus roemerianus	Black Needlerush, Needlegrass Rush	Needlerush marshland	N

Table C-1. Plant Species Known to Occur at Bloodsworth Island Range (cont'd)

Scientific Name	Common Name	Habitat	Origin*
Juniperus virginiana	Eastern Redcedar	Upland thicket	N
Kosteletzkya virginica	Virginia Saltmarsh Mallow	Saltmeadow cordgrass meadow	N
Limonium carolinianum	Lavender Thrift	Saltmeadow cordgrass meadow	N
Lonicera japonica	Japanese Honeysuckle	Upland thicket	I
Morella cerifera	Wax Myrtle	Upland thicket	N
Panicum amarum	Bitter Panicgrass	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
Prunus serotina	Black Cherry	Upland thicket	N
Rhus copallinum	Winged Sumac	Upland thicket	N
Robinia pseudoacacia	Black Locust	Upland thicket	N
Rubus sp.	a blackberry	Upland thicket	N/I
Rumex verticillatus	Swamp Dock	Sand Beaches	N
Ruppia maritima	Widgeongrass	Submerged aquatic vegetation	N
Sabatia stellaris	Rose of Plymouth	Marshelder thicket	N
Salicornia maritima	Slender Glasswort	Glasswort salt pan	N
Salicornia depressa	Virginia Glasswort	Glasswort salt pan	N
Salsola kali	Russian Thistle	Sand Beaches	I
Schoenoplectus maritimus	Cosmopolitan Bulrush	Saltgrass meadow	N
Schoenoplectus robustus	Sturdy Bulrush	Saltgrass meadow	N
Sesuvium maritimum	Slender Seapurslane	Sand Beaches	N

Table C-1. Plant Species Known to Occur at Bloodsworth Island Range (cont'd)

Scientific Name	Common Name	Habitat	Origin*
Setaria parviflora	Marsh Bristlegrass, Knotroot Foxtail	Marshelder thicket	N
Solidago sempervirens	Seaside Goldenrod	Saltmeadow cordgrass meadow	N
Spartina alterniflora	Smooth or Saltmarsh Cordgrass	Smooth cordgrass meadow	N
Spartina cynosuroides	Big Cordgrass	Marshelder thicket	N
Spartina patens	Saltmeadow Cordgrass	Saltmeadow cordgrass meadow	N
Strophostyles helvola	Amberique-bean	Sand Beaches	N
Symphyotrichum subulatum	Eastern Annual Saltmarsh Aster	Saltmeadow cordgrass meadow	N
Symphyotrichum tenuifolium	Perennial Saltmarsh Aster	Saltgrass meadow	N
Teucrium canadense	Canada Germander	Upland thicket	N
Toxicodendron radicans	Eastern Poison Ivy	Upland thicket	N
Xanthium strumarium	Rough Cocklebur	Sand Beaches	N
Zannichellia palustris	Horned Pondweed	Submerged aquatic vegetation	N
Zostera marina	Eelgrass, Seawrack	Submerged aquatic vegetation	N

*For Origin, N = native and I = invasive

Sources: DoN 2003 (Including Sipple 1978; McKuen and Bronori 1981; and USGS 1998), USDA 2014

Table C-2. Bird Species Known or Expected to Occur in the Vicinity of Bloodsworth Island Range

Common Name	Scientific Name	Global Rank	State Rank	State Status	Federal Status	DOD PIF SOC[1]	Breeding
Common Loon	*Gavia immer*	G5	-	-	-	X	-
Horned Grebe	*Podiceps auritus*	G5	-	-	-	X	-
Brown Pelican	*Pelecanus occidentalis*	G4	S1B	-	-	X	Co
Double-crested Cormorant	*Phalacrocorax auritus*	G5	-	-	-	-	Po
Northern Gannet	*Morus bassanus*	G5	-	-	-	-	-
Great Blue Heron	*Ardea herodias*	G5	-	-	-	-	Co
Great Egret	*Ardea alba*	G5	S3S4B	-	-	-	Co
Snowy Egret	*Egretta thula*	G5	S3B	-	-	X	Co
Tricolored Heron	*Egretta tricolor*	G5	S3B	-	-	X	Co
Little Blue Heron	*Egretta caerulea*	G5	S3B	-	-	X	Co
Cattle Egret	*Bubulcus ibis*	G5	-	-	-	-	Co
Green Heron	*Butorides virescens*	G5	-	-	-	-	Pr
Black-crowned Night Heron	*Nycticorax nycticorax*	G5	S3B	-	-	X	Co
Yellow-crowned Night Heron	*Nyctanassa violacea*	G5	S3B	-	-	X	Co
Least Bittern	*Ixobrychus exilis*	G4	S2S3B	I	-		-
American Bittern	*Botaurus lentiginosus*	G5	S1B	T	-	X	Po
White Ibis	*Eudocimus albus*	G5	-	-	-		-
Glossy Ibis	*Plegadis falcinellus*	G5	S3B	-	-	X	-
Mute Swan	*Cygnus olor*	G5	-	-	-	X	Co
Tundra Swan	*Cygnus columbianus*	G5	-	-	-	X	-
Canada Goose	*Branta canadensis*	G5	-	-	-	X	Co
Brant	*Branta bernicla*	G5	-	-	-		-
Snow Goose	*Anser caerulescens*	G5	-	-	-	X	-
Wood Duck	*Aix sponsa*	G5	-	-	-		Po
Mallard	*Anas platyrhynchos*	G5	-	-	-	X	Co
American Black Duck	*Anas rubripes*	G5	-	-	-	X	Co
American Black Duck-Mallard hybrid	*Anas rubripes x platyrhynchos*	-	-	-	-	-	-
Gadwall	*Mareca strepera*	G5	S2B	-	-	-	-
Northern Pintail	*Anas acuta*	G5	-	-	-	X	-
American Wigeon	*Mareca americana*	G5	-	-	-	X	-
Blue-winged Teal	*Spatula discors*	G5	S1B	-	-	-	-

Table C-2. Bird Species Known or Expected to Occur in the Vicinity of Bloodsworth Island Range (cont'd)

Common Name	Scientific Name	Global Rank	State Rank	State Status	Federal Status	DOD PIF SOC[1]	Breeding
Green-winged Teal	*Anas crecca*	G5	-	-	-	-	-
Canvasback	*Aythya valisineria*	G5	-	-	-	X	-
Redhead	*Aythya americana*	G5	-	-	-	X	-
Greater Scaup	*Aythya marila*	G5	-	-	-	X	-
Long-tailed Duck	*Clangula hyemalis*	G5	-	-	-	X	-
Surf Scoter	*Melanitta perspicillata*	G5	-	-	-	X	-
Black Scoter	*Melanitta americana*	G5	-	-	-	X	-
White-winged Scoter	*Melanitta deglandi*	G5	-	-	-	X	-
Common Goldeneye	*Bucephala clangula*	G5	-	-	-	X	-
Bufflehead	*Bucephala albeola*	G5	-	-	-	X	-
Hooded Merganser	*Lophodytes cucullatus*	G5	S3B	-	-	-	-
Common Merganser	*Mergus merganser*	G5	S2B	-	-	-	-
Red-breasted Merganser	*Mergus serrator*	G5	-	-	-	-	-
Turkey Vulture	*Cathartes aura*	G5	-	-	-	-	-
Black Vulture	*Coragyps astratus*	G5	-	-	-	-	-
Northern Harrier	*Circus hudsonius*	G5	S2B	I	-	X	Pr
Sharp-shinned Hawk	*Accipiter striatus*	G5	S2S3B	-	-	-	-
Cooper's Hawk	*Accipiter cooperii*	G5	-	-	-	-	-
Red-shouldered Hawk	*Buteo lineatus*	G5	-	-	-	-	-
Red-tailed Hawk	*Buteo jamaicensis*	G5	-	-	-	-	-
Bald Eagle	*Haliaeetus leucocephalus*	G5	S3S4	-	-	X	Co
Osprey	*Pandion haliaetus*	G5	-	-	-	-	Co
Merlin	*Falco columbarius*	G5	-	-	-	-	-
American Kestrel	*Falco sparverius*	G5	-	-	-	-	-
Peregrine Falcon	*Falco peregrinus*	G4T4	S2B	I	-	X	Co
Clapper Rail	*Rallus crepitans*	G5	-	-	-	X	Pr
King Rail	*Rallus elegans*	G4	S2B	-	-	X	-
Virginia Rail	*Rallus limicola*	G5	-	-	-	X	Pr
Sora	*Porzana carolina*	G5	S2B	-	-	-	-
Black-bellied Plover	*Pluvialis squatarola*	G5	-	-	-	X	-

Table C-2. Bird Species Known or Expected to Occur in the Vicinity of Bloodsworth Island Range (cont'd)

Common Name	Scientific Name	Global Rank	State Rank	State Status	Federal Status	DOD PIF SOC[1]	Breeding
Semipalmated Plover	*Charadrius semipalmatus*	G5	-	-	-	-	-
American Oystercatcher	*Haematopus palliatus*	G5	S3B	-	-	X	Co
Greater Yellowlegs	*Tringa melanoleauca*	G5	-	-	-	X	-
Lesser Yellowlegs	*Tringa flavipes*	G5	-	-	-	X	-
Solitary Sandpiper	*Tringa solitaria*	G5	-	-	-	-	-
Willet	*Tringa semipalmata*	G5	-	-	-	X	Co
Whimbrel	*Numenius phaeopus*	G5	-	-	-	X	-
Spotted Sandpiper	*Actitis macularius*	G5	S3S4B	-	-	-	-
Ruddy Turnstone	*Arenaria interpres*	G5	-	-	-	X	-
Rufa Red Knot	*Calidris canutus rufa*	G4T2	S1M	T	T	X	-
Sanderling	*Calidris alba*	G5	-	-	-	X	-
Dunlin	*Calidris alpina*	G5	-	-	-	X	-
Western Sandpiper	*Calidris mauri*	G5	-	-	-	X	-
Semipalmated Sandpiper	*Calidris pusilla*	G5	-	-	-	-	-
Least Sandpiper	*Calidris minutilla*	G5	-	-	-	-	-
Short-billed Dowitcher	*Limnodromus griseus*	G5	-	-	-	X	-
Long-billed Dowitcher	*Limnodromus scolopaceus*	G5	-	-	-		-
Bonaparte's Gull	*Chroicocephalus philadelphia*	G5	-	-	-	X	-
Laughing Gull	*Leucophaeus atricilla*	G5	S1B	-	-	X	-
Ring-billed Gull	*Larus delawarensis*	G5	-	-	-	-	-
Herring Gull	*Larus argentatus*	G5	-	-	-	-	Co
Great Black-backed Gull	*Larus marinus*	G5	-	-	-	-	Co
Caspian Tern	*Hydroprogne caspia*	G5	-	-	-	-	-
Royal Tern	*Thalasseus maximus*	G5	S1B	E	-	-	-
Common Tern	*Sterna hirundo*	G5	S1B	E	-	X	Co
Forster's Tern	*Sterna fosteri*	G5	S2B	I	-	X	Co
Black Tern	*Chlidonias niger*	G4G5	-	-	-	-	-
Black Skimmer	*Rynchops niger*	G5	S1B	E	-	X	-
Mourning Dove	*Zenaida macroura*	G5	-	-	-	X	-
Yellow-billed Cuckoo	*Coccyzus americanus*	G5	-	-	-		-
Barn Owl	*Tyto alba*	G5	S2B	I	-	-	Po

Table C-2. Bird Species Known or Expected to Occur in the Vicinity of Bloodsworth Island Range (cont'd)

Common Name	Scientific Name	Global Rank	State Rank	State Status	Federal Status	DOD PIF SOC[1]	Breeding
Short-eared Owl	*Asio flammeus*	G5	S1B	E	-	X	-
Great Horned Owl	*Bubo virginianus*	G5	-	-	-	-	-
Ruby-throated Hummingbird	*Archilochus colubris*	G5	-	-	-		Pr
Chimney Swift	*Chaetura pelagica*	G4	-	-	-	X	-
Eastern Wood-Pewee	*Contopus virens*	G5	-	-	-		-
Eastern Kingbird	*Tyrannus tyrannus*	G5	-	-	-	X	-
Red-eyed Vireo	*Vireo olivaceus*	G5	-	-	-		Po
American Crow	*Corvus branchyrhynchos*	G5	-	-	-	-	-
Fish Crow	*Corvus ossifragus*	G5	-	-	-	X	Co
Tree Swallow	*Tachycineta bicolor*	G5	-	-	-	-	Po
Purple Martin	*Progne subis*	G5	-	-	-		-
Barn Swallow	*Hirundo rustica*	G5	-	-	-	-	Co
Carolina Wren	*Thryothorus ludovicianus*	G5	-	-	-	-	Po
House Wren	*Troglodytes aedon*	G5	-	-	-	-	Pr
Sedge Wren	*Cistothorus platensis*	G5	S1B	E	-	X	-
Marsh Wren	*Cistothorus palustris*	G5	-	-	-	X	Co
Gray-cheeked Thrush	*Catharus minimus*	G5	-	-	-		-
Gray Catbird	*Dumetella carolinensis*	G5	-	-	-		Co
Cedar Waxwing	*Bombycilla cedrorum*	G5	-	-	-		-
European Starling	*Sturnus vulgaris*	G5	-	-	-	-	Co
Yellow Warbler	*Setophaga petechia*	G5	-	-	-		-
Black-throated Blue Warbler	*Setophaga caerulescens*	G5	S3S4B	-	-		-
Yellow-rumped (Myrtle) Warbler	*Setophaga coronata*	G5	S2B	-	-	-	-
American Redstart	*Setophaga ruticilla*	G5	-	-	-		Po
Common Yellowthroat	*Geothlypis trichas*	G5	-	-	-	-	Co
Yellow-breasted Chat	*Icteria virens*	G5	-	-	-	X	Po
Saltmarsh Sparrow	*Ammospiza caudacuta*	G2	S2B,S1N	I	-	X	Co
Seaside Sparrow	*Ammospiza maritima*	G4	-	-	-	X	Co
White-throated Sparrow	*Zonotrichia albicollis*	G5	-	-	-	-	-
Song Sparrow	*Melospiza melodia*	G5	-	-	-	-	Co

Table C-2. Bird Species Known or Expected to Occur in the Vicinity of Bloodsworth Island Range (cont'd)

Common Name	Scientific Name	Global Rank	State Rank	State Status	Federal Status	DOD PIF SOC[1]	Breeding
Swamp Sparrow	*Melospiza georgiana*	G5	-	-	-	-	-
Field Sparrow	*Spizella pusilla*	G5	-	-	-		Po
Eastern Towhee	*Pipilo erythrophthalmus*	G5	-	-	-	-	-
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	G5	-	-	-	-	-
Northern Cardinal	*Cardinalis cardinalis*	G5	-	-	-	-	Po
Eastern Meadowlark	*Sturnella magna*	G5	-	-	-	-	-
Brown-headed Cowbird	*Molothrus ater*	G5	-	-	-	-	-
Bobolink	*Dolichonyx oryzivorus*	G5	S3S4B	-	-	X	-
Red-winged Blackbird	*Agelaius phoeniceus*	G5	-	-	-	-	Pr
Common Grackle	*Quiscalus quiscula*	G5	-	-	-	-	-
Boat-tailed Grackle	*Quiscalus major*	G5	-	-	-	-	Co
Orchard Oriole	*Icterus spurius*	G5	-	-	-	-	-
House Finch	*Haemorhous mexicanus*	G5	-	-	-	-	-
American Goldfinch	*Spinus tristis*	G5	-	-	-	-	-

[1]These birds are on the DoD Partners in Flight's Bird Species of Concern list for the NAS Region. (Details and further SOC break-outs are found at http://www.denix.osd.mil/dodpif/)

Sources: DoN 1997, 2006, 2008, 2022; Gough et al. 1998; MDNR 2010a; Rambo 2014; NatureServe 2022.

Table C-3. Fish Species Known to Occur in the Vicinity of Bloodsworth Island Range

Scientific Name	Common Name	Global Rank	State Rank	State Status	Federal Status
Anchoa hepsetus	Striped Anchovy	G5	-	-	-
Anchoa mitchilli	Bay Anchovy (R)	G5	-	-	-
Brevoortia tyrannus	Atlantic Menhaden	G5	-	-	-
Centropristis striata	Black Sea Bass	-	-	-	-
Chaetodipterus faber	Atlantic Spadefish	G5	-	-	-
Chasmodes bosquianus	Striped Blenny (R)	G5	-	-	-
Cynoscion nebulosus	Speckled Trout, Spotted Seatrout	G5	-	-	-
Cynoscion regalis	Weakfish	-	-	-	-
Cyprinodon variegates	Sheepshead Minnow (R)	G5	-	-	-
Fundulus heteroclitus	Mummichog (R)	G5	-	-	-
Fundulus luciae	Spotfin Killifish (R)	G4	SU	-	-
Fundulus majalis	Striped Killifish (R)	G5	-	-	-
Gobiosoma bosci	Naked Goby (R)	G5	-	-	-
Leiostomus xanthurus	Spot	G5	-	-	-
Menidia menidia	Atlantic Silverside	G5	-	-	-
Micropogonias undulatus	Atlantic Croaker	G5	-	-	-
Morone americana	White Perch	G5	-	-	-
Morone saxatilis	Striped Bass, Rockfish	G5	-	-	-
Opsanus tau	Oyster Toadfish (R)	-	-	-	-
Paralichthys dentatus	Summer Flounder	-	-	-	-
Pogonias cromis	Black Drum	-	-	-	-
Pomatomus saltatrix	Bluefish	G5	-	-	-
Prionotus carolinus	Northern Searobin	G5	-	-	-
Pseudopleuronectes americanus	Winter Flounder, Lemon Sole	G5	-	-	-
Rhinoptera bonasus	Cownose Ray	-	-	-	-
Scomberomorus maculatus	Spanish Mackerel	G5	-	-	-
Strongylura marina	Atlantic Needlefish	G5	-	-	-
Synodus foetens	Inshore Lizardfish	G5	-	-	-
Trinectes maculatus	Hogchoker (R)	G5	-	-	-

Sources: DoN 1997, MDNR 2021b, USEPA 1996
(R) = Year-round resident

Table C-4. Marine Mammals Potentially Occurring in the Vicinity of the Bloodsworth Island Range

Scientific Name	Common Name	Global Rank	State Rank	State Status	Federal Status
Mysticetes					
Balaenoptera acutorostrata	Minke Whale	G5	-	-	-
Balaenoptera physalus	Finback Whale	G3G4	S1S2	E	LE
Eubalaena glacialis	North Atlantic Right Whale	G1	S1	E	LE
Megaptera novaeangliae	Humpback Whale	G4	S1S2	E	LE
Odontocetes					
Delphinus delphis	Short-Beaked Common Dolphin	G5	-	-	-
Globicephala macrorhynchus	Short-Finned Pilot Whale	G5	-	-	-
Kogia breviceps	Pygmy Sperm Whale	G4	-	-	-
Lagenorhynchus acutus	Atlantic White-sided Dolphin	G5	-	-	-
Mesoplodon europaeus	Gervais' Beaked Whale	G3	SNR	-	-
Phocoena phocoena	Harbor Porpoise	G4	-	-	-
Stenella coeruleoalba	Striped Dolphin	G5	-	-	-
Steno bredanensis	Rough-Toothed Dolphin	G4	-	-	-
Tursiops truncates	Bottlenose Dolphin	G5	-	-	-
Pinnipeds					
Cystophora cristata	Hooded Seal	G5	-	-	-
Pagophilus groenlandicus	Harp Seal	G5	-	-	-
Phoca vitulina	Harbor Seal	G5	-	-	-
Sirenians					
Trichechus manatus	West Indian Manatee	G2	-	-	LT

Sources: DoN 2006, MDNR 2021b

APPENDIX D
Potential Future Research

WETLAND MANAGEMENT; FISH AND WILDLIFE MANAGEMENT; MIGRATORY BIRD MANAGEMENT; LAND MANAGEMENT; INVASIVE SPECIES MANAGEMENT

Project Title

Wetland Research Study Areas

Project Description

The research plots would be located throughout BIR to study ecosystem changes over time, specifically as relating to vegetation composition, wildlife utilization, invasive species migration, relative sea-level rise, and erosion.

Impact to Mission

Should the installation propose to conduct activities that have the potential to be either harmful to known species or considered a taking under the MBTA, ESA or BGEPA, this monitoring would be conducted to ensure compliance with these acts. This research would also study the impact of past military activities on the island ecosystem.

Regulatory Drivers

Federal agencies are required to ensure that their actions will not adversely impact endangered species, marine mammals or migratory birds. Related regulatory drivers are the ESA, MMPA, MBTA, EO 13089 Coral Reef Protection, EO 13112 Invasive Species, EO 12962 Recreational Fisheries, MSFCMA, and OPNAVINST 5090.1 (series).

Implementation Schedule

Priority: OMB/EPA Class III, ERL 3, Navy Level 3

Funding Sources: O&MN, Legacy

Cost Estimate: ---

APPENDIX E
Data Call Information

Data Call Information