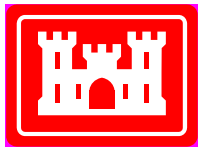
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

U.S. Army Garrison Aberdeen Proving Ground-
Adelphi Laboratory Center and
Blossom Point Research Facility

January 2022

Integrated Natural Resources Management Plan
2022-2026

U.S. Army Garrison Aberdeen Proving Ground/Adelphi Laboratory Center
Blossom Point Research Facility



Prepared for:

Environmental Division
U.S. Army Garrison Aberdeen Proving Ground/Adelphi Laboratory Center
Adelphi, Maryland 20783

Prepared by:

U.S. Army Corps of Engineers
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Baltimore, Maryland 21201

January 2022

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INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
ADELPHI LABORATORY CENTER
BLOSSOM POINT RESEARCH FACILITY

TRIPARTITE AGREEMENT (1 of 3)

This Integrated Natural Resources Management Plan has been developed by the U.S. Army Corps of Engineers, Baltimore District on behalf of the U.S Army Garrison Aberdeen Proving Ground, in cooperation with the U.S. Fish and Wildlife Service and the Maryland Department of Natural Resources. This Integrated Natural Resources Management Plan was subsequently reviewed for operation and effect and updated appropriately. This Integrated Natural Resources Management Plan continues to meet the requirements of the Sikes Act Improvement Act (16 USC 670 et seq, as amended). The signatures below indicate plan approval and continued mutual agreement regarding the cooperative advancement of a fully-integrated ecosystem-based natural resources management program on the installations.

PLAN APPROVAL

Johnny M. Casiano
Colonel, U.S. Army
Commander, U.S. Army Garrison
Aberdeen Proving Ground, Maryland

2022 0926
Date

Wendy C. Messick
Garrison Manager
U.S. Army Garrison
Aberdeen Proving Ground, Maryland
Adelphi Laboratory Center, Maryland

MESSICK.WENDY.CLARICE.1045307286 Digitally signed by MESSICK.WENDY.CLARICE.1045307286 Date: 2022.06.29 15:45:49 -04'00'

6/29/22
Date

T. Joseph Copeland, PE, PMP
Director, Public Works
U.S. Army Garrison
Aberdeen Proving Ground, Maryland

OSBORNE.NICCO.1281812463 Digitally signed by OSBORNE.NICCO.1281812463 Date: 2022.06.29 17:41:09 -04'00'

6/29/22
Date

Vance G. Hobbs
Chief, Environmental Division
Directorate of Public Works
U.S. Army Garrison
Aberdeen Proving Ground, Maryland

KRYSTON.SARAH.LISA.1298181980 Digitally signed by KRYSTON.SARAH.LISA.1298181980 Date: 2022.06.29 13:26:40 -04'00'

6/29/22
Date

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AGENCY AGREEMENT

GENEVIEVE PULLIS
Digitally signed by GENEVIEVE PULLIS
Date: 2022.03.09 11:05:01 -05'00'

Genevieve LaRouche
Supervisor
Chesapeake Bay Ecological Service Field Office
U.S. Fish and Wildlife Service

_____
Date

TRIPARTITE AGREEMENT (3 of 3)

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AGENCY AGREEMENT

Paul A. Peditto
Director
Wildlife and Heritage Service
Maryland Department of Natural Resources

March 25, 2022
Date

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ANNUAL REVIEW AND COORDINATION PAGE

This page is used to certify the annual review and coordination of the Integrated Natural Resources Management Plan (INRMP) for the U.S. Army Garrison Aberdeen Proving Ground Adelphi Laboratory Center and Blossom Point Research Facility.

By their signatures below, the certifying official acknowledges that the annual review and coordination of the INRMP has occurred for the specified year.

APPROVING OFFICIALS for U.S. ARMY GARRISON ABERDEEN PROVING GROUND/ADELPHI LABORATORY CENTER/BLOSSOM POINT RESEARCH FACILITY REVIEW: 2023

Johnny M. Casiano _____
Colonel, U.S. Army
Commander, U.S. Army Garrison _____
Aberdeen Proving Ground, Maryland Date

Wendy C. Messick _____
Garrison Manager
U.S. Army Garrison _____
Aberdeen Proving Ground, Maryland Date
Adelphi Laboratory Center, Maryland

T. Joseph Copeland, PE, PMP _____
Director, Public Works
U.S. Army Garrison _____
Aberdeen Proving Ground, Maryland Date

Vance Hobbs _____
Chief, Environmental Division
Directorate of Public Works _____
U.S. Army Garrison Date
Aberdeen Proving Ground, Maryland

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APPROVING OFFICIALS for U.S. ARMY GARRISON ABERDEEN PROVING GROUND/ADELPHI LABORATORY CENTER/BLOSSOM POINT RESEARCH FACILITY REVIEW: 2024

Johnny M. Casiano _____
Colonel, U.S. Army
Commander, U.S. Army Garrison _____
Aberdeen Proving Ground, Maryland Date

Wendy C. Messick _____
Garrison Manager
U.S. Army Garrison _____
Aberdeen Proving Ground, Maryland Date
Adelphi Laboratory Center, Maryland

T. Joseph Copeland, PE, PMP _____
Director, Public Works
U.S. Army Garrison _____
Aberdeen Proving Ground, Maryland Date

Vance Hobbs _____
Chief, Environmental Division
Directorate of Public Works _____
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Aberdeen Proving Ground, Maryland

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APPROVING OFFICIALS for U.S. ARMY GARRISON ABERDEEN PROVING GROUND/ADELPHI LABORATORY CENTER/BLOSSOM POINT RESEARCH FACILITY REVIEW: 2025

Johnny M. Casiano _____
Colonel, U.S. Army
Commander, U.S. Army Garrison _____
Aberdeen Proving Ground, Maryland Date

Johnny M. Casiano _____
Garrison Manager
U.S. Army Garrison _____
Aberdeen Proving Ground, Maryland Date
Adelphi Laboratory Center, Maryland

T. Joseph Copeland, PE, PMP _____
Director, Public Works
U.S. Army Garrison _____
Aberdeen Proving Ground, Maryland Date

Vance Hobbs _____
Chief, Environmental Division
Directorate of Public Works _____
U.S. Army Garrison Date
Aberdeen Proving Ground, Maryland

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By their signatures below, the certifying official acknowledges that the annual review and coordination of the INRMP has occurred for the specified year.

APPROVING OFFICIALS for U.S. ARMY GARRISON ABERDEEN PROVING GROUND/ADELPHI LABORATORY CENTER/BLOSSOM POINT RESEARCH FACILITY REVIEW: 2026

Johnny M. Casiano _____
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Commander, U.S. Army Garrison _____
Aberdeen Proving Ground, Maryland Date

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Garrison Manager
U.S. Army Garrison _____
Aberdeen Proving Ground, Maryland Date
Adelphi Laboratory Center, Maryland

T. Joseph Copeland, PE, PMP _____
Director, Public Works
U.S. Army Garrison _____
Aberdeen Proving Ground, Maryland Date

Vance Hobbs _____
Chief, Environmental Division
Directorate of Public Works _____
U.S. Army Garrison Date
Aberdeen Proving Ground, Maryland

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EXECUTIVE SUMMARY

PURPOSE OF THE INRMP

Purpose and Scope

This Integrated Natural Resources Management Plan (INRMP) is the U.S. Army Garrison Aberdeen Proving Ground (APG) plan and management strategy for the conservation of natural resources on the Adelphi Laboratory Center (ALC) property in Prince George's and Montgomery Counties and the Blossom Point Research Facility (BPRF) in Charles County, Maryland. The plan covers natural resource management activities for the next five years (2022-2026), but the philosophy embedded in the plan is the foundation from which APG will continue to develop the natural resource management programs at ALC and BPRF beyond 2026. APG will conserve the biological diversity on its facilities and make sound decisions regarding the use of natural resources to support both the military mission and needs of the region and the nation.

The Sikes Act Improvement Act (SAIA) requires military installations in the United States to prepare an INRMP that provides for the following management activities, to the extent that such activities are consistent with the use of the base for military preparedness:

- The conservation and rehabilitation of natural resources on military installations;
- The sustainable multipurpose use of the resources, to include hunting, fishing, trapping, and non-consumptive uses; and
- Public access to the installation, subject to safety requirements and military security.

The SAIA requires preparation of INRMPs in cooperation with the U.S. Fish and Wildlife Service (USFWS), and the head of the appropriate state, territorial, or commonwealth fish and wildlife agency and, under 16 U.S.C. 670a(d)(2), priority shall be given to the entering into of contracts for the procurement of implementation and enforcement services with Federal, state, territorial, or commonwealth agencies having responsibility for conservation and management of fish or wildlife. The SAIA also states that the Department of Defense (DoD) may enter into cooperative agreements with states (territories or commonwealth), local governments, nongovernmental organizations, and individuals, and into interagency agreements with the heads of other Federal departments and agencies (16 U.S.C. 670c). In preparing this INRMP, as required by the SAIA as amended through 2010 (16 United States Code [U.S.C.] §670a et seq.), APG coordinated with the USFWS, Maryland Department of Natural Resources (MDNR) and National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) to ensure that the INRMP includes the appropriate aspects of each agency's requirements with respect to SAIA. The revisions made to update this INRMP are considered to be minor and will not result in biophysical consequences materially different from those anticipated in the existing 2015-2020 INRMP or analyzed in an existing Record of Environmental Consideration (REC). As a result, neither an additional National Environmental Policy Act (NEPA) analysis nor an opportunity for public comment was necessary for this INRMP update. A REC is included in **Chapter 6** of the INRMP.

BENEFITS OF INRMP IMPLEMENTATION

The INRMP provides APG with a single document that describes the state of natural resources and describes natural resources management on ALC and BPRF. The INRMP provides a concise analysis of all levels of the ecosystem, from the interaction of terrestrial and aquatic habitats with each other, to the management methods and goals for individual species. This larger picture provides a broader basis of understanding for planning and budgeting purposes.

IMPLEMENTATION OF THE INRMP

Primary Natural Resources Management Goals

The natural resources program structure has been developed based on installation-specific management situations and is designed to facilitate issue identification and prioritization, as well as project funding, implementation, and tracking. The resource-specific management programs addressed in this INRMP include the following:

- Natural Resources Management Program
- Threatened and Endangered Species Program
- Wetlands Management Program
- Fish and Wildlife Management Program
- Forestry Management Program
- Vegetative Management Program
- Invasive Species Management Program
- Integrated Pest Management Program
- Land Management Program (Soil Erosion)
- Geographic Information System
- Outdoor Recreation Program
- Wildland Fire Management Program
- Coastal Management Program
- Floodplain and Water Resources Management Program

Management issues for each of these programs have been identified and are discussed in the INRMP and provide the basis for the INRMP goals and objectives.

Goals and objectives have been established for the natural resources management programs to promote sustainability and enhance biodiversity (**Table ES-1**). The objectives developed for each goal represent the specific focus areas to achieve the established goals. Staffing, funding, and scheduling requirements for achieving the goals have also been established. The implementation of ten INRMP goals will not require a significant change in the management direction for ALC or BPRF; however, new projects are proposed for execution within this INRMP update.

All requirements set forth in this INRMP requiring the expenditure of APG funds are expressly subject to the availability of appropriations and requirements of the Anti-Deficiency Act

(31 USC section 1341). No obligation undertaken by APG under the terms of this INRMP will require or be interpreted to require a commitment to expend funds not obligated for a particular purpose.

Changes in Existing Management Practices

No changes in existing management practices are proposed under this INRMP update. However, it is recommended that APG continue current management activities and adapt as necessary for effective natural resource management and sustainability of the military mission.

Environmental Impacts of INRMP Implementation

No significant environmental impacts are anticipated as a result of INRMP implementation. APG employs a conscientious approach to environmental management. Natural processes are favored over human intervention under most circumstances. Implementation of the projects in this INRMP will help facilitate natural processes, and create direct, minor benefits for specific species and habitats. A REC is included to satisfy the NEPA requirements for the implementation of this INRMP.

Table ES-1. ALC/BPRF INRMP Goals and Objectives

Goal	Objective
Goal 1: Natural Resource Management Implement a natural resources management program that reflects the principles of ecosystem management and ensures the sustainability of the military mission.	Manage natural resources consistent with environmental laws, regulations and legislation, for Federal, State, DoD or Army rules.
	Use adaptive management strategies to protect, conserve and enhance native fauna and flora with an emphasis on priority species and native biodiversity enhancement.
Goal 2: Rare, Threatened and Endangered Species Ensure protection of federally listed threatened and endangered species and species of special concern and undertake management measures that support conservation and recovery of these species.	Identify and preserve these species in accordance with the Endangered Species Act (ESA), Endangered Species Recovery Plans, U.S. Army regulations and guidance, approved site-specific management plans, including Endangered Species Management Plans (ESMP).
	Protect unique plant species and habitat identified as rare statewide or locally, but without legal protection status, to the extent practical without restricting key mission operations.
Goal 3: Habitat Management Protect and enhance all habitats on ALC and BPRF, particularly sensitive and ecologically significant habitats, in a manner that promotes healthy, sustainable ecological communities.	Monitor all missions/activities for possible adverse impacts to soil resources, water quality and the ecological integrity of aquatic and terrestrial habitats. Adapt management as necessary.

Goal	Objective
Goal 4: Water Resources Protect the integrity of surface and groundwater resources and aquatic habitat to maintain and enhance biodiversity and protect water quality.	Protect aquatic and riparian resources by establishing and maintaining riparian management zones that limit activities within buffers zones around streams and wetlands to those activities that would cause little to no impact on water quality and aquatic habitats. Identify and restore degraded habitats when practical.
	Prevent the degradation of water quality from point and non-point sources of pollution to include sediments, nutrients, and chemical pollution.
	Achieve no net loss of wetlands.
	Protect and improve the stability and resiliency of the BPRF shoreline and prevent further loss of land.
Goal 5: Fish and Wildlife Maintain the diversity of species and habitats currently found at ALC and BPRF, restore and enhance degraded habitats where possible, and promote sustainable management of resources in a manner consistent with ecosystem management principles and the military mission.	Maintain fish and wildlife biodiversity, especially native species, through protecting present wildlife habitats from degradation. Reduce habitat fragmentation and restore native grassland, forest and wetland communities.
	Provide for migratory bird and bald eagle protection.
	Sustain healthy populations of game and nongame species at levels compatible with land use objectives and the military mission.
Goal 6: Forest Resources Conserve and manage forest resources in a sustainable fashion that maintains biodiversity, ecological functions and values, as well as the military mission.	Protect forest resources from unacceptable losses to damage agents and degradation resulting from insects and disease, invasive species, and wildfire.
	Carry on the objective of forest resources management at BPRF for an optimum combination of uses (multiple-use management) including: - Wildlife habitat preservation and enhancement; - Wetland, watershed, and groundwater protection; - Possible timber production; - Protection of the shoreline and natural resources in support of the Chesapeake Bay Action Plan; - Preservation of existing historical and cultural resources.

Goal	Objective
Goal 7: Pest and Invasive Species Manage and prevent the spread of pests and invasive species that threaten habitat and native species.	Employ judicious use of both non-chemical and chemical control techniques to achieve effective pest management with minimal environmental consequence.
	Identify, monitor and control invasive and pest species and habitat.
	Carry on pest management priorities at ALC and BPRF to include control of disease vectors, protection of real estate, control of nuisance pests, control of undesirable vegetation, protection of beneficial plants, and control of miscellaneous animal pests (such as birds, rodents, and other mammals).
Goal 8: Soil Resources Manage soil resources in a sustainable manner and protect soils from erosion and destabilization through preventative and restoration efforts and prevent potential soil erosion impacts on water quality, habitat quality, and mission objectives.	Monitor soils regularly for erosion and address problem areas as appropriate.
	Protect soil resources from disturbances from earth-moving activities, construction and natural erosive forces through use of best management practices (BMPs).
	Use native species for erosion control.
Goal 9: Community Outreach Encourage relationship with the local community on ALC and BPRF, as appropriate, without interruption to the military mission.	Continue to provide outdoor recreational opportunities to the extent that they do not conflict with the military mission or compromise environmental values.
	Make a positive contribution to local conservation efforts and the community by participating in educational opportunities and providing information on issues affecting ALC, BPRF and the region.
Goal 10: Fire Management The primary goal for fire management at ALC and BPRF is to prevent unacceptable losses to military property from wildfire.	Implement appropriate wildfire prevention and suppression measures.

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INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

U.S. ARMY GARRISON ABERDEEN PROVING GROUND ADELPHI LABORATORY CENTER AND BLOSSOM POINT RESEARCH FACILITY

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1.0 INTEGRATED NATURAL RESOURCE MANAGEMENT PLAN OVERVIEW

1.1 PURPOSE

The purpose of the U.S. Army Garrison Aberdeen Proving Ground (APG) 2022-2026 Integrated Natural Resource Management Plan (INRMP) is to guide the conservation and management of natural resources at the Adelphi Laboratory Center (ALC) in Adelphi, which is within Prince George's and Montgomery Counties, Maryland and Blossom Point Research Facility (BPRF) outside of La Plata on Cedar Point Neck, Charles County Maryland. This INRMP supports the installations' commitment to sustaining a healthy environment in which to carry out its mission. It outlines conservation efforts for the natural resources at ALC and BPRF and will aid in ensuring compliance with applicable environmental laws and regulations. This INRMP is an update of the 2015-2020 INRMP for ALC and BPRF and will guide natural resource management at ALC and BPRF from 2022 through 2026, and provide a solid foundation on which to build the program beyond the year 2026. The INRMP is consistent with the Sikes Act Improvement Act (SAIA) and guidance and regulations provided in Department of Defense (DoD) Instruction (DoDI) 4715.03 (Natural Resources Conservation Program) and DoD Manuel (DoDM) 4715.03 (Integrated Natural Resources Management Plan Implementation Manual).

1.2 SCOPE

This INRMP is the foundation for ecosystem- or landscape-level management of the natural resources at ALC and BPRF. It provides comprehensive elements for use by installation managers to implement management measures to enhance and maintain biodiversity and sustainability through an ecosystem approach while supporting mission requirements. Implementation of this plan applies to organizations both internal and external to ALC and BPRF that influence, or have the potential to influence ALC's and BPRF's natural resources, directorates, mission partners, contract personnel, installation residents and their dependents, private groups, and individuals. This INRMP is an integral part of the installations' Environmental Goals and is intended to be used when planning activities that may affect natural resources located on and adjacent to the ALC and BPRF properties.

1.3 GOALS AND OBJECTIVES

The primary goal of the INRMP is to ensure that natural resources are managed to maintain ecosystem viability and ensure the sustainability of military lands and support the military mission. This goal can be achieved through the integration of the military mission activities and the natural resource management program described in this INRMP. ALC has established ten natural resource management program goals with associated objectives which are outlined in **Table 1-1** below.

Table 1-1. ALC/BPRF INRMP Goals and Objectives

Goal	Objective
Goal 1: Natural Resource Management Implement a natural resources management program that reflects the principles of ecosystem management and ensures the sustainability of the military mission.	Manage natural resources consistent with environmental laws, regulations and legislation, for Federal, State, DoD or Army rules.
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Goal 10: Fire Management The primary goal for fire management at ALC and BPRF is to prevent unacceptable losses to military property from wildfire.	Implement appropriate wildfire prevention and suppression measures.

1.4 RESPONSIBILITIES

1.4.1 Installation Stakeholders

The APG Garrison Commander is directly responsible for operating and maintaining ALC and BPRF, including the implementation and enforcement of this INRMP. The support of the Director of the Army Research Laboratory (ARL) (the major tenant at ALC) and the Director of the Public Works Directorate (DPW) is a critical component of the implementation of this INRMP and integration of natural resources management and the military mission. The ALC Garrison Manager provides day to day oversite of ALC and BPRF.

The DPW maintains an Environmental Division which is responsible for the environmental programs at APG, ALC and BPRF including the management of compliance operations, hazardous waste, environmental restoration, and cultural and natural resources. The Chief of the Environmental Division is responsible for the supervision of all components of the ALC and BPRF natural resources programs. Cultural resources and natural resources staff (teams) are combined into the Environmental Integration Branch.

Implementation of this INRMP requires assistance and support from other Garrison directorates and offices. This includes the Environmental Compliance Branch (e.g., air quality, sediment and

erosion control, stormwater management), DPW Operations and Maintenance (e.g., Pest Control and Grounds Maintenance Contracts), DPW Master Planning (e.g., GIS support, map creation), and the Staff Judge Advocate (e.g., legal reviews).

1.4.2 External Stakeholders

1.4.2.1 U.S. Fish and Wildlife Service (USFWS)

The USFWS is a signatory agency of installation INRMPs in accordance with the Sikes Act. The DoD and Army also consult formally and informally with the USFWS on endangered species and wetland issues, pursuant to applicable legislation including the ESA and Clean Water Act (CWA). The office with responsibility for ALC and BPRF is the USFWS Chesapeake Bay Field Office in Annapolis, Maryland. The USFWS is a signatory cooperator in implementation of this INRMP.

1.4.2.2 Maryland Department of Natural Resources (MDNR)

MDNR oversees the management and use of the state's forests and parks, fisheries, and wildlife. It has statewide responsibilities for assessing and restoring water quality and habitat, managing and regulating recreational boating, fishing and hunting, and managing wetlands, wildlife, and rare, threatened, and endangered species.

MDNR has a Natural Heritage Program as part of a Natural Heritage Network. The heritage program maintains the most comprehensive databases on state rare plant and animal species and natural communities. This information helps guide natural resource management to protect and conserve state-listed rare, threatened or endangered species. The MDNR is a signatory cooperator in implementation of this INRMP.

1.4.2.3 National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS)

The NOAA Fisheries provides guidance concerning the conservation, protection, and management of off-shore living marine resources and their habitats. APG coordinated with the NOAA Fisheries for the revision of the INRMP and for any threatened and endangered species and Essential Fish Habitat coordination as needed.

1.5 AUTHORITY

Preparation and implementation of this INRMP is required by the Sikes Act (16 U.S. Code [USC] 670a *et seq.*), DoDI 4715.03 (*Natural Resources Conservation Program*) (DoD, 2011), Army Regulation (AR) 200-1 (*Environmental Protection and Enhancement*) (DA, 2007), and Army Memorandum (21 March 1997), *Army Goals and Implementing Guidance for Natural Resources Planning Level Survey (PLS) and Integrated Natural Resources Management Plans (INRMP)* (DA, 1997). This INRMP was initially prepared using the *Integrated Natural Resources Management Plan Template* instituted by the DoD in 2006 (DA, 2006). It has been revised per

DODM 4715.03. Additional DoD reference materials used in the development of this INRMP and will be referenced throughout the implementation of this INRMP include the *Best Practices for INRMP Implementation* (Horne Engineering Services, Inc., 2005) and *Conserving Biodiversity on Military Lands: A Guide for Natural Resources Managers* (The Nature Conservancy, 2008).

This INRMP has been developed in accordance with the Sikes Act and DoD policies and directives and is the primary mechanism for compliance with natural resources laws and regulations. Federal, state and local laws and regulations, as well as DoD and Army directives may apply to proposed management actions within this INRMP. The following sections describe other laws and policies that guided the development of this INRMP.

1.5.1 The Sikes Act

Under the Natural Resource Management on Military Lands Act of 1960, commonly known as the Sikes Act,

> "The Secretary of Defense shall carry out a program to provide for the conservation and rehabilitation of natural resources on military installations. To facilitate the program, the Secretary of each military department shall prepare and implement an integrated natural resources management plan for each military installation in the United States under the jurisdiction of the Secretary. Consistent with the use of military installations to ensure the preparedness of the Armed Forces, the Secretaries of the military departments shall carry out the program to provide for the conservation and rehabilitation of natural resources on military installations; the sustainable multipurpose use of the resources, which shall include hunting, fishing, trapping, and non-consumptive uses; and subject to safety requirements and military security, public access to military installations to facilitate the use."

Per 16 USC 670a(b) of the SAIA of 2004, to the extent appropriate and applicable, this INRMP provides for the following:

- Fish and wildlife management, land management, forest management, and fish- and wildlife-oriented recreation.
- Fish and wildlife habitat enhancement or modifications.
- Wetland protection, enhancement, and restoration, where necessary for support of fish, wildlife, or plants.
- Integration of, and consistency among, the various activities conducted under the plan.
- Establishment of specific natural resources management goals and objectives and time frames for proposed action.
- Sustainable use by the public of natural resources to the extent that the use is not inconsistent with the needs of fish and wildlife resources.

- Public access to the military installation that is necessary or appropriate for the use described above, subject to requirements necessary to ensure safety, military security, and fulfillment of the military mission.

- Enforcement of applicable natural resources laws (including regulations).

- No net loss in the capability of military installation lands to support the military mission of the installation.

When fully coordinated with appropriate federal and state agencies, this INRMP fulfills the SAIA as amended though 2018 (16 USC 670 et seq.). The SAIA requires military installations in the United States to prepare an INRMP that provides for the following management activities, to the extent that such activities are consistent with the use of the installation for military preparedness:

1) The conservation and rehabilitation of natural resources on military installations;

2) The sustainable multipurpose use of the resources, to include hunting, fishing, trapping, and non-consumptive uses; and

3) Public access to the installation, subject to safety requirements and military security.

1.5.2 National Environmental Policy Act

The National Environmental Policy Act (NEPA) requires analysis and evaluation of environmental impacts created by proposed major federal actions. 32 Code of Federal Regulations (CFR) Part 651 (Environmental Analysis of Army Actions, Federal Register Vol. 67, No. 61, July 1, 2002) and the Council on Environmental Quality (CEQ) (Implementing Guidelines for NEPA, 40 CFR Parts 1500-1508) recommend a Record of Environmental Consideration (REC) be completed for natural resources management plans that have previously been evaluated through an Environmental Assessment (EA) and where no major changes are proposed in the INRMP. NEPA compliance requirements of proposed Army actions are outlined in 32 CFR Part 651.

NEPA requires Federal agencies to consider environmental consequences of major proposed actions. The NEPA documentation for this updated INRMP is in the form of a REC (**Chapter 6**), and analyzes the potential consequences of the implementation of this INRMP. Recognizing the efficiencies and benefits associated by combining this INRMP and its associated NEPA documentation into one document, this plan has been developed to satisfy both requirements. The INRMP has been reorganized from Army Guidelines to accommodate NEPA documentation within the plan.

1.5.3 Endangered Species Act

This INRMP has the signatory approval of the USFWS. This signature approval includes agreement that the INRMP complies with the ESA. Review of the INRMP comprises an informal

consultation with regard to the ESA. Consultation was also conducted with the National Marine Fisheries Service (NMFS) for endangered marine species under its authority and potentially found in the vicinity of BPRF.

Per provisions of the 2004 National Defense Authorization Act, this INRMP "provides a benefit to the species for which critical habitat is proposed for designation." The USFWS policy [ESA Section 4(a)(3)(B)(i)] states that, where applicable, federal critical habitat designation is not warranted if the INRMP includes certain criteria, which are summarized in **Section 3.2.1,** Endangered Species Act and **Section 4.2,** Threatened and Endangered Species Management.

1.5.4 Department of Defense Directive 4715.1E: Environment, Safety, and Occupational Health (ESOH)

The 30 December 2019 DoD Directive regarding Environment, Safety, and Occupational Health (ESOH) establishes policies to sustain and improve the military mission by managing installations' assets, including natural infrastructure. Natural infrastructure is defined as all natural resources (air, water, and land) that the DoD operates in or controls.

1.5.5 Department of Defense Instruction 4715.03: Natural Resources Conservation Program and DoD Manuel 4715.03 Integrated Natural Resources Management Plan Implementation Manual

This updated INRMP was prepared in accordance with DoDI 4715.03 and DoDM 4715.03. DoDI 4715.03 prescribes procedures for integrated management of natural and cultural resources, including preparing an INRMP as required by the SAIA. DoDI 4715.03 also states that "INRMPs shall be prepared, maintained, and implemented for all lands and waters under DoD control that have suitable habitat for conserving and managing natural resources."

DoDM 4715.03 is a manual that establishes implementing guidance to manage DoD's natural resources for mission and stewardship purposes.

1.5.6 Deputy Under Secretary of Defense Sikes Act Policy Memorandum

The 10 October 2002 Deputy Under Secretary of Defense (DUSD) memorandum regarding the *Implementation of Sikes Act Improvement Act: Updated Guidance* defines requirements and expectations associated with USFWS and State natural resources agency coordination, DoD reporting, implementation and funding, and other miscellaneous requirements, such as no net loss to military lands and cooperative agreements.

1.5.7 Department of Defense Guidance, Implementation of Sikes Act Improvement Amendments: Supplemental Guidance Concerning INRMP Reviews

The DoD Supplemental Guidance, dated November 1, 2004 provided additional clarification of DoD policy regarding the review and revision of INRMPs. This guidance states that, while the

Sikes Act specifies that INRMPs must be reviewed "on a regular basis, but not less often than every 5 years," not all INRMP reviews require a revision each 5-year period. The SAIA specifically directs that an INRMP should be reviewed "as to operation and effect," emphasizing that the review is intended to determine whether the existing implemented INRMP meets the requirements of the SAIA and contributes to the conservation and rehabilitation of natural resources on the installation. If it is determined that an existing INRMP is adequate, then a revision is not needed. Further, the review must be performed by the "parties," meaning the installation, the USFWS, and the state regulatory agency (MDNR in this case).

The guidance also reiterates that, although the Sikes Act specifies only that a formal review must be completed no less often than every 5 years, DoD policy requires installations to review INRMPs annually in cooperation with the other parties to the INRMP. Annual reviews facilitate "adaptive management" by providing an opportunity for the parties to review the goals and objectives of the plan, as well as establish a realistic schedule for undertaking proposed actions.

1.5.8 Army Regulation 200-1: Environmental Protection and Enhancement

The Army's commitment to the conservation of its natural resources is further reflected in AR 200-1, *Environmental Protection and Enhancement*. AR 200–1 requires the preparation of INRMPs and prescribes Army policies, procedures, and standards for the "conservation, management, and restoration of land and the renewable natural resources on it, consistent with and in support of the military mission."

1.5.9 32 Code of Federal Regulations Part 651: Environmental Effects of Army Actions

32 CFR Part 651 "implements the NEPA of 1969, setting forth the Army's policies and responsibilities for the early integration of environmental considerations into planning and decision-making." 32 CFR Part 651 codified the former AR 200-2 into Federal regulation. As described in **Section 1.5.2** above, and stated in §651.14, "The Army goal is to concurrently integrate environmental reviews with other Army planning and decision-making actions, thereby avoiding delays in mission accomplishment. To achieve this goal, proponents shall complete NEPA analysis as part of any recommendation or report to decision makers prior to the decision (subject to 40 CFR 1506.1). Early planning (inclusion in Installation Master Plans, INRMPs, Integrated Cultural Resources Management Plans (ICRMPs), Acquisition Strategies, strategic plans, etc.) will allow efficient program or project execution later in the process." To meet this end, the NEPA requirements are integrated within this INRMP, in the form of a REC (**Chapter 6).**

1.5.10 Headquarters, Department of the Army INRMP Policy Memorandum, 21 March 1997

Headquarters, Department of the Army (HQDA) INRMP Policy Memorandum (21 March 1997) entitled *Army Goals and Implementing Guidance for Natural Resources Planning Level Surveys (PLS) and Integrated Natural Resources Management Plan (INRMP)*. The INRMP Policy Memorandum states that the purpose for completing planning-level surveys and the INRMP is "to

ensure that natural resource conservation measures and Army activities on mission land are integrated and are consistent with federal stewardship requirements" (HQDA, 1997).

1.6 STEWARDSHIP AND COMPLIANCE

The Army Strategy for the Environment is based on the concept of sustainability and is designed to sustain the Army now and into the future. This Strategy transitions the Army's compliance-based environmental program to a mission-oriented approach based on the principles of sustainability. A sustainable Army simultaneously meets current as well as future mission requirements worldwide, safeguards human health, improves quality of life, and enhances the natural environment (U.S. Army, 2020).

APG is committed to sustainability through the implementation of this INRMP, which identifies goals and objectives that not only meet compliance requirements but also consider environmental stewardship responsibilities in managing natural resources and mission activities. Stewardship projects such as community outreach through the hunting program, habitat conservation through riparian buffers, and monitoring mission impacts on soils and habitat go beyond compliance requirements to preserve and manage natural resources for the future.

The SAIA encourages environmental stewardship by fostering an open dialogue between facilities and the Federal and state resource agencies. It is the goal of this open dialogue to engender understanding between the parties and stimulate discussion and ideas for better implementation of natural resources protection and enhancement measures at the installation. This openness also helps ensure that stewardship considerations are integrated into planning and analysis for activities and actions at the installation. The Command and staff of APG are committed to environmental stewardship as an integral part of the mission at ALC and BPRF installations. This commitment is evidenced by support of past environmental programs and their full support of this INRMP. It is important to understand the relationship between the natural resources program and the ARL military mission, which is paramount in developing and implementing this INRMP.

1.7 REVIEW AND REVISION PROCESS

In accordance with the SAIA, ALC is required to work with the USFWS and MDNR to regularly review and revise this INRMP, as necessary, at least once every five years. It is DoD policy that ALC invite the USFWS and MDNR to evaluate the effectiveness of the INRMP to determine whether it is being implemented to meet the requirements of the SAIA and contribute to the conservation and restoration of natural resources on military installations.

DoD Instruction 4715.03 also requires the installation to internally review this INRMP annually and revise as necessary. Annual revisions could include any new environmental compliance requirements, changes in the military mission or installation policy, or other new information that would significantly affect the ability of the installation to implement the INRMP. If the installation mission or its natural resources management issues change significantly from those outlined in the original plan, an INRMP revision, to include coordination with the USFWS and MDNR will be required. As part of the INRMP annual review and coordination process, the Chief of the

Environmental Division will make the determination if an INRMP revision is required. A signature page is included in the front of the INRMP to facilitate the annual review.

1.8 MANAGEMENT STRATEGY

While the purpose of this INRMP is to integrate natural resources management and the military mission, the strategy for accomplishing this is an ecosystem-based approach. ALC uses this strategy to comprehensively manage natural resources, as many natural resources are interdependent on each other. A direct impact on a natural resource by an activity under the military mission may indirectly influence several other resources within that ecosystem. The ecosystem-based approach allows natural resource managers to more effectively manage military mission activities to minimize impacts or even enhance the natural resources, and thus the ecosystems, found on their installation.

Ecosystem-based management requires open communication and education of those performing mission-related activities such as training and testing. All parties involved with land activities, have a role in ecosystem management. Coordination with USFWS and MDNR can also enhance the ability of ALC to effectively manage the ecosystems and contribute to environmental stewardship within the larger ecosystems of the state of Maryland.

The goals and objectives outlined in this INRMP (see **Section 1.3**) serve as the guide for ecosystem-based management on ALC. Natural resources management projects and daily land management activities that work towards meeting these goals will result in successful ecosystem management.

1.9 OTHER PLAN INTEGRATION

While this INRMP is developed for the natural resources management on ALC and BPRF, the successful implementation of this INRMP requires integration of other management and mission plans on ALC. The development of this INRMP includes integration of other installation plans, Federal and state regulations and documents that directly or indirectly influence the management of natural resources on ALC. Internal installation stakeholders were consulted and involved in the development of the natural resources program, to ensure this INRMP is implemented and supported across the installation. **Table 1-2** includes a list of ALC plans and Federal and state laws that were incorporated into this INRMP.

Table 1-2. ALC Plans and Federal and State Law Integration Through The INRMP

Specific Plans and Laws	Sections
National Environmental Policy Act	Section 3.3, Chapter 6
Maryland State Wildlife Action Plan	Section 3.7
Clean Water Act	Section 3.2.6, 4.3, 4.19
Endangered Species Act	Section 3.2.1, 4.2
Migratory Bird Treaty Act	Section 3.2.3, 4.8
Bald Eagle Management Plan and Bald and Golden Eagle Protection Act	Section 3.2.2, 4.8

Essential Fish Habitat	Section 3.2.4
Coastal Zone Management Act	Section 3.2.5, 4.18
Integrated Pest Management Plan	Section 4.9, 4.10
Forest Management Plan	Section 4.6
Integrated Wildland Fire Management Plan	Section 4.16

2.0 CURRENT CONDITIONS AND USE

2.1 INSTALLATION INFORMATION

2.1.1 General Description

ALC

ALC (Latitude 39 -1'-45"N, Longitude 76 -58'-19"W) is located in Adelphi, Maryland (**Figure 2-1**). The site straddles the border between two Maryland jurisdictions, Prince George's and Montgomery Counties. Of the total 207-acre area, 84 acres are within Montgomery County and 123 acres are within Prince George's County. ALC is approximately six miles from the District of Columbia. The installation is located within one mile of the Capital Beltway (Interstate 495) and Interstate 95 (I-95). ALC lies in the Anacostia River drainage basin which is a tributary of the Potomac River. It is bordered by residential areas on the east and south and by the General Service Administration's Federal Center on the north and west. ALC consists of four main building areas with parking lots, forested lands and two stream corridors, Paint Branch and Hillandale Tributary.

BPRF

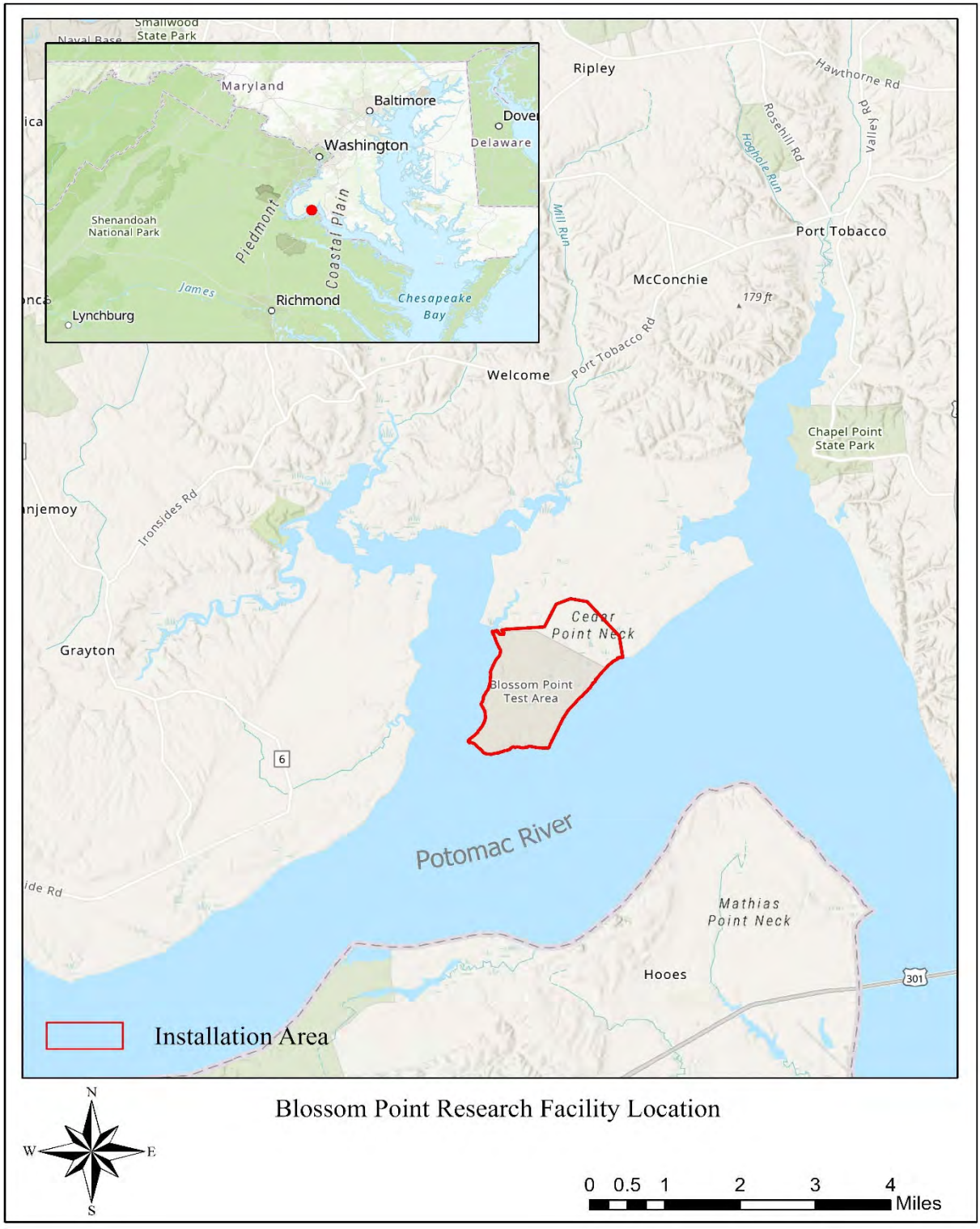
BPRF (Latitude 38 -24 -50"N, Longitude 77 5 -50"W) occupies approximately 1,600 acres on Cedar Point Neck in southern Charles County, Maryland (**Figure 2-2**). It is located approximately 65 miles southeast of ALC. BPRF is approximately 35 miles south of the District of Columbia. The closest town is La Plata, Maryland, which is approximately nine miles northeast of the facility. BPRF is situated on Cedar Point Neck, a peninsula on the north side of the Potomac River and is bounded on three sides by the Potomac and Nanjemoy Creek. The area to the north of the facility includes sparsely populated agricultural and forest lands. BPRF is largely forested with wetlands, open fields, testing areas, and a few buildings.

2.1.2 Regional Land Use

ALC

ALC is located adjacent to Hillandale, Maryland, a surburban residential community. The land adjacent to the installation has a variety of land use designations. The General Services Administration (GSA) owns a large business complex adjacent to ALC to the north and slightly west, which is the headquarters for the U.S. Food and Drug Administration (USFDA). Areas to the east and south of the installation are primarily rural and suburban residential in nature. Paint Branch Park is immediately south of the installation. Prince George's and Montgomery Counties are highly urbanized areas surrounding Washington, D.C. ALC is located just outside the Capital Beltway, which is heavily developed by government agencies, business complexes, commercial areas, and residential communities. Within the area of ALC, there are also several greenways along stream corridors; the greenway for Paint Branch is adjacent to ALC as Paint Branch flows through the installation.

Figure 2-1. Location of ALC



Blossom Point Research Facility Location

Figure 2-2. Location of BPRF

BPRF

BPRF is located on the Cedar Neck Point, a peninsula adjacent to agricultural lands. Charles County is located in southern Maryland between the Patuxent and Potomac Rivers. This county is largely comprised of agricultural lands and forest lands with some residential and urban development. The area surrounding BPRF is presently zoned for a mixture of agricultural and rural residential uses. Most of the land north of the facility has been designated as an "Agricultural Conservation District." The Charles County Comprehensive Master Plan uses this classification to specify property on which only one residential dwelling per every five acres can be placed. This low-density designation is intended to preserve the existing farmland resources and the agricultural economy of the county. The shoreline along Cedar Neck Point, not including the portion on BPRF, is designated as a "Resource Protection District." This land use classification carries restrictions on new development at one residential dwelling per every 20 acres. This area was classified in compliance with the State of Maryland's Chesapeake Bay Critical Area Law.

2.1.3 History and Pre-Military Land Use

ALC

The region that includes ALC has been inhabited since at least 10,000 BC. During the early 17th century, the region was inhabited predominately by the Algonquin-speaking Piscataway people. During the late 17th century, the Iroquois-speaking Susquehannock predominated in the Chesapeake area. The colony of Maryland was established in 1634 and Prince George's County was established in 1696. Montgomery County was separated from Frederick County in 1776. The ALC area was historically agricultural. As in most of the Chesapeake Tidewater area, tobacco was the most important cash crop and was grown on both large and small plantations. Multiple cropping became more common after the American Revolution, as the soils were depleted of nutrients essential for large-scale tobacco farming.

After the Civil War, the plantations and tobacco-related economy, which had been dependent on slave labor, declined. The area remained largely rural and agricultural into the mid-20th century, with small towns such as Bladensburg and Beltsville serving the agricultural population as localized market and distribution centers. In the late 19th century, a suburban corridor serving the District of Columbia began to develop from the village centers along the railroad line and, later, street car lines that ran north and east of the city.

In 1944, the Naval Ordnance Laboratory (later the Naval Surface Warfare Center (NSWC)) was established on a 732-acre (296 ha) site, five miles north of Washington DC. In the early 1970s, ALC was designed and constructed on a 137-acre (55.4 ha) parcel of the original Naval site and the ALC property acquired an adjoining 30-acre (12.1 ha) parcel, referred to as Site W, from the NSWC.

BPRF

Prior to being acquired by the Army, BPRF was owned by the Corporation of Roman Catholic Clergymen of Maryland. In November 1942, the National Bureau of Standards (NBS) leased the southern portion of Cedar Point Neck from the Catholic Church for fuse and ordnance testing. This activity was transferred from the NBS to the Department of the Army (DA) in 1953. In June 1980, the DA bought the land from the Catholic Church.

2.1.4 Military Mission

The mission of APG is to provide test and test support services for authorized customers, within DoD and outside DoD, including government and non-government organizations, domestic and foreign. APG provides comprehensive test and training both real and simulated; provides expert knowledge and technical services including instrumentation application, facility operations, manufacturing and fabrication; exploits emerging technologies; and develops leading edge instrumentation and test methodologies.

ALC

ALC is home to the Headquarters for ARL. ARL provides America's Soldiers a technological edge through scientific research, technology development, and analysis (U.S. Army, 2004). The mission of ARL is to provide the underpinning science, technology, and analysis that enable full-spectrum operations. The Laboratory also provides critical analysis on existing developmental weapon systems, with emphasis on factors such as survivability, lethality, man-machine interface, and battlefield environmental effects. The ARL is unique because it serves as one of the few Army Laboratories that provides highly advanced, specialized, and one-of-a-kind research facilities. The laboratory works in a variety of technical disciplines, through direct in-house laboratory efforts and joint programs with government, industry, and academia.

The mission of ALC is to support innovative science and technology by providing service and infrastructure while optimizing resources, sustaining the environment, and enhancing the well-being of the Army's workforce and community.

BPRF

BPRF is a satellite installation of ALC and serves as a primary test facility for fuses, explosive and pyrotechnic devices, telemetry systems, drones, and lasers. In addition, BPRF tests firing, recovery, and disassembly of explosive-loaded, fused projectiles for rockets, mortars, and cannons. The explosive testing facilities at BPRF are also available to other interested parties. The U.S. Naval Research Laboratory also holds a lease on 291 acres for Project Vanguard, a long-range communications tracking station for satellites.

2.1.5 Operations and Activities

ALC

Most of the operations and activities on ALC occur within buildings and do not impact natural resources. ALC contains a helipad, but it is seldom used.

BPRF

BPRF is used for testing and training activities that include ranges and other open space. These operations and activities are limited to the open areas and meadows and avoid sensitive areas such as forested lands, wetlands, and surface water resources. Unexploded ordnance is a concern at BPRF and munitions of concern can be found on the site, which is being addressed through the Military Munitions Response Program (MMRP).

2.1.6 Constraints Map

ALC

Natural resource constraints on the mission at ALC include wetlands, Paint Branch and Hillandale Run and their respective floodplains, steep slopes, and forested land that provides habitat for forest interior dwelling bird species. Powder Mill Bog (PMB), located south of Floral Drive, potentially supports habitat for two state-endangered species, Long's rush (*Juncus longii*) and capitate beakrush (*Rhynchospora cephalantha*), and any impacts to hydrology or plant species within this bog must be avoided per MDE. MDE enforces a 25-foot buffer on all non-tidal wetlands where any disturbance should be avoided or mitigated. Riparian buffers to protect water quality and brown trout (*Salmo trutta*) habitat may also limit activity within 200-feet of Paint Branch and 150-feet of tributaries to Paint Branch. **Figure 2-3** illustrates these natural resources constraints on ALC. While most of the operations and activities occur within the existing buildings, these constraints do not currently impact the military mission at ALC. However, future development may be constrained by these natural resources.

BPRF

There are several natural resource constraints on the mission at BPRF as much of the facility consists of wetlands, forests, and quality fish and wildlife habitat. There are bald eagle (*Haliaeetus leucocephalus*) nests that are protected under the Federal Bald and Golden Eagle Protection Act. Waterfowl habitat and terrapin and horseshoe crab spawning habitat also exist on this site. Much of the facility is within Maryland's Critical Area. Mission activities must avoid impacts to wetlands and the 100-foot buffer on tidal waters and wetlands; submerged aquatic vegetation; forest habitat for forest interior dwelling bird species; bald eagle nests and habitat; and fish and wildlife habitat. **Figure 2-4** illustrates these natural resource constraints on the mission at BPRF.

2.1.7 Opportunities Map

ALC

Opportunities for mission-related activities on ALC are limited to the existing developed areas and potentially the immature hardwood forested areas. **Figure 2-5** illustrates these opportunity areas at ALC.

BPRF

Opportunities for mission-related activities on BPRF are limited to the existing developed areas and potentially the open fields and meadows outside of the Critical Area. **Figure 2-6** illustrates these opportunity areas at BPRF.

2.2 GENERAL PHYSICAL ENVIRONMENT AND ECOSYSTEMS

2.2.1 Climate

ALC

Summers at ALC are dominated by prevailing winds from the south and southwest which bring warm and humid conditions to the region. Warmest temperatures occur in July with a mean monthly temperature of 76.2 degrees Fahrenheit (°F), or 24.6 degrees Celsius (°C). Cold and dry winds from the northwest dominate the winter months. Coldest temperatures occur in January with a mean monthly average temperature of 33.7 °F (1 °C). The mean annual temperature is approximately 55 °F (13 °C) (NOAA, 2021).

Precipitation events occur evenly throughout the year and bring an average of 44 inches of precipitation to the region. Thunderstorms occur on an average of 30 to 35 days each year; two-thirds of which occur during the months of June, July, and August. The quantity of snowfall in the region varies widely from year to year but averages approximately 19 to 20 inches annually. Normal relative humidity ranges from 50 to 80 percent and typically peaks just before sunrise.

BPRF

Prevailing winds from the south and southwest bring warm and humid conditions to BPRF during the summer months. Warmest temperatures occur in July with a mean monthly temperature of 89 °F, or 32 °C. Cold and dry winds from the northwest dominate the winter months. Coldest temperatures occur in January, with a mean monthly average temperature of 21 °F. The mean annual temperature is approximately 45 °F (HDL, 1983).

Precipitation events occur evenly throughout the year and bring an average of 47 inches of precipitation to the region. Thunderstorms occur, on average, 35 days each year; 70 percent of which occur during the months of May through August. Snowfall varies, but generally averages

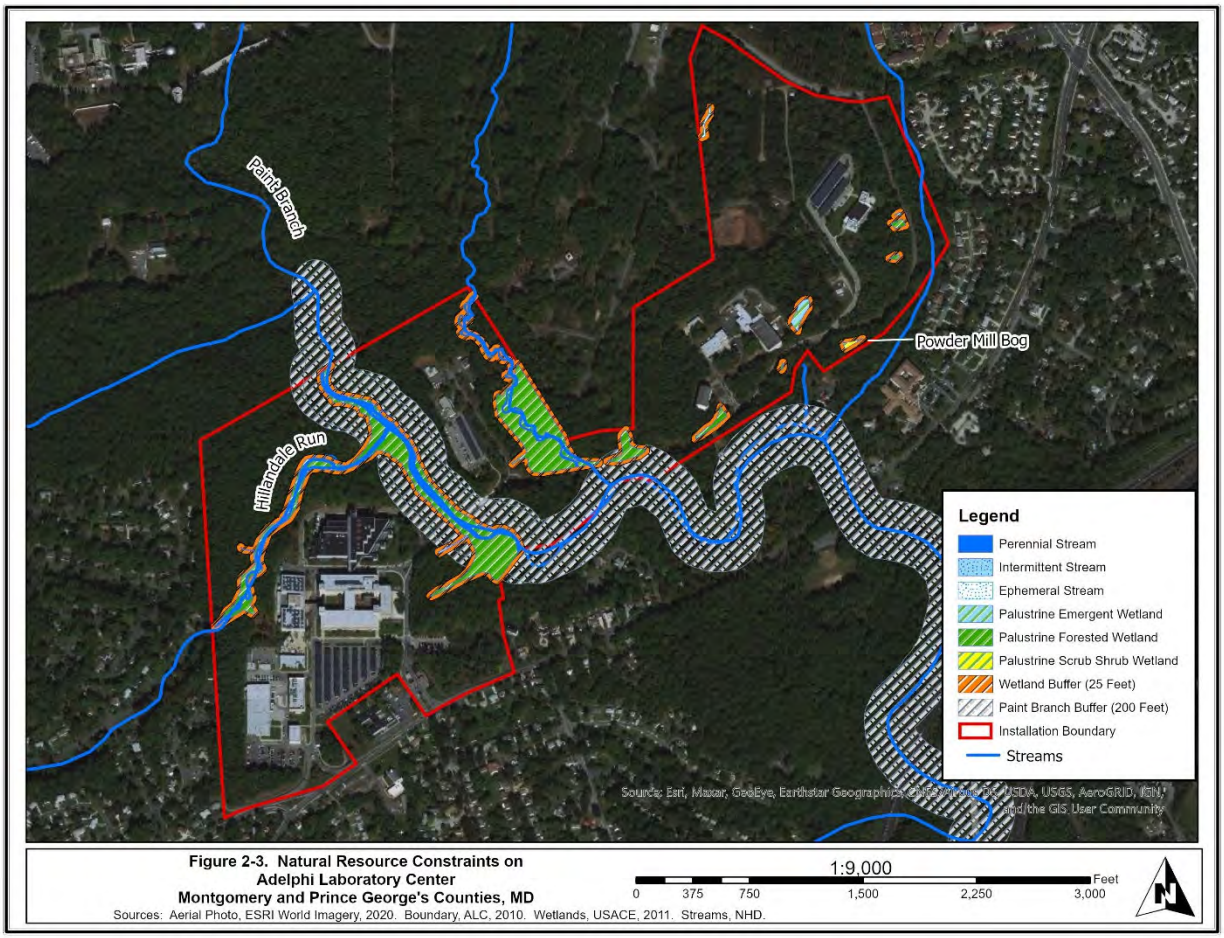


Figure 2-3. Natural Resource Constraints on ALC

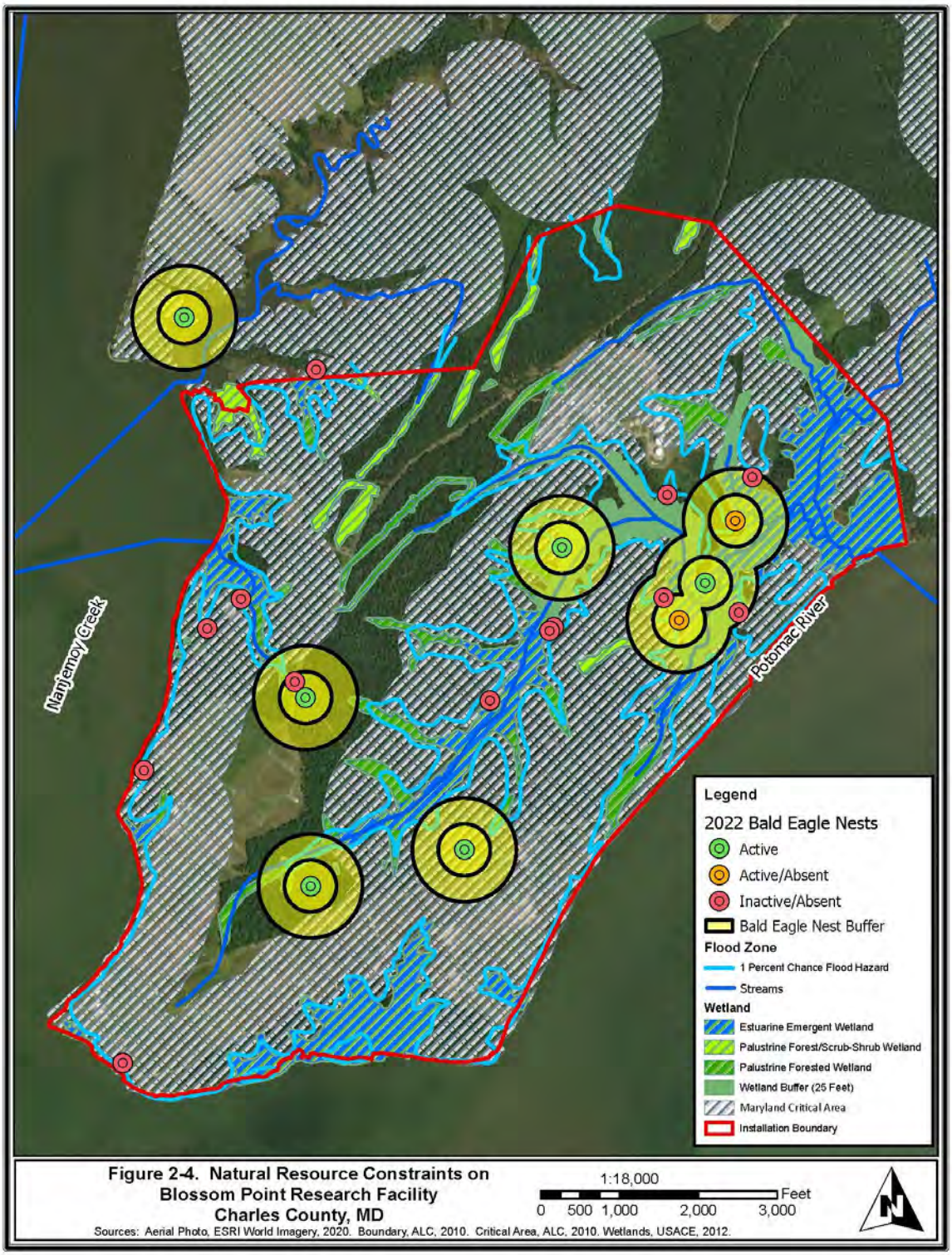


Figure 2-4. Natural Resource Constraints on BPRF

For Official Use Only

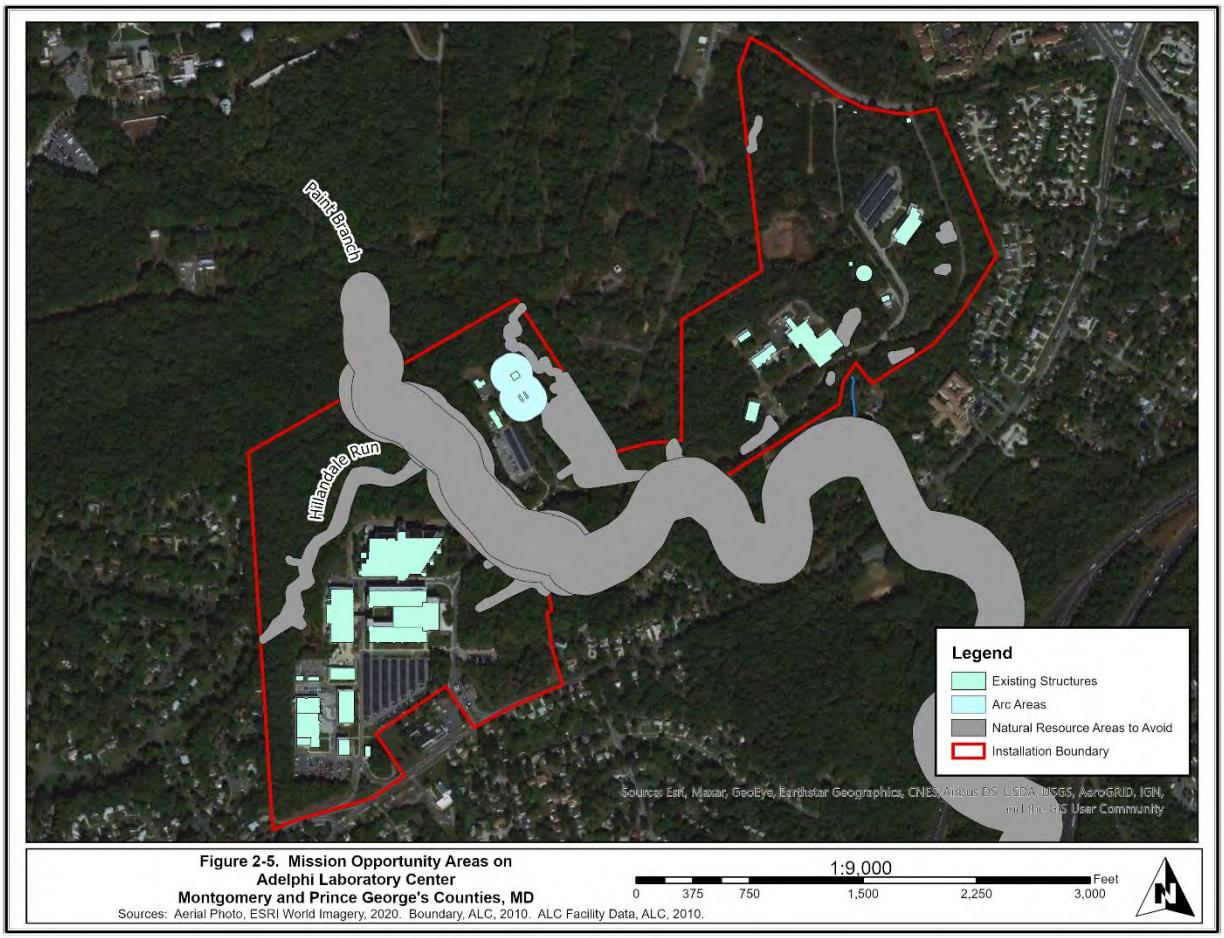


Figure 2-5. Mission Opportunity Areas on ALC

Figure 2-6. Mission Opportunity Areas on BPRF

less than 10 inches annually (ESE, 1981). Normal relative humidity ranges from 50 to 85 percent and typically peaks just before sunrise.

2.2.2 Physiography and Topography

ALC

The terrain of ALC is hilly, with numerous rock outcroppings, sloping generally towards the Paint Branch valley. Elevations range from 138 to 282 feet above mean sea level (MSL). The highest elevations on ALC are found in the 600 Area, reaching 282 feet above MSL and in the northwest and southwest corners of the installation ranging from 274 to 278 feet above MSL. The lowest point on ALC is 138 feet above MSL, at Paint Branch where it flows off the installation at the southern boundary. Slopes found within ALC range from 2 to 40 percent and are steepest along the stream valleys. For further information and mapping, see the Planning Level Survey (PLS) in **Appendix F**.

BPRF

Topography at Blossom Point is characterized by rolling hills with narrow ridge tops and valleys drained by non-tidal and tidal tributaries to Nanjemoy Creek and the Potomac River. Elevations range from MSL along the Potomac River and Nanjemoy Creek to 25 feet above MSL at Upper Cedar Point. In general, the installation is relatively flat with slopes of 2 to 5 percent.

The 4.5-mile shoreline around BPRF has an average bluff height of about 20 feet above MSL. The shoreline, in general, experiences erosive wave action from the Potomac River and is eroding at an average of 1 to 3 feet per year (Wardwell, 2001). Tidal fluctuations are undercutting bluffs causing erosion and slumping which poses a threat to several landfill sites and other structures. There are beaches along the bluff line where sand spits have formed across drowned valleys. Further information about the topography at BPRF can be found in the PLS in **Appendix F**.

2.2.3 Geology and Soils

ALC

ALC lies within the Fall Line region, the geologic transition between the unconsolidated sediments of the Coastal Plain Physiographic Province and the crystalline rocks of the Piedmont Physiographic Province. The Coastal Plain sediments form a wedge-shaped mass, which dips and thickens to the southeast, reaching a thickness of approximately 2,500 to 3,000 feet in southeast Prince George's County. Crystalline rocks of the Piedmont are represented by the Wissahickon Formation, a mica gneiss of Precambian or early Paleozoic age. Saproline commonly occurs in a 16-foot-thick layer atop the Wissahickon, except in areas subject to active erosion. Coastal Plain sediments on ALC are represented by the Potomac Group, which is subdivided into a sand and gravel facies and clay facies, by upland gravel and sand deposits of Tertiary Age, and by Holocene-Aged alluvial deposits along stream channels. The central portion of ALC primarily consists of rock and saprolite of the Wissahickon Formation while on northwest portion exhibits the sand

facies of the Potomac Group. Sediments overlying bedrock at ALC, range from 45 feet thick at higher elevations (e.g., beneath Building 203) to only 8 feet thick near Paint Branch. The saprolite cover is irregular in width and varies in physical composition.

Twenty-three soil types are present at ALC and are presented in **Table 2-1**, below and **Figure 2-7**. The Blocktown channery silt loam, Christiana-Downer complex, and Sassafras-Croom complex cover a majority of the facility. Upland areas have deep, very permeable soils, which are moderately to somewhat excessively well drained, and are subject to severe erosion. Soils on the intermediate elevations and slopes are generally shallower, overlying a dense fragipan, resulting in impeded internal drainage. Soils in the low areas along stream valleys are poorly drained, silty loams.

Outside of the stream corridors, development constraints that occur on the facility are generally slight to moderate and result from steep slopes or perched high water tables. Highly erodible land (HEL) determinations by the Montgomery County and Prince George's County Soil Conservation Districts identified the Croom gravelly (8% slopes or greater), and Manor soils as highly erodible soils.

Table 2-1. Soil Types on ALC

Soil Key	Soil Type	County	Hydric
116E	Blocktown channery silt loam, 25-40% slopes, very rocky	Montgomery	Yes (5% of map unit)
1C	Gaila silt loam, 8-15% slopes	Montgomery	Yes (5% of map unit)
400	Urban land	Montgomery	
54A	Hatboro silt loam, 0-3% slopes, frequently flooded	Montgomery	Yes
59B	Beltsville silt loam, 3-8% slopes	Montgomery	
61B	Croom gravelly loam, 3-8% slopes	Montgomery	
61UB	Croom-Urban land complex, 0-8% slopes	Montgomery	
BaB	Beltsville silt loam, 2-5% slopes	Prince George's	Yes (5% of map unit)
BuB	Beltsville-Urban land complex, 0-5% slopes	Prince George's	Yes (5% of map unit)
ByF	Brinklow-Blockton channery loams, 25-65% slopes	Prince George's	
CaC	Chillum silt loam, 5-10% slopes	Prince George's	

Soil Key	Soil Type	County	Hydric
CaD	Chillum silt loam, 10-15% slopes	Prince George's	
CcC	Christiana-Downer complex, 5-10% slopes	Prince George's	Yes (5% of map unit)
CF	Codorus and Hatboro soils, frequently flooded	Prince George's	Yes (40% of map unit)
CrE	Croom gravelly sandy loam, 15-25% slopes	Prince George's	
CzB	Croom-Urban land complex, 0-5% slopes	Prince George's	
McD	Manor loam, 15-25% slopes	Prince George's	
MfF	Manor-Brinklow complex, 25-65% slopes, very rocky	Prince George's	
RcB	Russett-Christiana complex, 2-5% slopes	Prince George's	Yes (5% of map unit)
ScC	Sassafras-Croom complex, 5-10% slopes	Prince George's	
SnB	Sassafras-Urban land complex, 0-5% slopes	Prince George's	
SnD	Sassafras-Urban land complex, 5-15% slopes	Prince George's	
SOF	Sassafras and Croom soils, 25-40% slopes	Prince George's	Yes (5% of map unit)

BPRF

BPRF is located in the Atlantic Coastal Plain Physiographic Province. The unconsolidated sediments overlie crystalline rock of Precambrian to early Cambrian age. In the area of the installation, approximately 1,300 feet of sediment covers the bedrock. The crystalline basement consists of granite, gabbro, diorite, schist, greenstone, and quartzite. The geologic units encountered from the surface to the bedrock are the Nanjemoy Formation, the Aquia Formation, and the Raritan and Patapsco Formation. The Nanjemoy Formation is present at a depth of 10 to 70 feet below MSL.

The surficial deposits are of both Recent and Pleistocene Age and are derived in large measure from erosion and redeposition of older surfaces to the west and north. Recent deposits are evident in sand bars and beach deposits that now close off earlier eroded drainage areas on the south side of the installation. Late Pleistocene deposits of Talbot Age are found beneath the recent deposits. The older Talbot sediments were laid down as terraces during a period of subsidence. An interval of elevation and erosion intervened during which the existing drainage pattern developed.

Fifteen soil types are present at BPRF, listed in **Table 2-2**, and shown on **Figure 2-8**. The soils are generally poorly to moderately well drained and range in texture from fine sand to silty loams and clay to coarse sands and gravels. Many of these soils types are listed as hydric. The greatest development constraints are associated with the high to moderately high seasonal high water table on BPRF. None of the soil types is classified as HEL by the Charles County Soil Conservation District.

Table 2-2. Soil Types on BPRF

Soil Key	Soil Type	Hydric
AsA	Annemessex silt loam, 0-2% slopes	Yes (15% of map unit)
AsB	Annemessex silt loam, 2-5% slopes	Yes (10% of map unit)
DfA	Dodon fine sandy loam, 0-2% slopes	
DfB	Dodon fine sandy loam, 2-5% slopes	
EkA	Elkton silt loam, 0-2% slopes, frequently ponded	Yes
LQA	Lenni and Quindocqua soils, 0-2% slopes	Yes
LsA	Liverpool silt loam, 0-2% slopes	Yes (5% of map unit)
LsB	Liverpool silt loam, 2-5% slopes	Yes (5% of map unit)
LxD	Liverpool-Piccowaxen complex, 5-15% slopes	
MT	Mispillion and Transquaking soils, tidally flooded	Yes
NG	Nanticoke and Mannington soils, frequently flooded	Yes
PcA	Piccowaxen loam, 0-2% slopes	Yes (10% of map unit)
PcB	Piccowaxen loam, 2-5% slopes	Yes (10% of map unit)
RgB	Reybold loam, gravelly subsoil, 2-5% slopes	
W	Water	Yes

2.3 GENERAL BIOTIC ENVIRONMENT

2.3.1 Threatened and Endangered Species and Species of Concern

2.3.1.1 Special Status Flora and Habitats

ALC

No Federal or state-listed threatened, endangered, or special status flora species were observed on ALC during the PLSs conducted in 2020 or during the 2015 Rare, Threatened and Endangered Species Survey (**Appendices F and G**).

In 2002, biologists located the PMB (**Photograph 2-1**), a small Fall-Line Magnolia Bog/Terrace Gravel on ALC. This site is a remnant of a once more widely distributed plant community that has been largely destroyed by drainage or filling for commercial and residential development along the Fall Line in the Maryland and Virginia suburbs of Washington, D.C. Not a true bog, PMB is a groundwater-fed, saturated wetland. Its nutrient poor, gravelly soils support a distinctive plant community that is considered Highly Globally Rare. Fewer than ten Fall Line Terrace Gravel Bogs are known to exist worldwide, and most (including this one) are highly degraded (NatureServe, 2009).

Photograph 2-1. PMB in June 2015

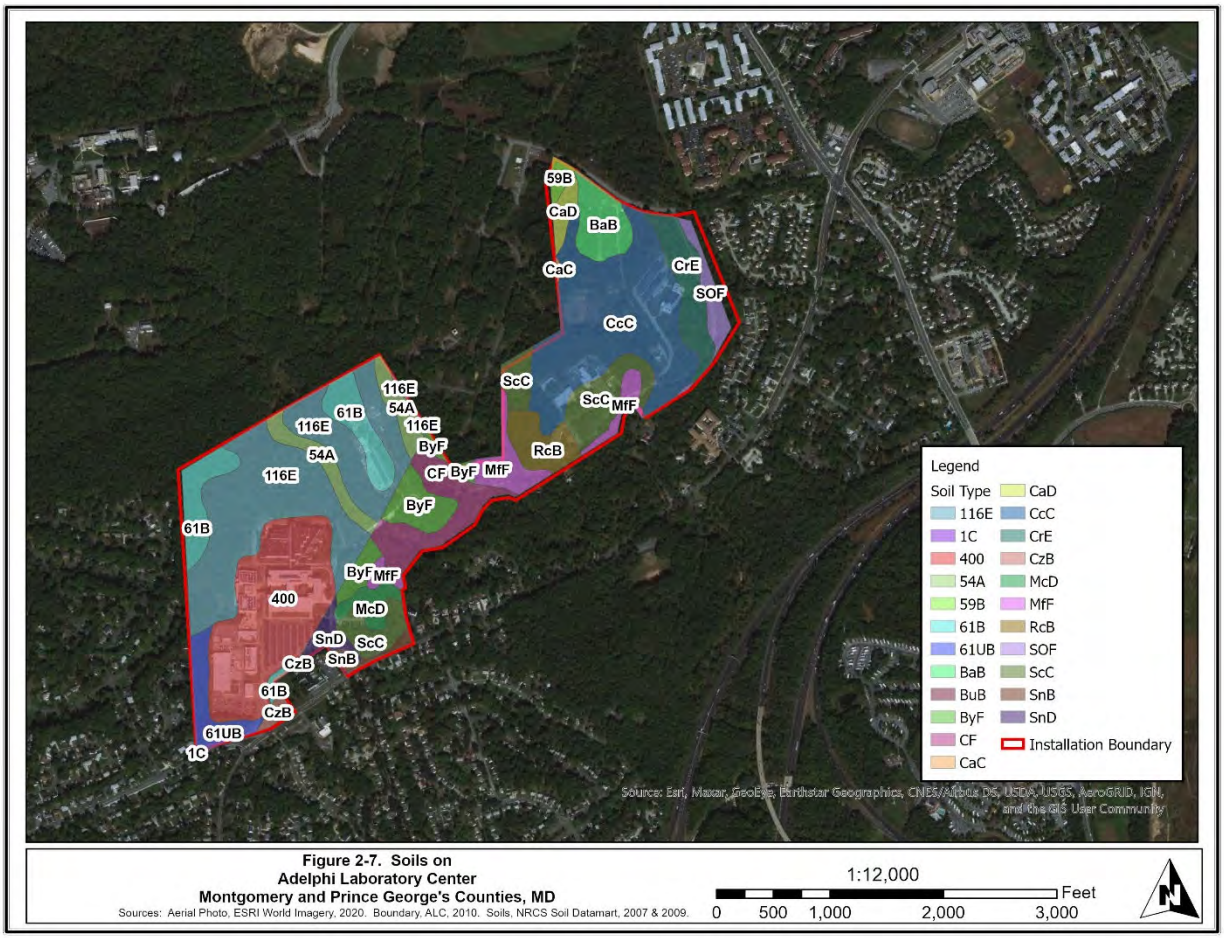


Figure 2-7. Soils on ALC

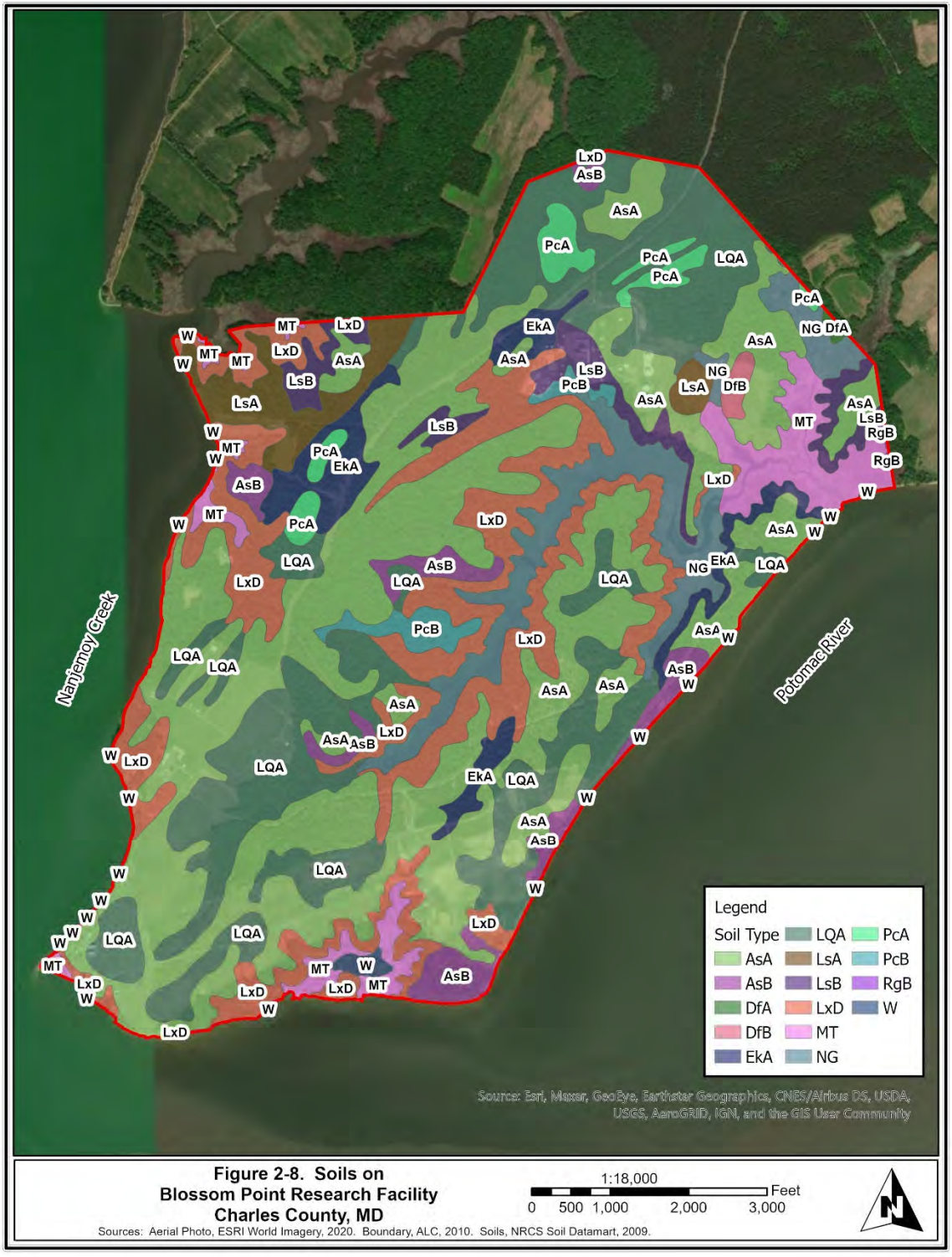


Figure 2-8. Soils on BPRF

Five rare and uncommon plant species were documented at the PMB in 2002 and 2007. **Table 2-3** lists plant species documented by MDNR in 2007 to potentially occur within the PMB. None of these species were observed during the PLSs conducted in June 2015. The area was surveyed again in 2020 and no rare plant species were observed. Other listed potential plant species can be found in **Table 2-3**.

BPRF

A Threatened and Endangered Species survey was conducted at BPRF in 1999 and 2015, and a PLS was conducted in 2020. No Federal or state-listed rare, threatened or endangered floral species were observed during the surveys.

Habitat for the small whorled pogonia (*Isotria medeloides*) exists on BPRF, though this plant is believed to be extirpated from the State of Maryland. The small whorled pogonia habitat is deciduous or deciduous-coniferous forest with light to moderate leaf litter, an open herb layer (occasionally dense ferns), moderate to light shrub layer, and relatively open canopy (Flora of North America, 2002). This plant has not been observed on BPRF.

Critical habitat for the endangered Chesapeake Bay distinct population segment (DPS) of Atlantic sturgeon (*Acipenser oxyrinchus*) was designated in the Potomac River in 2017. At this time, the mission at BPRF is limited to activities on land and the installation has no jurisdiction on the river. Other listed potential plant species can be found in **Table 2-3**.

Table 2-3. Rare, Threatened and Endangered Species and Habitats Potentially Occurring on ALC and BPRF

Scientific Name	Common Name	Status	Location
Flora			
Aeschynomene virginica	Sensitive Joint Vetch	Federally Threatened, State Endangered	ALC (Prince George's County)/ BPRF
Eriocaulon decangulare	Ten-angled Pipewort	G5, S2, State Rare	ALC (PMB)
Juncus longii	Long's Rush	G3Q, S1, State Endangered	ALC (PMB)/BPRF
Pogonia ophioglossoides	Snakemouth Orchid (Rose pogonia)	State Watch List	ALC (PMB)
Rhynchospora cephalantha	Capitate Beakrush	G5, S1, State Endangered	ALC (PMB)
Solidago uliginosa	Bog Goldenrod	State Watch List	ALC (PMB)
Habitats			
Bog and Fen Wetland Complex	Fall-Line Terrace Gravel Bog	State Highly Rare	ALC (Documented)

Scientific Name	Common Name	Status	Location
Fauna			
Acipenser brevirostrum	Shortnose sturgeon	Federally Endangered	BPRF
Acipenser oxyrinchus	Atlantic sturgeon	Federally Endangered (Chesapeake Bay Distinct Population Segment)	BPRF
Alasmidonta heterodon	Dwarf wedge mussel	Endangered, Endangered	BPRF
Ambystoma tigrinum	Eastern tiger salamander	State Endangered	BPRF
Bombus affinis	Rusty Patched Bumble Bee	Federally Endangered	ALC/BPRF
Clemmys guttata	Spotted turtle	Under Federal Review	ALC/BPRF (Documented on BPRF)
Danaus plexippus	Monarch butterfly	Candidate Species	ALC/BPRF (Documented on ALC)
Elliptio lanceolata	Yellow lance	Federally Threatened	ALC/BPRF
Farancia e. erytrogramma	Rainbow snake	State Endangered	ALC/BPRF
Myotis lucifugus	Little brown bat	Under Federal Review	ALC/BPRF (Documented on ALC & BPRF)
Myotis septentrionalis	Northern long-eared bat	Federally Threatened	ALC/BPRF (Documented on ALC & BPRF)
Myotis sodalis	Indiana bat	Federally Endangered	ALC (Montgomery County)
Perimyotis subflavus	Tricolored bat	Under Federal Review	ALC/BPRF (Documented on ALC & BPRF)
Stygobromus hayi	Hay's Spring amphipod	Federally Endangered	ALC (Montgomery County)
Stygobromus kenki	Kenk's amphipod	Federal Candidate (Resolved Taxon)	ALC (Montgomery County)

(Sources: MDNR 2021; USFWS 2021; NOAA 2021)

2.3.1.2 Special Status Fauna

ALC

The northern long-eared bat (NLEB) (*Myotis septentrionalis*) was listed as threatened by the USFWS in May 2015. An acoustic bat survey with focus on the NLEB was conducted at ALC during the summers of 2016 and 2019. The NLEB was recorded at one sample site on ALC during the 2016 surveys; however no NLEB were detected during the 2019 surveys. See **Appendix G** for a copy of the Bat Survey Report.

The rusty patched bumble bee (*Bombus affinis*) was listed as endangered by USFWS in January 2017. This bee could occur in the State of Maryland. According to the Environmental Conservation Online Services (ECOS) website, the bee has historically been documented east and west of the D.C. Metro Area. The ALC Environmental Division consulted with the USFWS in April 2017 regarding the rusty patched bumble bee. The USFWS stated that since there were no extant occurrences of the bee in Maryland, no further consultation was required at the time.
Surveys for reptile and amphibian and avian species (**Appendices H and K**) were conducted in 2018 at ALC. The Reptile and Amphibian Survey did not find any Federal or state-listed species. A total of 49 species were observed at ALC during the Avian Survey. Three species were recorded at ALC which are state-listed as rare, state watchlist, or state watchlist for breeding. This included the sharp-shinned hawk (*Accipiter striatus*) (rare/watchlist for breeding), brown creeper (*Certhia americana*) (state watchlist), and dark-eyed junco (*Junco hyemalis*) (watchlist for breeding).

Additional listed potential species can be found in **Table 2-3.**

BPRF

The herptofaunal survey in 2011 (**Appendix H**) targeted the state-endangered rainbow snake (Benedict, 2011). The rainbow snake (**Photograph 2-2**) is a highly aquatic species, preferring swamps, marshes, and slow-moving streams and can tolerate brackish water. The rainbow snake can also be found on dry land, burrowing in moist soil, muck or a sandy substrate. While habitat exists on BPRF for this species, none were observed during the field survey.

This area of the Potomac River may provide habitat for spawning for the Atlantic sturgeon. The Chesapeake Bay DPS of the Atlantic sturgeon is listed as Endangered under the ESA.

A spotted turtle was photographed on BPRF during the April 2012 field surveys for the BPRF Invasive Species Survey Management Plan and again in 2016. It was observed again in a 2018 survey. The 2012 photograph can be viewed on the last page of the PLS for BPRF in **Appendix F**. The turtle is currently under review by the USFWS to become a listed species. There is potential for this turtle to occur on ALC as well.

An acoustic bat survey with focus on the NLEB (**Photograph 2-3**) was conducted at BPRF during the summers of 2016 and 2019. The NLEB was recorded at one sample site on BPRF during the 2016 surveys; however no NLEB were detected during the 2019 surveys. See **Appendix G** for a copy of the 2019 Bat Survey Report.

The rusty patched bumble bee (**Photograph 2-4**) could also potentially occur on BPRF. See the ALC section above for consultation information on the bee.

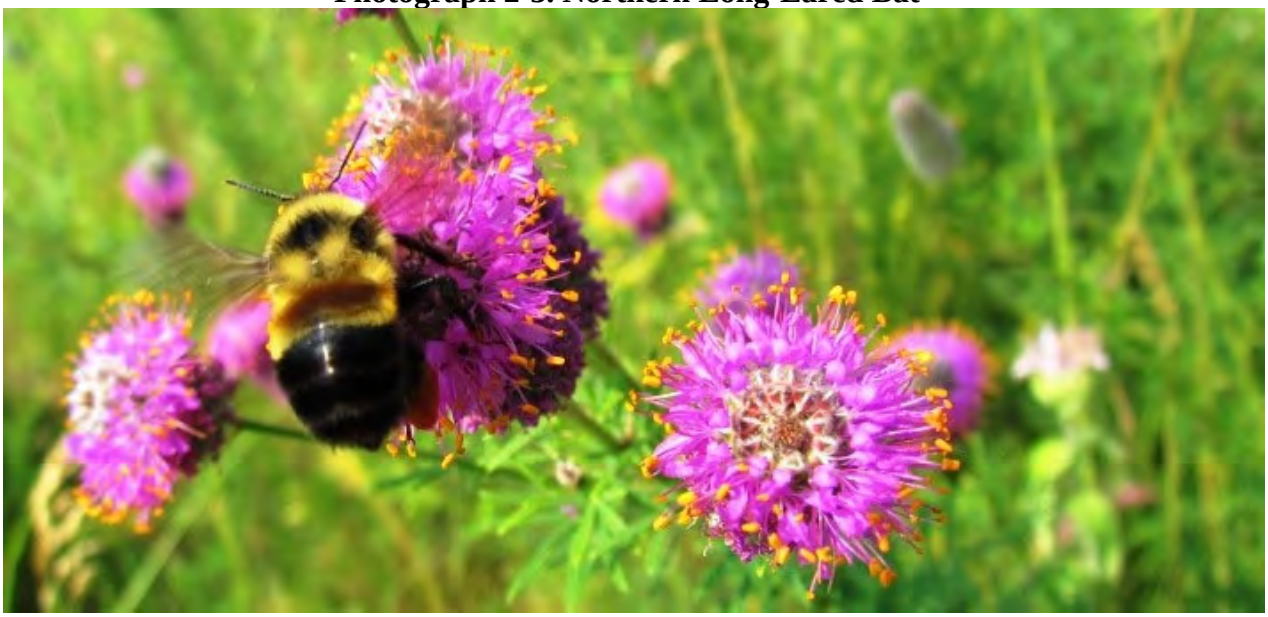
Surveys for reptile and amphibian and avian species (**Appendices H and K**) were conducted in 2018 at BPRF. The Reptile and Amphibian Survey did not find any Federal or state-listed species. A total of 94 species were observed at BPRF during the Avian Survey. Eight species were recorded at BPRF which are state-listed as rare, state watchlist, or state watchlist for breeding and/or historically breeding in the state. This included the bald eagle (watchlist), least flycatcher

(*Empidonax minimus*) (watchlist), brown creeper (watchlist), red-breasted nuthatch (*Sitta canadensis*) (watchlist for breeding), golden-crowned kinglet (*Regulus satrapa*) (watchlist for breeding), Swainson's thrush (*Catharus ustulatus*) (historically breeding), golden-winged warbler (*Vermivora chrysoptera*) (rare), and dark-eyed junco (watchlist for breeding).

Additional listed potential species can be found in **Table 2-3**.

Photograph 2-2. Rainbow Snake

Photograph 2-3. Northern Long-Eared Bat



Photograph 2-4. Rusty Patched Bumble Bee

2.3.2 Wetlands and Water Resources

2.3.2.1 Wetlands

Wetlands are of critical importance to the protection and maintenance of biological resources, and they provide essential breeding, spawning, nesting, and wintering habitats for many fish, birds, amphibians, and other wildlife species. Wetlands also enhance the quality of surface waters by (1) impeding erosive forces of moving water, (2) trapping waterborne sediment and associated pollutants, (3) maintaining baseflow to surface waters through the gradual release of stored flood waters and groundwater, and (4) providing a natural means of flood control and storm damage protection by absorbing and storing water during high-runoff periods. Wetlands were delineated in 1994 and were rechecked in 2020 in conjunction with the PLSs for the INRMP. There was no jurisdictional determination for the 2020 PLS.

ALC

In 2018 a Wetland Delineation conducted by USACE, Baltimore District, took place at ALC. This survey reduced the acreage of wetlands located on ALC due to the fact that the floodplains associated with the streams on ALC had been previously delineated incorrectly as wetlands.

There are eleven wetlands on ALC, amounting to approximately 2.52 acres (**Figure 2-9**). The previous amount was 10.4 acres. There are scattered small wetlands in the forested areas on the eastern portion of the facility that drain to drainage ditches that eventually flow to Paint Branch.

BPRF

Wetlands are extensive at BPRF (**Figure 2-10**). The 25 wetlands identified on BPRF total approximately 263 acres. Most of these wetlands are estuarine emergent wetlands, palustrine forested, estuarine scrub-shrub and palustrine scrub-shrub wetlands. Dominant wetland vegetation includes common cattail (*Typha latifolia*), sedges (*Carex* spp. and *Cyperus* spp.), and common reed (*Phragmites australis*) (a nonnative and invasive species) in marshes, while high bush blueberry (*Vaccinium corymbosum*), red maple (*Acer rubrum*), American holly (*Ilex opaca*) and sweet gum (*Liquidambar styraciflua*) are dominant in forested wetlands. The estuarine emergent wetlands represent important feeding, resting, and cover areas for migratory and resident birds and waterfowl. A State of Maryland waterfowl management program is currently in place at BPRF. BPRF has several ponds in its tidal marsh areas (**Photograph 2-5**) with water depths less than two feet.

Photograph 2-5. Typical Tidal Wetland on BPRF

Activities on BPRF must also be determined as consistent with the Maryland Tidal Wetland Act, Non-tidal Wetlands Protection Act, and Chesapeake Bay Critical Areas Act. Activities within 25 feet of non-tidal wetlands must be coordinated with the Maryland, Non-tidal Wetlands and Waterways Division. See the PLSs in **Appendix F** for further wetland information.

2.3.2.2 Water Resources

ALC

The dominant hydrologic feature on ALC is Paint Branch (**Figure 2-9**). The stream originates approximately 6 miles north of the installation, cuts in a southeasterly direction through the interior of ALC, and then flows another 4 miles south to its confluence with the Northeast Branch of the Anacostia River. Ultimately, the Anacostia River empties into the Potomac River, which discharges into the Chesapeake Bay.

Hillandale Run flows east to west across ALC, empties into Paint Branch in the north central portion of the installation. Both streams have predominantly cobble substrates, moderately rapid currents, and well-shaded, undeveloped stream banks (**Photograph 2-6**). Another unnamed tributary of Paint Branch is located primarily outside of the eastern boundary of the installation, more or less parallel to Kuester Road. This stream receives drainage from the 400 Area.

Throughout much of the installation steep side slopes restrict the 100-year floodplain for both tributaries and Paint Branch to their narrow stream valleys. Below their confluence, the floodplain broadens and reaches its widest point, approximately 250 feet, between Floral Drive and the installation's southeastern border.

A stream protective buffer must be maintained adjacent to Paint Branch and its tributaries. The State of Maryland designates these waterways as Class III – Natural Trout Waters. Montgomery County, Maryland guidelines for environmental management of development recommend a minimum buffer width of 200-feet from the stream bank when slope ranges are 25 percent or greater. This 200-foot buffer is applicable to Paint Branch. A 150-foot buffer is to be maintained on the Paint Branch tributaries within the boundaries of ALC.

BPRF

BPRF is located on the north side of the Potomac River at its junction with the Nanjemoy Creek. The Nanjemoy Creek bounds the facility on the west while the Potomac River bounds the facility on the south and east. Several perennial streams and drainage ways dissect the research facility, draining the wetlands and runoff off-site to either the Potomac River or the Nanjemoy Creek. There are truncated ravine heads around the marshland and large shoal areas with weakly developed channels along the shoreline. Freshwater streams generally drain the upstream agricultural lands and become tidally influenced near the Potomac, where the streams are then classified as estuarine. Much of the boundaries of BPRF are shoreline. **Figure 2-10** illustrates the many streams and channels across BPRF.

2.3.2.3 Floodplains

ALC

The 100-year flood elevation at ALC is approximately 155 feet above mean sea level along Paint Branch (**Figure 2-11**). Throughout much of the installation steep side slopes restrict the 100-year floodplain for Paint Branch and both tributaries to their narrow stream valleys. Below their confluence, the floodplain broadens and reaches its widest point, approximately 250 feet, between Floral Drive and the installations' southeastern boarder. This floodplain, which occupies approximately eight acres of land, is generally within the protective stream buffers.

Photograph 2-6 Typical Stream Condition on ALC

BPRF

The high tide elevation is 1-foot above MSL. The average tidal variation is 20 to 40 inches daily. The 100-year tidal flood elevation, established by USACE, Baltimore District, is nine feet above MSL (**Figure 2-12**). The facility is subject to tidal flooding. Approximately one third of the installation is located within the 100-year floodplain.

2.3.2.4 Coastal Zone Management Resources

ALC and BPRF both are within the Maryland Coastal Management Zone, which is designated by county (**Figure 2-13**). ALC is located partly within Prince George's County, which is a coastal zone county. Paint Branch is a major water resource on ALC that contributes to the Chesapeake Bay. Activities that impact the water quality of Paint Branch can also impact the health of the Chesapeake Bay. BPRF is located within Charles County and is bordered by the Potomac River, a main tributary to the Chesapeake Bay. Activities on BPRF can directly impact the health of the Chesapeake Bay, thus appropriate management strategies that can protect and enhance the coastal zone are included in this INRMP.

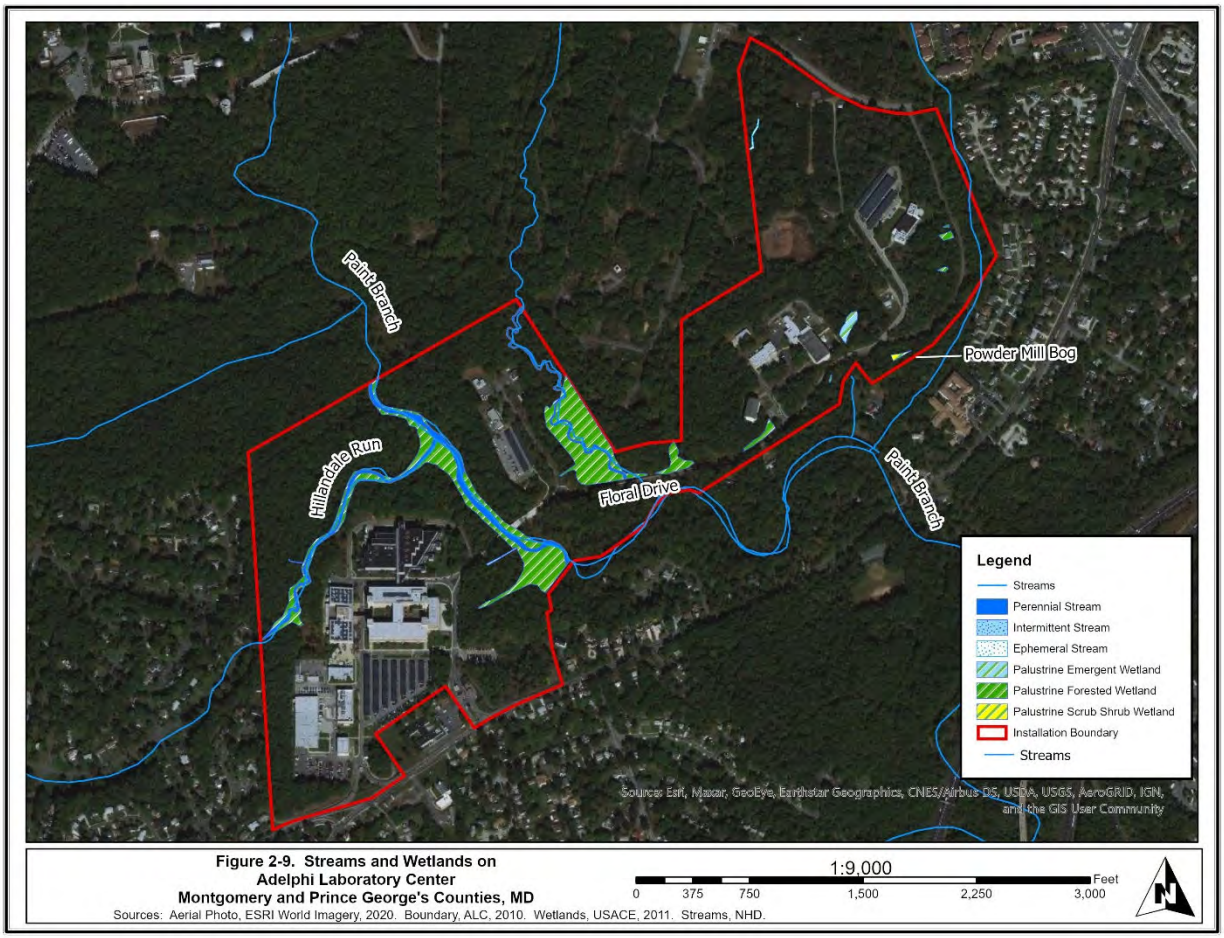


Figure 2-9. Streams and Wetlands on ALC

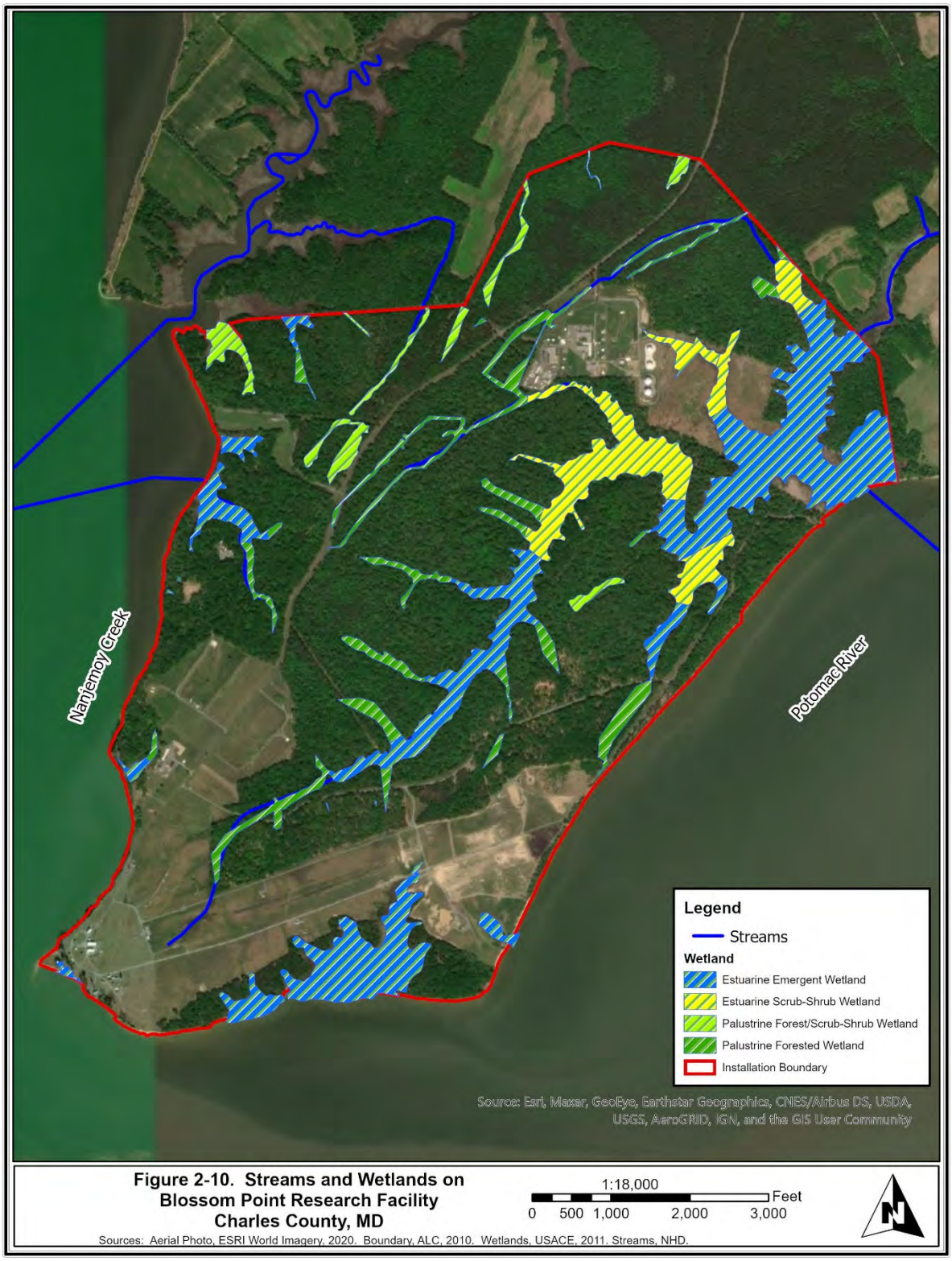


Figure 2-10. Streams and Wetlands on BPRF

BPRF is also within the Chesapeake Bay Critical Area (**Figure 2-14**). The Critical Area includes all land within 1,000 feet of Maryland's tidal waters and tidal wetlands, as well as the waters of the Chesapeake Bay, the Atlantic Coastal Bays, their tidal tributaries and the lands underneath these tidal areas. There are many streams and wetlands on BPRF that contribute to the quality of the Chesapeake Bay. The Critical Area Buffer is the land area immediately adjacent to tidal waters, tidal wetlands, and tributary streams. The minimum Buffer width is 100-feet; however, on some properties it may be wider because of steep slopes, wetlands, or sensitive soils. The Buffer serves as an important protective area for aquatic resources and shoreline habitat. The Buffer is subject to much stricter requirements than the rest of the Critical Area because it is essential to water quality improvement and fish, wildlife, and plant habitat enhancement. A fully forested Buffer is the best environment for filtering pollutants and removing sediment, nutrients, and toxic substances that run off the land and pollute Maryland's waterways. A naturally vegetated Buffer also provides the most functional habitat for wildlife, providing food, cover, and nesting areas. Vegetation along the shoreline is also essential to maintaining the intertidal zone, which is important to a variety of fish, shellfish, crabs, and birds. The Buffer also functions as an important physical barrier between human activity and development-related disturbance and Maryland's streams, creeks, rivers, and bays.

2.3.3 Fauna

ALC

A PLS for fauna was conducted at ALC from 22-24 June 2020. The large tract of contiguous forest provides good habitat for fauna species, especially Forest Interior Dwelling Bird Species (FIDS). Common mammals that were observed during the 2020 survey and previous surveys include white-tailed deer (*Odocoileus virginianus*) and common raccoon (*Procyon lotor*). The floodplains and streams on ALC provide habitat for reptiles and amphibians including bullfrogs (*Rana catesbeiana*), eastern American toad (*Anaxyrus americanus americanus*), and eastern box turtle (*Terrapene carolina*), which were observed during the 2020 survey. Bird species observed during the 2020 survey include American robin (*Turdus migratorius*), great blue heron (*Ardea herodias*), mourning dove (*Zenaida macroura*), turkey vulture (*Cathartes aura*), Cooper's hawk (*Accipiter cooperii*) and red-winged blackbird (*Agelaius phoeniceus*). During the 2020 survey a nesting Cooper's hawk with two young fledglings was observed near Wetland 3.

Thirteen species of amphibians and reptiles were observed on ALC during the 2018 survey, including two species of salamander, five species of frogs and toads, two turtle species, three snake species and one species of lizard (**Photographs 2-7, 2-8 and 2-9**).

A total of 49 species of birds were observed at ALC during the 2018 Avian Survey (**Appendix K**). Nine species recorded at ALC are listed as FIDS and include the red-shouldered hawk (*Buteo lineatus*), hairy woodpecker (*Leuconotopicus villosus*), Acadian flycatcher (*Empidonax virescens*), brown creeper, wood thrush (*Hylocichla mustelina*), red-eyed vireo (*Vireo olivaceus*), northern parula (*Setophaga americana*), Louisiana waterthrush (*Parkesia motacilla*), and scarlet tanager (*Piranga olivacea*). See the PLSs in **Appendix F** for further information.

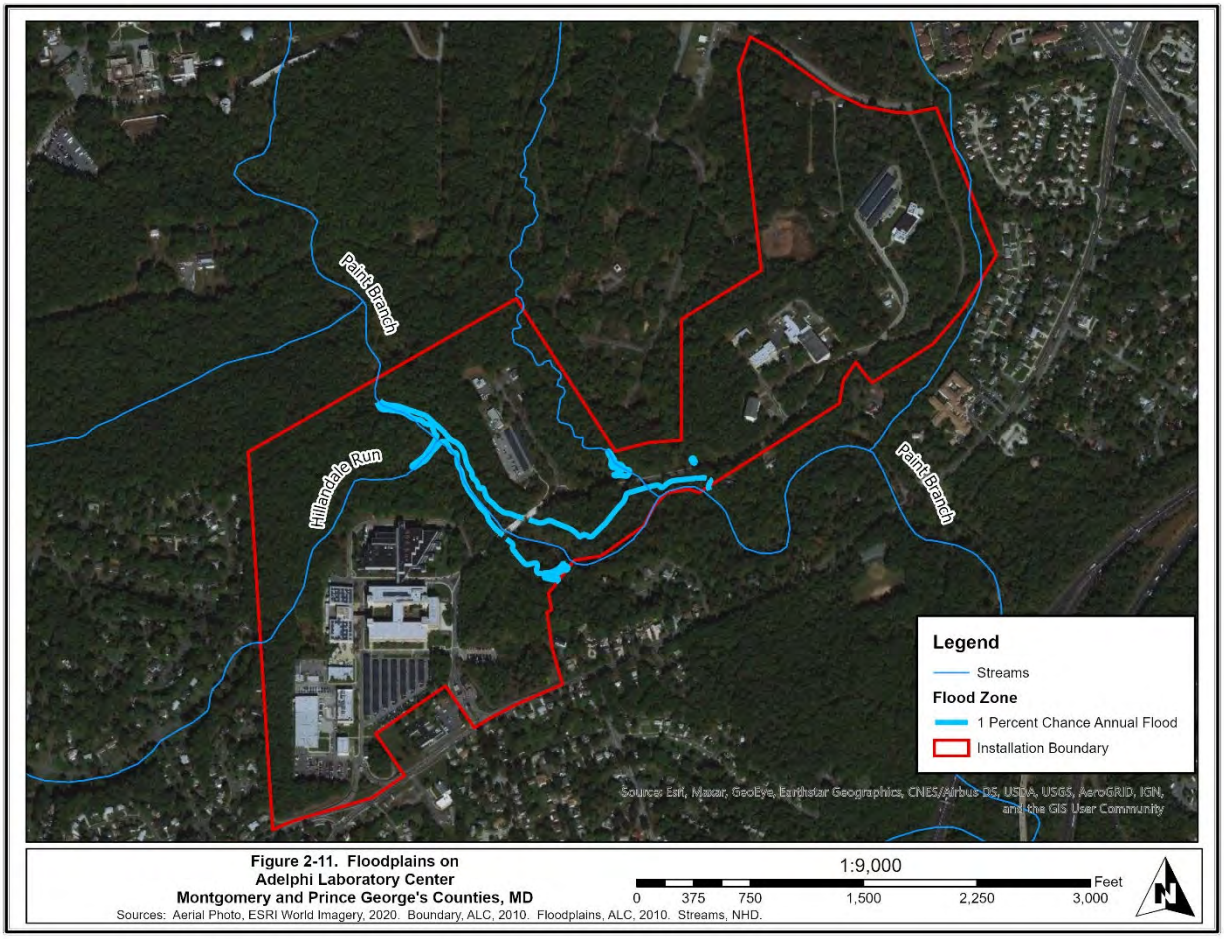


Figure 2-11. Floodplains on ALC

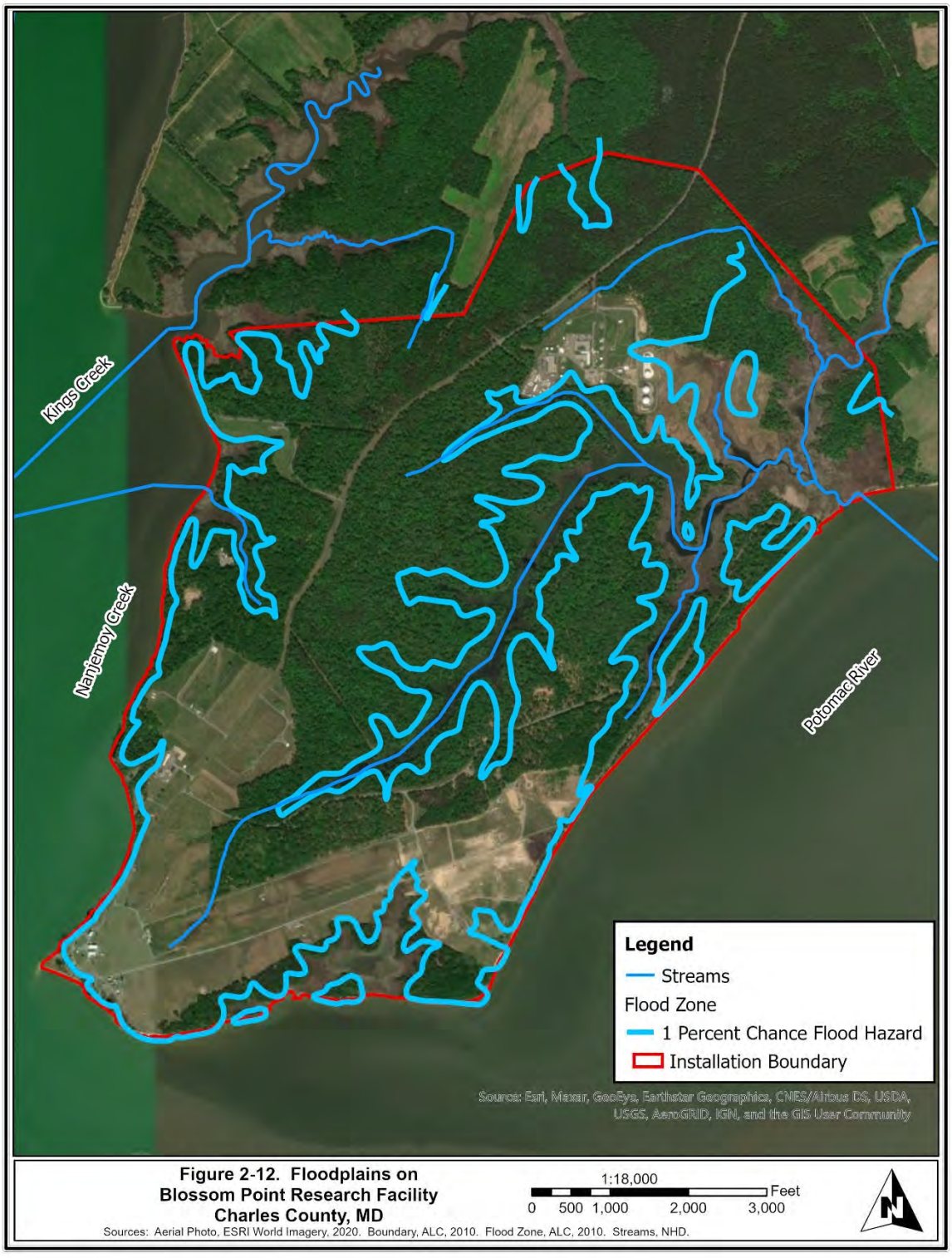


Figure 2-12. Floodplains on BPRF

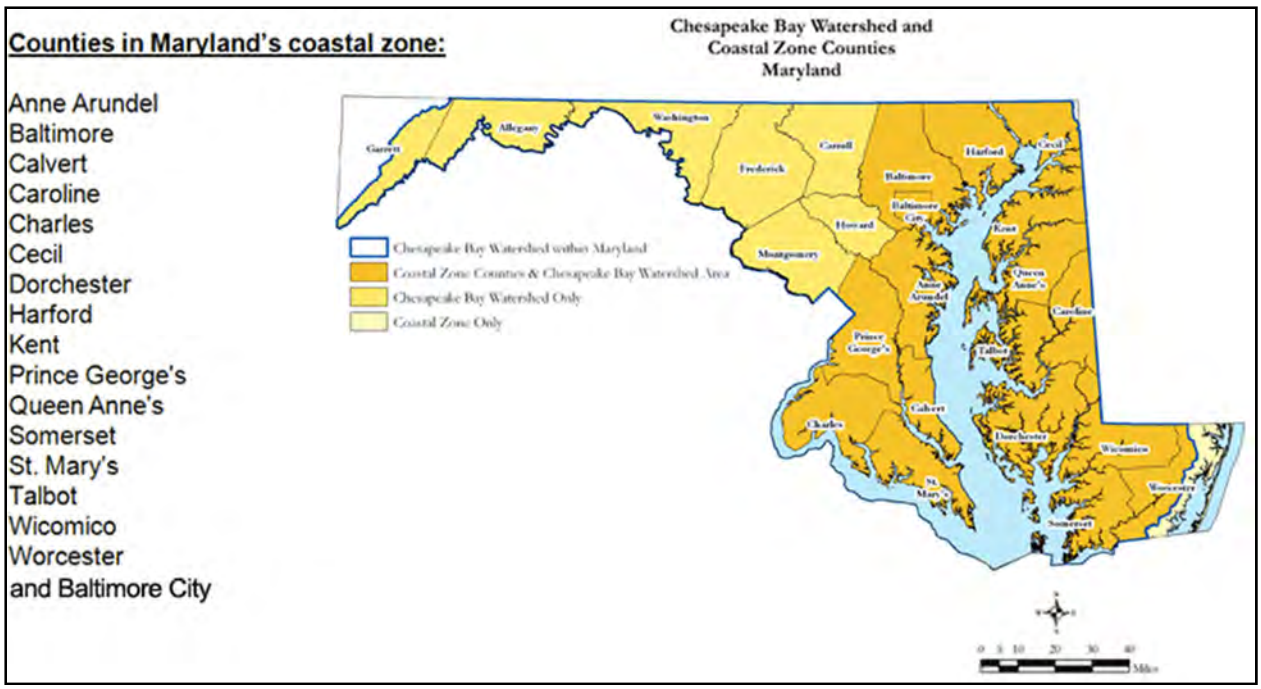


Figure 2-13. Maryland Coastal Zone Management Area

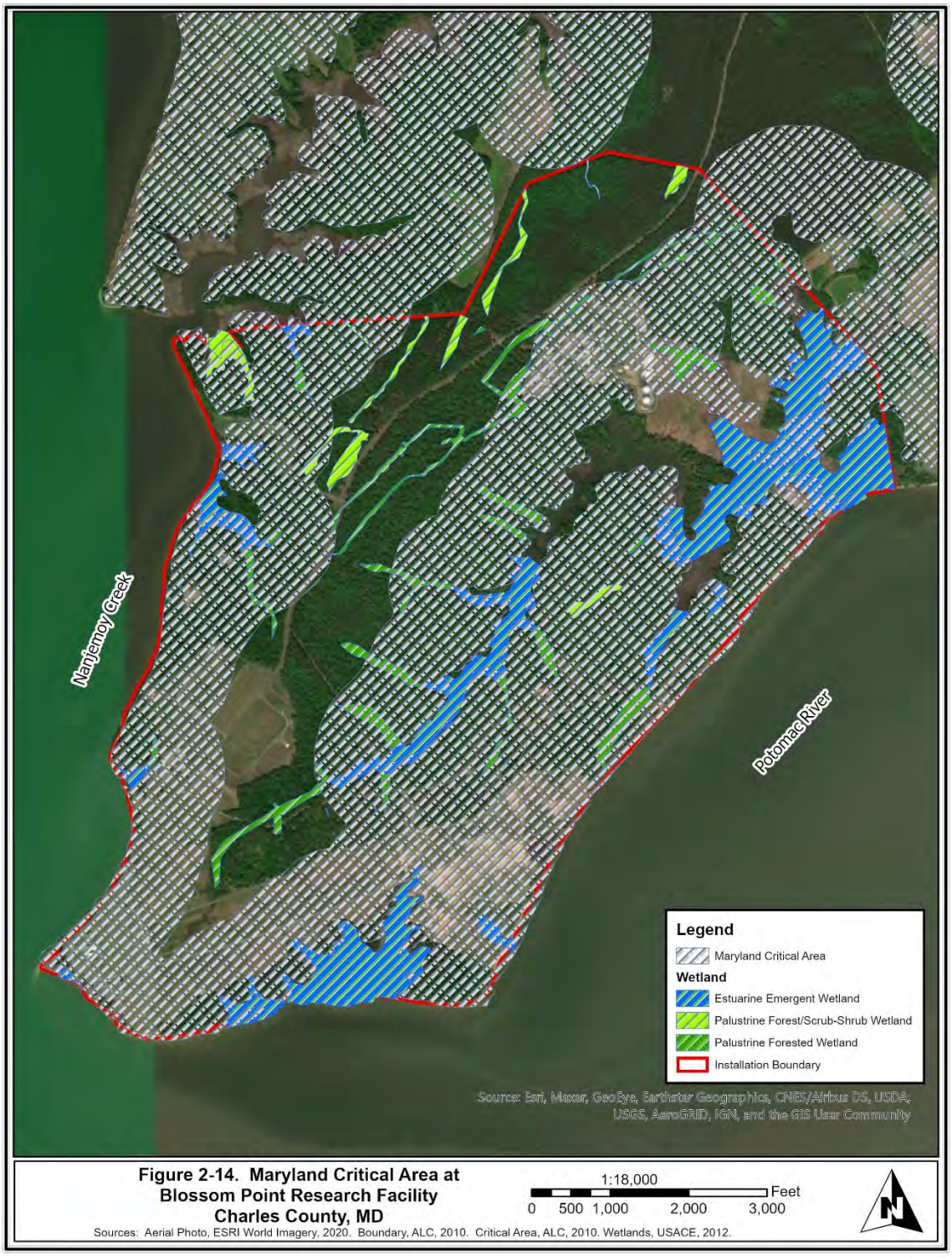


Figure 2-14. Maryland Critical Area at BPRF

Spawning areas for brown trout, an important sport fish, are found upstream of ALC in the upper part of Paint Branch (the area upstream of Fairland Road). The Montgomery County Council has designated this area as a Special Protection Area based on its trout spawning capability, high water quality, and the threat posed by the intensity of existing and future development in the watershed.

In 2019, USACE, Baltimore District, delivered the Stream Assessment for Paint Branch and its Associated Tributaries Report. The study assessed the physical, biological and water quality health of Paint Branch and its tributaries on ALC to identify and document fish and macroinvertebrate populations, impaired stream conditions and potential pollution sources. The field work conducted for this project occurred in the fall of 2016 and the spring of 2017. The results of the ALC invertebrate and fish sampling conducted as part of this stream assessment indicated a community typical of an urban stream in this area of Maryland, with midges and snails being the most common invertebrate species, and blacknose dace (*Rhinichthys atratulus*), rosyside dace (*Clinostomus funduloides*), American eel (*Anguilla rostrate*), common shiner (*Luxilus cornutus*) and northern hog sucker (*Hypentelium nigricans*) among the most common fish species.

Photograph 2-7. American Toad Observed on ALC During June 2015 Survey

Photographs 2-8 and 2-9. Box Turtle and Eastern Smooth Earth Snake Observed on ALC During June 2015 Survey

BPRF

The installation is suitable for many species of wildlife because of the diversity of habitats. Approximately 9,000 feet of 7-foot chain link fencing has been installed from the road to the water's edge (Port Tobacco Creek and Nanjemoy Creek) on each side of the road.

A PLS for fauna was conducted at BPRF from 4-7 and 19-21 August 2020. The most common game species is the white-tailed deer. Other wildlife includes gray squirrel (*Sciurus carolinensis*), eastern cottontail (*Sylvilagus floridanus*), woodchuck (*Marmota monax*), bobwhite (*Colinus virginianus*), mourning dove (*Zenaida macroura*), black duck (*Anas rubripes*), and wood duck (*Aix sponsa*). Fur bearing species include opossum (*Didelphis virginiana*), mink (*Neovison vison*), muskrat (*Ondatra zibethicus*), striped skunk (*Mephitis mephitis*), beaver (*Castor canadensis*), raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*) and gray fox (*Urocyon cinereoargenteus*).

Twenty-five species of amphibians and reptiles were observed on BPRF during the 2018 survey, including three species of salamander (**Photograph 2-10**), one species of newt, eight species of frogs and toads, four turtle species, six snake species and three species of lizard.

A total of 94 species were observed at BPRF during the 2018 Avian survey (**Appendix K**). Sixteen species recorded at BPRF are listed as FIDS and include the red-shouldered hawk, barred owl (*Strix varia*), hairy woodpecker, pileated woodpecker (*Dryocopus pileatus*), Acadian flycatcher, brown creeper, wood thrush, yellow-throated vireo (*Vireo flavifrons*), red-eyed vireo, northern

parula, black-throated green warbler (*Setophaga virens*), black and white warbler (*Mniotilta varia*), American

Photograph 2-10. Spotted Salamander Observed on BPRF During 2018 Survey

redstart (*Setophaga ruticilla*), prothonotary warbler (*Protonotaria citrea*), ovenbird (*Seiurus aurocapilla*), and scarlet tanager.

See the PLSs in **Appendix F** for further information.

Bald eagles are known to nest at BPRF, which are protected under the Federal Bald and Golden Eagle Protection Act. In July 2007, the bald eagle was removed from the Federal List of Endangered and Threatened Species. Bald eagles will continue to be protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act (MBTA).

A fly over survey and a ground survey were conducted in May 2013 by the Center for Conservation Biology to locate bald eagle nests and assess activity. In addition to the nine known nests, three additional nests were located. Of the active nests, chicks could be observed in three of them from the aerial survey. In 2014, there were four active nests (Center for Conservation Biology, 2013-2016).

Aerial surveys of the bald eagle nests were conducted again on 22 March and 26 April 2015 using a low flying aircraft. There were five active bald eagle nests and a total of seven chicks. In 2016,

the aerial surveys were conducted on 6 March and 10 April 2016. There were four active nests and four chicks that were verified. One nest contained chicks, but the surveyors were unable to determine how many chicks were present. In 2017, there were four active nests with three confirmed nests. Two nests were brooding at the time of the last survey, so the biologists were unable to confirm the number of chicks present (Center for Conservation Biology, 2013-2017). In 2018, surveys were conducted in March and April. There were three active nests with chicks present. Three chicks were confirmed in April, and one nest was still brooding, so the total number of chicks was not confirmed. In 2019, the March survey found three active nests with one nest from 2018 moved to a new location on BPRF. In 2022, five nests were observed with each nest containing two chicks.

Nest 12 was removed in 2016 as part of a tree clearing project near the area leased by the Navy for line of sight for satellite tracking. Pursuant to the permit under which the Nest 12 was removed, nest monitoring was conducted at BPRF for the period 2016-2019 by the Navy, with reporting to the USFWS. There was no monitoring in 2020 due to the disruptions and restrictions resulting from the COVID-19 pandemic. Nest monitoring was cancelled in 2021 due to budget restrictions, was conducted again through a partnership with the Naval Facilities Engineering Systems Command (NAVFAC) in 2022. The locations of the current eagle nests are shown on **Figure 2-15**. The Bald Eagle Management Plan can be found in **Appendix L**. It was updated with the Army Environmental Command (AEC) in 2016.

There are several platforms for osprey (*Pandion haliaetus*) nesting that are maintained by BRPF staff. BPRF also provides suitable FIDS habitat. The waterfront adjacent to BPRF represents a suitable waterfowl concentration and staging area.

The beaches bordering BPRF provide likely terrapin (*Malaclemys terrapin*) and horseshoe crab (*Limulus polyphemus*) spawning habitat, and the waters bordering BPRF, specifically the Potomac River, are likely to provide habitat for anadromous fish, striped bass (*Morone saxatilis*) and largemouth bass (*Micropterus salmoides*). Natural oyster bars are also near the property, typically found a short distance downstream within the mainstem of the River.

The MDNR conducts fin fish surveys three times each year. The most common species observed from 2003 to 2017 was Atlantic silverside (*Menidia menidia*) and white perch (*Morone americana*).

2.3.4 Flora

ALC

Vegetation at ALC is a mix of oak-hickory-pine forest and Appalachian oak forest. A PLS for flora was conducted at ALC from 22-24 June 2020. The majority of the installation is forested with urban, developed land and mowed, maintained lawns. Tree species found on the installation include the following:

- Oak – Hickory – Pine Forest:
    - Dominant Species – hickories (*Carya* spp.), loblolly pine (*Pinus taeda*), and white (*Quercus alba*) and post oaks (*Quercus stellata*)

    - Subdominant Species – black gum (*Nyssa sylvatica*), tulip poplar (*Liriodendron tulipifera*), sweetgum (*Liquidambar styraciflua*), persimmon (*Diospyros virginiana*), flowering dogwood (*Cornus florida*), sourwood (*Oxydendrum arboreum*), Virginia pine (*Pinus virginiana*) and a variety of oak species

- Appalachian Oak Forest:
    - Dominant Species – white and northern red oaks (*Quercus rubra*)

    - Subdominant Species – red (*Acer rubrum*) and sugar maple (*Acer saccharum*), yellow birch (*Betula alleghaniensis*), hickories, tulip poplar, sweetgum, American beech species (*Fagus grandifolia*), and several oak species (*Quercus* spp.)

A stream buffer, discussed in **Section 2.3.2.2**, consists of the forested areas along Paint Branch and its tributaries, which is maintained to protect water resources and habitat. Further information about the floral resources observed at ALC is located in the PLSs in **Appendix F**.

BPRF

Before being cleared for development and agriculture, BPRF was originally classified as an oak-hickory-pine forest. Medium to tall forestland of broadleaf deciduous and needleaf evergreen trees were characteristic of the area. Currently, vegetation types within the installation include maintained lawn, forestland, flat, grassy land, forested and shrub wetlands and tidal marsh. Tree cover consists of natural stands of mixed maples, oaks, black locust (*Robinia pseudoacacia*), black walnut (*Juglans nigra*), sweetgum, blackgum (*Nyssa sylvatica*), ash (*Fraxinus* spp.), willow (*Salix* spp.), tulip poplar (*Liriodendron tulipifera*), Virginia pine, red cedar (*Juniperus virginiana*), and American holly. There are scattered sumac (*Rhus* sp.), tulip poplar, and sycamore (*Platanus occidentalis*) along the streams and swamps. Shrubs and small trees include elderberry (*Sambucus canadensis*), bayberry (*Myrica heterophylla*), autumn-olive (*Elaeagnus* sp.), dogwood (*Cornus florida*.), sweetbay (*Magnolia virginiana*s), and redbud (*Cercis canadensis*). PLSs were conducted from 4-7 and 19-21 August 2020; see the PLSs (**Appendix F**) and the Forest Management Plan (**Appendix M**) for further information.

Range management practices have changed over the years. Ranges were once fully cleared. Current practices allow ranges to revert to grassy vegetation. Appropriate areas are maintained and cleared as firebreaks. Firebreaks, at least 50-feet wide, are required around each aboveground magazine.

In addition to terrestrial vegetation, submerged aquatic vegetation (SAV) has been historically located adjacent to BPRF. SAV is important in providing erosion control, water quality benefits, fish habitat, and is also an important source of primary production.

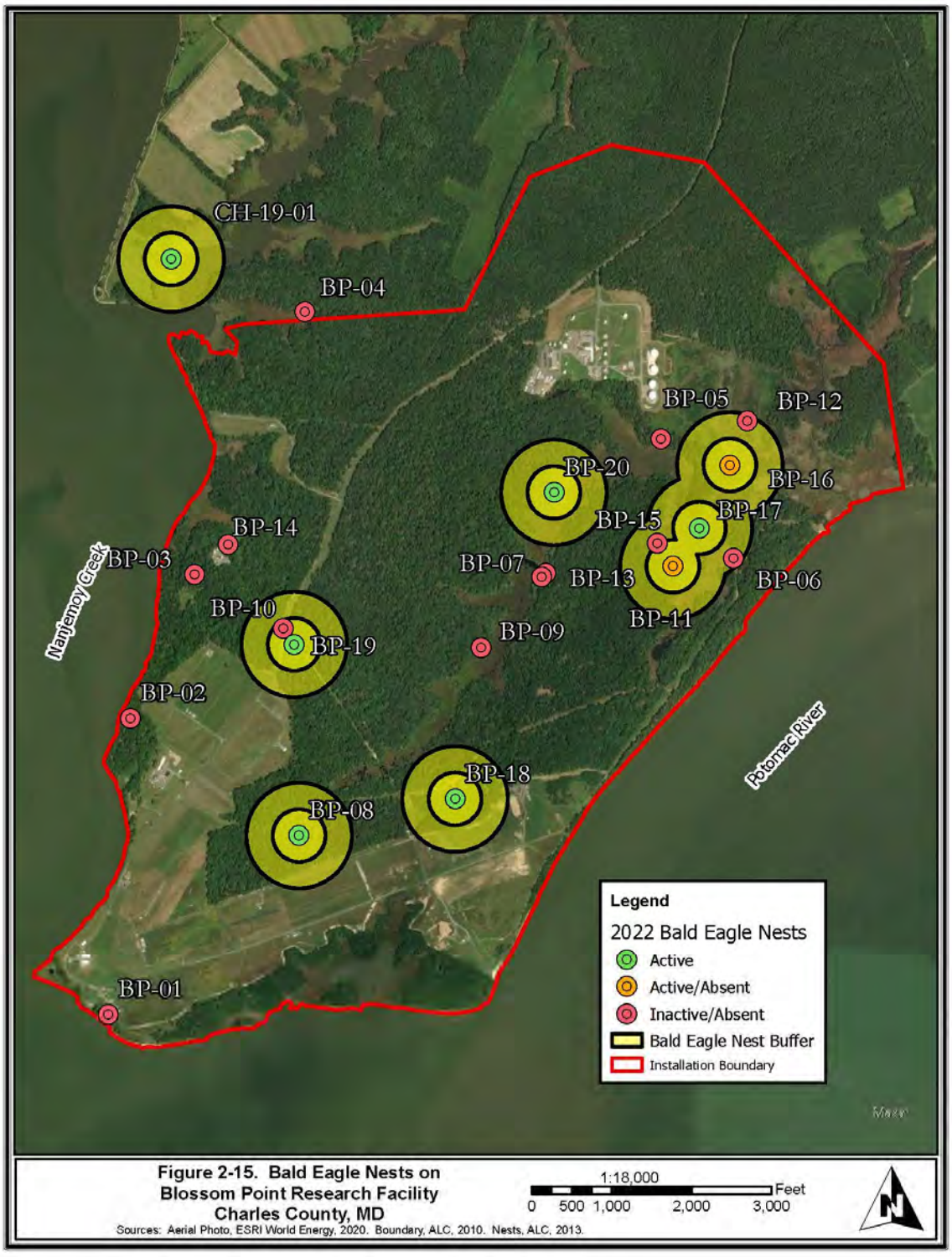


Figure 2-15. Bald Eagle Nests on BPRF

3.0 ENVIRONMENTAL MANAGEMENT STRATEGY AND MISSION SUSTAINABILITY

3.1 SUPPORTING SUSTAINABILITY OF THE MILITARY MISSION AND THE NATURAL ENVIRONMENT

The U.S. Army defines a sustainable Army as simultaneously meeting current as well as future mission requirements worldwide, safeguarding human health, improving the quality of life, and enhancing the natural environment. The Army Strategy for the Environment transitions the Army's compliance-based environmental program to a mission-oriented approach based on the principles of sustainability. The mission of the Army Strategy for the Environment is to continually incorporate environmental considerations in all contingency and combat operations, as our environmental stewardship inevitably becomes a contributing factor in achieving stability. This is a strategy for a homeland that is protected, an environment that is sustained, and waterways and ecological resources that are preserved as natural and economic assets, and an Army that is trusted by the public.

ALC is committed to supporting the military mission through sustainable practices and integrated natural resources management. This INRMP identifies the natural resources on ALC and BPRF, the management programs and the natural resource management goals and objectives to sustain the mission and environment. ALC strives to be a steward of the environment and manage resources not just for compliance purposes but to sustain these resources into the future while supporting the present and future military mission.

3.1.1 Integrate Military Mission and Sustainable Land Use

The mission of ALC is to support innovative science and technology by providing service and infrastructure while optimizing resources, sustaining the environment, and enhancing the well-being of the Army's workforce and community. The primary mission-related activities at ALC and BPRF are research and field testing of weapon systems. ALC and BPRF has integrated sustainable land use and the military mission within their mission statement. This mission is achieved through the natural resource management programs identified within this INRMP, environmental compliance, and regular evaluation of the military mission and land use at ALC and BPRF.

3.1.2 Define Impact to the Military Mission

While the military mission at ALC is achieved primarily within the laboratory facilities, the mission at BPRF requires open lands for field testing and research. Typical types of field tests involve fuses, explosive and pyrotechnic devices, telemetry systems, drones, and lasers. In addition, BPRF tests firing, recovery, and disassembly of explosive-loaded, fused projectiles for rockets, mortars, and cannons. The explosive testing facilities at BPRF are also available to other interested parties. The testing areas on BPRF are limited by wetlands, the Coastal Zone

Management Area, migratory bird habitat, and fish and wildlife habitat. ALC identified all of these significant natural resources and confines testing activities to the fields in the south central portions of BPRF to avoid and minimize impacts to these resources.

ALC also complies with environmental regulations and coordinates with state agencies, such as MDNR to ensure sustainable use of these lands. ALC operates under and meets requirements of permits for stormwater discharge and air emissions for generators and boilers.

3.2 NATURAL RESOURCES CONSULTATION REQUIREMENTS

3.2.1 Endangered Species Act

The ESA of 1973, as amended, requires lands under the jurisdiction of the DA, to conserve listed species. As defined in the ESA, conservation is the use of all methods and procedures necessary to bring any listed species to the point where protections provided by the Act are no longer necessary. Section 7 of the ESA requires the Army to formally consult and confer with the USFWS if any action by the Army may affect a listed species or critical habitat.

The ESA specifically requires agencies not to "take" or "jeopardize" the continued existence of any endangered or threatened species, or to destroy or adversely modify habitat critical to any endangered or threatened species. Under Section 9 of the Act, "take" means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect"; and under Section 7, "jeopardize" means to engage in any action that would be expected to "reduce appreciably the likelihood of the survival and recovery of a listed species by reducing its reproduction, numbers, or distribution."

Army policy on listed species includes the following elements: balancing mission requirements with endangered species protection, cooperating with regulatory agencies, and conserving biological diversity within the context of the military mission. As required by AR 200-1, the Army must ensure that it carries out mission requirements in compliance with requirements of the ESA. All Army land uses, including military training, testing, timber harvesting, recreation, and grazing, are subject to ESA requirements for the protection of listed species and critical habitat. In fulfilling its conservation responsibilities, the Army is required to work closely and cooperatively with USFWS, which is the federal agency responsible for enforcing the ESA. Installations are encouraged to engage in informal consultation with USFWS while planning projects or activities to ensure ESA compliance. In conserving biological diversity, installation commanders and Army natural resource managers are required to develop and implement policies and strategies to maintain viable populations of native plants and animals, maintain natural genetic variability within and among populations, maintain functioning representations of the full spectrum of ecosystems and biological communities, and integrate human activities with the conservation of biological diversity.

ALC is required to consult with the USFWS whenever they undertake an action that could have an impact on a listed species. Early informal consultation, including correspondence and discussions with USFWS, is the preferred method of consultation as it proactively addresses any concerns. Results of the informal consultation may identify the need for formal consultation, if

the activity may have an effect upon a listed species, as required under Section 7 of the ESA. Through the formal consultation process, the USFWS determine whether a proposed action is likely to jeopardize the continued existence of a listed species, destroy or adversely modify designated critical habitats, or potentially result in the incidental take of a species. The Section 7 formal consultation may result in the issuance of a biological opinion by USFWS, which outlines the conditions under which ALC may proceed with the proposed action in order to remain compliant with the ESA.

3.2.2 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act, enacted in 1940, prohibits take, possession, transport, or sale (among other actions) of live or dead eagles and their parts, nests, or eggs unless authorized by permit. "Take" is defined to include disturbing eagles. The term "disturb" means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause injury to an eagle, a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or nest abandonment. If an activity may disturb an eagle nest or roosting or foraging eagles, ALC will coordinate with USFWS for advice and recommendation for how to avoid disturbance and to determine whether a permit is necessary.

3.2.3 Migratory Bird Treaty Act

The MBTA is an international agreement among the United States, Canada and Mexico that protects designated species of birds. Many birds are protected under the MBTA. A complete list of all species of all migratory birds protected by the MBTA is in 50 CFR 10.13 and can be found at this link:

https://www.fws.gov/birds/management/managed-species/migratory-bird-treaty-act-protected-species.php

The MBTA regulates the taking of these birds, their nests, eggs, parts or products. The MBTA states that it is unlawful "at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, attempt to capture or attempt to kill, purchase, offer to purchase, deliver for shipment, ship, export, import, cause to be shipped, deliver for transport, transport or cause to be transported, carry or cause to be carried or receive for shipment, transportation, carriage or export, possess, offer for sale, sell, offer to sell, barter, offer to barter, any migratory bird, any part, nest or egg of any such bird or any part, nest or egg thereof;" unless and except as permitted by regulations in the MBTA. All persons, organizations and agencies are liable for prosecution for violations and must follow permitting requirements for taking migratory birds. Special purpose permits may be requested and issued that allow for the relocation or transport of migratory birds for management purposes.

3.2.4 Essential Fish Habitat

ALC would be required to coordinate with the NMFS regarding Essential Fish Habitat (EFH) in any cases where they propose to undertake an action that could have an impact under the

Magnuson-Stevens Fishery Conservation and Management Act (Public Law 94-265). This coordination protects essential breeding and critical life stage habitats for commercially important fish. SAV provides EFH to multiple species offshore at BPRF. NMFS recommends no in river work between 15 February and 15 June of any given year.

Spawning areas for brown trout, an important sport fish, are found upstream of ALC in the upper part of Paint Branch (the area upstream of Fairland Road). The Montgomery County Council has designated this area as a Special Protection Area based on its trout spawning capability, high water quality, and the threat posed by the intensity of existing and future development in the watershed. In an effort to preserve brown trout habitat, MDNR recommends no in-stream work between 1 October and 30 April of any given year.

3.2.5 Coastal Zone Management Act and Maryland Critical Area Law

The Coastal Zone Management Act of 1972 (16 USC 1451 - 1464, as amended) established a voluntary national program within the Department of Commerce to encourage coastal states to develop and implement coastal zone management plans. Subsequent to Federal approval, each state's plan was required to define boundaries of the coastal zone, to identify uses of the area to be regulated, the mechanism for controlling such uses, and broad guidelines for priorities of uses within the coastal zone. In addition, the 1972 law established a system of criteria and standards for requiring that Federal actions be conducted in a manner consistent with the federally approved plan (Section 307 of the Coastal Zone Management Act (CZMA)). Since the State of Maryland adopted the Critical Areas Law as part of their coastal zone management plan, land management actions at BPRF within the Critical Area should be consistent with the provisions of the Critical Areas regulations and guidelines.

In 1984, to safeguard the Chesapeake Bay from the negative impacts of intense development, the Maryland General Assembly enacted the Chesapeake Bay Critical Area Protection Program, a far-reaching effort to control future land use development in the Chesapeake Bay watershed. The ribbon of land within 1,000 feet of the tidal influence of the Chesapeake Bay was determined to be crucial because development in this "critical area" has direct and immediate effects on the health of the Bay. The Chesapeake Bay Critical Area Commission (2012) was charged with devising a set of criteria which would minimize the adverse effects of human activities on water quality and natural habitats and would foster consistent, uniform and more sensitive development activity within the Critical Area. In cooperation with the Critical Area Commission, local critical area management programs are administered by the 61 local governments whose jurisdictions are partially or entirely within the Critical Area.

Both ALC and BPRF are located within the Coastal Zone Management Area and BPRF is located within the Critical Area. Activities on both facilities are required to be consistent with the CZMA, and the components of the Critical Area program are listed below. In the event of disturbance within 1,000 feet of tidal waters of Maryland's Critical Area, the Critical Area Commission staff shall be contacted.

3.2.5.1 Components of the Critical Area Protection Program

The Critical Area Law requires that each local jurisdiction identify and provide for the establishment, preservation, and maintenance of Habitat Protection Areas. These areas include: a naturally vegetated 100-foot buffer (the Buffer) to tidal wetlands and waters; non-tidal wetlands; the habitats of threatened and endangered species, and species in need of conservation, and their habitat; significant plant and wildlife habitat; and, anadromous fish spawning areas.

Growth Allocation

To accommodate future growth, a local jurisdiction is authorized under the Critical Area Act to change a land use designation and allow development at a density or intensity which exceeds the limits of a site's original designation.

Native Trees and Shrubs Recommended for Planting in the Critical Area

Native shrubs and trees are the species indigenous to an area - occurring prior to European contact. Over the past several hundred years, humans have imported or bred plants to suit their cultural, aesthetic, and environmental needs. A number of species have escaped from cultivated gardens or were planted intentionally into natural areas for wildlife benefit, only to cause havoc in the local ecosystem. While some of these plants do provide benefits to wildlife, the long range results are areas that cannot provide for the year round needs of wildlife and are aesthetically unpleasing.

100-Foot Buffer

A keystone of the Chesapeake Bay Critical Area Protection Program is the establishment, preservation, and maintenance of a 100-foot, naturally vegetated, forested buffer (the Buffer) landward from the Mean High Water Line of tidal waters or from the edge of tidal wetlands and tributary streams. The Buffer acts as a water quality filter for the removal or reduction of sediment, nutrients, and toxic substances found in runoff. The Buffer also minimizes the adverse impact of human activities on habitat within the Critical Area. No disturbance of the Buffer may be permitted by local jurisdictions unless an applicant can meet the strict provisions for a variance.

Non-Tidal Wetlands

The minimum standards established by the state and adopted by the local jurisdictions for the conservation of non-tidal wetlands in the Critical Area include: (a) the establishment and maintenance of a vegetated buffer of 25 feet around areas identified as non-tidal wetlands; (b) new development must not substantially damage or change the character of non-tidal wetlands; (c) only new development that is intrinsically water-dependent, or of substantial economic benefit to the public, is allowed to disturb non-tidal wetlands. In the event of such development, measures must be taken to replace lost non-tidal wetlands and to provide for water quality benefits and habitat protection equal to or greater than that provided by the original wetlands.

Significant Plant and Wildlife Habitat

The Critical Area Criteria require that protection be afforded plant and wildlife habitats which are of significance from a state-wide or local perspective because of their rarity. Under the Criteria, habitats identified for protection include colonial water bird (heron, egret, tern, etc.) nesting areas;

aquatic areas of historic waterfowl concentration; riparian forests (forested areas of 300 feet in width along streams and the Bay's shoreline); relatively undisturbed, large (100 acres or more) tracts of forest which support breeding populations of forest interior-dwelling birds (vireos, warblers, flycatchers, woodpeckers, etc.); certain plant and animal communities which are the best examples of their kind in Maryland; and other areas determined to be of local significance.

3.2.5.2 Critical Areas Land Use Classifications

Portions of BPRF which lie in the state-designated Critical Area are identified on **Figure 2-14**. Lands within the Critical Area are classified into three categories of management areas, in which different types and intensities of uses are allowed to occur.

Intensely Developed Areas (IDAs)

Intensely Developed Areas (IDAs) are defined as areas of twenty or more adjacent acres where residential, commercial, institutional or industrial land uses predominate. IDAs are areas of concentrated development where little natural habitat occurs. In IDAs, the Law requires that new development and redevelopment be accompanied by techniques to reduce water quality impacts associated with stormwater runoff. These techniques are often referred to as best management practices (BMPs). The Criteria specify that these techniques be capable of reducing pollutant loads generated from a developed site to a level at least 10% below the load generated at the same site prior to development. BMPs for meeting the 10% rule include filter and infiltration systems along with stormwater wetland and pond systems. In some cases IDA on-site compliance with the 10% rule proves impossible. In those cases, local jurisdictions may provide an offset program by which equivalent water quality benefits are achieved off-site but within the same watershed. In addition, the clustering of development reduces the amount of impervious surfaces and increases the area of natural vegetation thereby lessening adverse impacts to water quality and habitat areas. The Criteria also specify that development activities minimize destruction of forest and woodland vegetation and secure Habitat Protection Areas. Urban forestry programs benefit water quality by controlling sediment, by reducing runoff and by removing nutrients and other potential pollutants. They also furnish direct habitat value by providing sources of food and areas of temporary shelter for some wildlife species.

Limited Development Areas (LDAs)

Limited Development Areas (LDAs) are areas in which development is of a low or moderate intensity. LDAs contain areas of natural plant and animal habitats but are not dominated by agriculture, wetland, forest, barren land, surface water or open space. The quality of runoff from these areas has not been substantially altered or impaired. Housing densities in LDAs are between one dwelling unit per five acres and four dwelling units per acre. Areas with IDA characteristics but with fewer than 20 acres are classified as LDAs. Development or redevelopment of LDAs must not change the prevailing character of land use and must improve water quality. It must also conserve existing areas of natural habitat and incorporate wildlife corridors that ensure continuity of wildlife and plant habitat. The retention and increase of forested areas is of paramount concern to the health of the Chesapeake and its tributaries. Forest cover affords the Bay a host of benefits including habitat and water temperature mediation. Forest cover also reduces and filters runoff. The Criteria stipulate that developers replace cleared forest cover in ratios ranging from 1:1 to 3:1.

In areas of new development or redevelopment, where no forest coverage existed previously, 15% of the area must be planted with trees. The Criteria allow development in areas where slopes rise 15% or more above grade only if such development can be shown to control soil erosion and runoff. Impervious surfaces (those through which water will not run) contribute to runoff and so threaten the quality of the Bay's waters. Such coverage in LDA development or redevelopment is limited to between 15% and 25% according to the nature and history of the site. Developers are strongly encouraged to use permeable surfaces.

Resource Conservation Areas (RCAs)

RCAs are characterized by natural environments or by resource-utilization activities. Resource-utilization refers to such activities as agriculture, aquaculture, commercial forestry and fisheries activities which the Criteria consider protected land uses. The Criteria limit new development in RCAs to one dwelling unit per 20 acres. The "1-in-20" criterion is intended to ensure that RCAs maintain a natural character, preserving favored land uses while avoiding fragmentation of areas providing adequate to robust wildlife and plant habitat. New commercial and industrial facilities are not allowed in RCAs and that development which is allowed in the RCAs must conform to the standards set for LDAs. Timber harvests conducted in the Critical Area must be done pursuant to a Timber Harvest Plan approved by the MDNR. Such plans, prepared by professional foresters, provide for the protection of water quality, continuity of habitat and the reforestation of timbered areas.

3.2.5.3 Army Chesapeake Bay Strategy

The Army has initiated the Army Chesapeake Bay Strategy in order to address the major issues confronting the bay, including nutrient and sediment pollution, toxic chemical contaminants, habitat loss and over-harvesting of fish and shellfish.

The five main goals of the strategy are to:

- Contribute to restoring and sustaining the water quality of the Chesapeake Bay and its tributaries.
- Restore and sustain living resources and healthy habitats on Army installations.
- Support the implementation of ecosystem-based fisheries management.
- Strengthen stormwater management practices and maintain healthy watersheds.
- Foster Chesapeake Bay stewardship.

Army Installations and USACE continue to develop plans, designs, and construction projects related to ecosystem restoration, navigation, and flood risk management with support from non-federal sponsors in the Chesapeake Bay region (U.S. Army, 2009).

To facilitate collaboration among its installations located within the Chesapeake Bay watershed, the DoD formed a Chesapeake Bay Action Team. ALC participates in these quarterly conference calls.

3.2.6 Wetlands

The U.S. Congress enacted the CWA in 1972 to "*restore and maintain the chemical, physical, and biological integrity of the Nation's waters*." Section 404 of the CWA delegates jurisdictional authority over wetlands to USACE and the U.S. Environmental Protection Agency (USEPA). Waters of the United States protected by the CWA include rivers, streams, estuaries, and most ponds, lakes, and wetlands. USACE and USEPA jointly define wetlands as…"*areas that are inundated or saturated by surface or ground water 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. Wetlands generally include swamps, marshes, bogs, and similar areas*." Wetland functions and values include but are not limited to the following: ground water recharge, ground water discharge, flood flow alteration, sediment stabilization, sediment or toxicant retention, nutrient removal or transformation, production export, wildlife diversity/abundance, aquatic diversity/abundance, uniqueness/heritage, and recreation.

Section 404 of the CWA also regulates the discharge of dredge or fill material into wetlands and Waters of the U.S. Any earth-moving activities that may impact wetlands should be avoided; if found unavoidable, coordination with USACE and MDE is required to apply for the appropriate permit to conduct the activity. MDE also regulates activities within 25-feet of non-tidal wetlands and 100-feet of tidal wetlands and waters, where impacts should be avoided or best management practices be employed.

3.2.7 Tribal Governments

In compliance with the American Indian Religious Freedom Act, Executive Order 13007 (Indian Sacred Sites), and DoDI 4715.03, APG must allow Native Americans access to installation sites and resources that are of religious importance, or that are important to the continuance of their cultures, subject to installation safety and security. Sacred sites and traditional cultural properties are identified at the discretion of federally recognized Native American tribes in consultation with APG's Cultural Resources Manager. There are currently no designated Native American sacred sites or traditional cultural properties on ALC or BPRF.

For Tribal Government consultations, ALC and BPRF engages four Native American tribes: the Delaware Tribe of Indians, the Eastern Shawnee Tribe of Oklahoma, the Delaware Nation of Oklahoma, and the Seneca-Cayuga Nation. Tribal governments are consulted as part of the NEPA process at the time of INRMP revisions, and at other times as warranted.

3.2.8 Maryland State Historical Trust

The Natural Resources Manger coordinates internally with Cultural Resources staff to ensure that natural resource management actions are conducted in accordance with the Integrated Cultural Resources Management Plan, and in compliance with federal and state historic preservation laws. For example, actions may require archaeological surveys prior to ground disturbance and

consultation with the Maryland State Historic Preservation Office (SHPO) for impacts to historic structures or cultural resources sites.

3.3 NEPA COMPLIANCE

NEPA was signed into law on January 1, 1970. NEPA requires federal agencies to be instrumental in environmental protection. NEPA is the basic national charter for the protection of the environment and it mandates that Federal agencies use a systematic, interdisciplinary approach to ensure that the impacts of Federal actions on the environment are considered during the decision-making process (NEPA, 1969). Under NEPA, Federal agencies that fund, support, permit, or implement major programs and activities are required to assess the environmental impact of implementing their actions early in the planning process. While the NEPA process is not intended to fulfill the specific requirements of other environmental statutes and regulations, the process is designed to provide the decision-maker with an overview of the major environmental resources to be affected, the interrelationship of these components, and potential conflicts. As such, the NEPA process begins in the early stages of the decision-making process to ensure that planning decisions reflect environmental values, avoid delays later in the process, and head off potential conflicts (CEQ, 1978).

32 CFR 651, E*nvironmental Analysis of Army Actions*, requires full disclosure, documentation, and mitigation of significant impacts on the human environment for Army and Army-related actions (e.g. military training, new technology, equipment testing, construction projects, land management actions, real property transactions, etc.). The purpose of NEPA is to analyze impacts of proposed actions and alternatives for use as a planning and decision-making tool and to give the public a platform for active involvement to ensure (1) federal agencies identify environmental problems; (2) provide alternatives; and (3) mitigate impacts when used early in the planning stages of project development. Integration of NEPA requirements with other planning requirements at the earliest possible time ensures that all activities (construction projects, mission changes, and services contracts) are reviewed for impacts on overall natural resources issues, and ensure that the NEPA documentation fully addresses direct, indirect, and cumulative impacts of activities on natural resources or, in particular, biodiversity.

3.3.1 Levels of Documentation and Public Involvement

There are three main levels of NEPA documentation, each of which has specific levels of analysis and complexity and is dependent on the extent and significance of the impact:

(1) The simplest level of documentation of an action is the REC. This document and its associated categorical exclusions are used when an action individually and cumulatively has already been determined to not have a significant impact on the human environment, but have effects that need to be documented.

(2) A more complex level of documentation is the EA. This document is intended to facilitate agency planning and decision-making by increasing the understanding of the potential effects of a proposed action and any alternatives to the action on the human environment.

An EA requires a 30-day public comment period and followed by the publishing of a Finding of No Significant Impact (FNSI), if warranted, which describes the EA's conclusions. If a FNSI is not warranted, then an Environmental Impact Statement (EIS) is required.

(3) The most comprehensive level of NEPA documentation is the EIS. This document is a detailed written statement required by NEPA for major federal actions that have a significant adverse impact on the human environment and includes an extensive analysis of the proposed action and the alternatives. Public meetings and hearings as well as three published documents for public review are required components of an EIS:

a. Notice of Intent (NOI) – a public notice that an EIS will be prepared
b. Notice of Availability (NOA) – a notice published to inform the public that the EIS is available for review
c. Record of Decision (ROD) – a concise public document summarizing the findings and the basis for the decision.

In accordance with 32 CFR 651, the environmental review process is initiated early in the concept/planning stages of a proposed action. 32 CFR Part 651 and the Council on Environmental Quality recommend a REC be completed for INRMPs. Recognizing the efficiencies and benefits associated by combining the INRMP and its associated REC into one document, this plan has been developed to satisfy both requirements. The INRMP has been reorganized from Army Guidelines to accommodate NEPA documentation within the plan. The REC is included in **Chapter 6**.

3.3.2 Mitigation Measures

Mitigation is a means to offset damage to the environment when it cannot be avoided through the NEPA process. Below are the six general mitigation tactics, as outlined in 32 CFR 651:

(1) Avoidance: Avoiding the impact altogether by not taking a certain action or parts of an action. This method avoids environmental impact by eliminating certain activities in certain areas.
(2) Minimize impacts: Minimizing impacts by limiting the degree or magnitude of the action and its implementation. Limiting the degree or magnitude of the action can reduce the extent of an impact.
(3) Restoration of the environment: Rectify the impact by repairing, rehabilitating, or restoring the effect on the environment. This method restores the environment to its previous condition or better.
(4) Preservation and maintenance operations: Reduce or eliminate the impact over time by preservation and maintenance operations during the life of the action. This method designs the action so as to reduce adverse environmental effects.
(5) Compensation: Compensate for the impact by replacing or providing substitute resources or environments. This method replaces the resource or environment that will be impacted by the action. Replacement can occur in-kind or otherwise.

(6) Replacement: Replace the resource or environment that will be impacted by the planned projects. Replacement can occur on-site or at another location. This could involve creation of the same type or better quality habitat for a particular impacted fish or wildlife species or creation of habitat for another species.

Mitigation that is identified in a FNSI is a Class 1 "must fund" for environmental purposes (see **Section 5.1.1,** Environmental Funds). This provides a reliable mechanism to fund mitigation included in NEPA documents.

3.4 BENEFICIAL PARTNERSHIPS AND COLLABORATIVE RESOURCE PLANNING

ALC maintains a partnership with MDNR Wildlife and Heritage Division for the coordination of the managed hunting program at BPRF. The MDNR provides professional wildlife biology advice and recommendations regarding game species on the facility. White-tailed deer are the only wildlife species that are presently managed for consumptive use at BPRF.

A State of Maryland waterfowl management program was previously in place, but currently there is no waterfowl hunting on BPRF. Non-game species management is also conducted with assistance from federal and state wildlife agencies.

The Army has initiated the Army Chesapeake Bay Strategy in order to address the major issues confronting the bay, including nutrient and sediment pollution, toxic chemical contaminants, habitat loss and over-harvesting of fish and shellfish.

The five main goals of the strategy are to:

- Contribute to restoring and sustaining the water quality of the Chesapeake Bay and its tributaries.
- Restore and sustain living resources and healthy habitats on Army installations.
- Support the implementation of ecosystem-based fisheries management.
- Strengthen stormwater management practices and maintain healthy watersheds.
- Foster Chesapeake Bay stewardship.

Army Installations and USACE continue to develop plans, designs, and construction projects related to ecosystem restoration, navigation, and flood risk management with support from non-federal sponsors in the Chesapeake Bay region (U.S. Army, 2009).

To facilitate collaboration among its installations located within the Chesapeake Bay watershed, the DoD formed a Chesapeake Bay Action Team. ALC participates in these quarterly conference calls.

3.5 PUBLIC ACCESS AND OUTREACH

3.5.1 Public Access and Outdoor Recreation

ALC and BPRF are classified as closed posts, but visitors can be granted access with the proper credentials and a reason to visit. There is currently no Morale, Welfare and Recreation support or Family Housing at either installation.

Outdoor recreation at ALC is available to on-site personnel through an outdoor fitness trail consisting of multiple par course stations along Floral Drive from the 400 to 600 Areas. Should a member of the public inquire about outdoor recreation opportunities, the Natural Resources Manager would work with the Garrison personnel to accommodate the request. All recreational opportunities at ALC and BPRF are open and accessible to anyone regardless of race, religion, creed, national origin or sex.

BPRF currently provides a managed hunting program for white-tailed deer conducted in cooperation with the MDNR. The managed hunting program is conducted via a firearms season exemption for managed hunts from MDNR. The managed hunting season runs from October to December and BPRF can hose approximately five hunters per business day. The bag limit per person and the overall season bag limit is set using the results of the yearly spring white-tailed deer Forward Looking Infrared Camera (FLIR) surveys. In 2021, hunters were allowed to harvest up to eight deer (four antlerless and two antlered). The overall bag limit for the program in 2021 was 65 deer.

Shotgun is the only weapon authorized for hunting at BPRF. Ammunition used is slug only. Hunting is conducted from stationary stands (located north of the range) which provides a safe environment for the hunters. Stationary stands are more secure than portable stands (less risk of collapse and falls) and shooting from a tree stand at a downward angle provides an additional safety measure.

Conservation Law Enforcement Officers (CLEO) are stationed at APG, but not at ALC or BPRF due to the size of the installations and due to budget constraints. The hunts at BPRF are conducted using Garrison personnel that serve as Wildlife Conservation Officers (WCO) that are appointed by the Garrison Commander. WCOs check hunter's credentials (i.e., Maryland hunting license, safety certificate and shooter qualification) and provide assistance to and from the tree stand if needed. WCOs track deer, ensure harvested deer are properly tagged before leaving BPRF and enter harvest data on the yearly tracking spreadsheet. If outside assistance was needed, the Charles County Sheriff's Department or the MDNR Natural Resources Police would respond to BPRF.

The Rules and Regulations for the managed hunts and a sample hunting permit are included in the White-tailed Deer Management Plan in **Appendix N**. The Rules and Regulations contain the yearly hunting permit fee. The Natural Resources Manager maintains survey and harvest records in the Conservation/Deer Management Folder on the K drive.

3.5.2 Public Outreach

BPRF has hosted the MDNR "Becoming an Outdoors Woman" White-tailed Deer Hunting

Workshop. The workshop consists of a one-day classroom and field work shop and an antlerless white-tailed deer hunt on the second day for members of the public.

The public has been solicited by public notice every two years on their interest to establish a Restoration Advisory Board (RAB) for the MMRP program. To date, there has not been sufficient interest to establish a RAB.

3.5.3 Organizations Involved in Public Affairs and Outreach for Natural Resources Programs

The Public Affairs Office is responsible for communications with the public regarding natural resources. Currently, the Public Affairs office publishes public notices for NEPA documents and the solicitation for establishment of a RAB, and develops the program for communicating ALC and BPRF mission and operations to the public.

3.5.4 Natural Resources Awareness Programs

Natural resources awareness programs include making the INRMP available to all personnel on ALC and BPRF. The APG Natural Resources Team hosts a quarterly Conservation Subcommittee Meeting where tenants are invited to hear updates on natural resources projects and issues on the installations.

The ACL Environmental Team hosts an annual Earth Day Walk and puts up poster displays to educate personnel on the environmental and natural resources programs on ALC. The Environmental Division also contributes environmental stories to the ALC News and Facebook page throughout the year.

Personnel and customers at BPRF are made aware of the eagle and osprey nest areas, and protected habitats. Photographs of the listed species such as the rainbow snake and NLEB are posted on the bulletin board in Building 511 at BPRF.

3.6 STATE WILDLIFE ACTION PLAN

Under the Congressional requirements of the relatively new State and Tribal Wildlife Grant Program, all state fish and wildlife agencies had to submit a State Comprehensive Wildlife Conservation Plan or Strategy by October 1, 2005 to the USFWS. These strategies will provide an essential foundation for the future of wildlife conservation and a stimulus to engage the states, federal agencies and other conservation partners to strategically think about their individual and coordinated roles in prioritizing conservation efforts in each state and territory.

In order to meet these requirements, MDNR developed the *Maryland Wildlife Diversity Conservation Plan* in 2005. The plan was intended to summarize the current knowledge of the status of Maryland's wildlife and to guide future efforts in Maryland's wildlife conservation. The Natural Heritage Program, part of the Wildlife and Heritage Service, is the lead agency for the

plan's development, with significant input from the Maryland Biological Stream Survey (MBSS) and other public and private stakeholders.

As required by Congress, the Plan must address the needs of both "species in greatest need of conservation" and the "full array of wildlife". Congress has identified eight elements to be examined in the Plan. These elements are:

(1) Information on the distribution and abundance of species of wildlife, including low and declining populations as the State fish and wildlife agency deems appropriate, that are indicative of the diversity and health of the State's wildlife; and,
(2) Descriptions of locations and relative condition of key habitats and community types essential to conservation of species identified in (1); and,
(3) Descriptions of problems which may adversely affect species identified in (1) or their habitats, and priority research and survey efforts needed to identify factors which may assist in restoration and improved conservation of these species and habitats; and,
(4) Descriptions of conservation actions proposed to conserve the identified species and habitats and priorities for implementing such actions; and,
(5) Proposed plans for monitoring species identified in (1) and their habitats, for monitoring the effectiveness of the conservation actions proposed in (4), and for adapting these conservation actions to respond appropriately to new information or changing conditions; and,
(6) Descriptions of procedures to review the strategy at intervals not to exceed ten years; and,
(7) Plans for coordinating the development, implementation, review, and revision of the plan with Federal, State, and local agencies and Indian tribes that manage significant land and water areas within the State or administer programs that significantly affect the conservation of identified species and habitats; and,
(8) Congress also affirmed through this legislation that broad public participation is an essential element of developing and implementing these plans, the projects that are carried out while these plans are developed, and the Species in Greatest Need of Conservation that Congress has indicated such programs and projects are intended to emphasize.

The 2005 Plan was revised in 2015 and published in June 2016. The plan is now titled the *Maryland State Wildlife Action Plan 2015-2025*. The entire plan can be viewed at:

http://www.dnr.state.md.us/wildlife/Pages/plants_wildlife/SWAP_Submission.aspx
Maryland's 2015 Plan outlines 24 statewide conservation actions. Habitat loss and fragmentation are common themes among the many significant threats addressed in the plan. Through this plan, several species of greatest conservation need have been identified (**Table 3-1**). The list of species can be viewed at:

http://www.dnr.state.md.us/wildlife/Documents/SWAP/SWAP_Chapter3.pdf

A description of Magnolia bog habitat (PMB) can be viewed at:

http://www.dnr.state.md.us/wildlife/Documents/SWAP/SWAP_Chapter4.pdf

Table 3-1. Wildlife Diversity of Maryland Taxa

	Total*	State-listed	Federally-listed	S1 - S3 Ranked	G1 – G3 Ranked	GCN
Mammals	97	19	8	20	17	41
Birds	443	33	6	127	8	141
Herpetofauna	89	19	6	23	10	45
Fishes	>300	17	4	24	6	31
Invertebrates	20,000+	76	3	207	103	350
Total	Over 20,000	164	27	401	144	608

*Native species, including those that have become extirpated in the state.

Key: S1 = Critically imperiled in the state
S2 = Imperiled in the state
S3 = Rare to uncommon and potentially vulnerable to extirpation within in the state
G1 = Critically imperiled across its entire range (i.e., globally)
G2 = Imperiled across its entire range (i.e., globally)
G3 = Rare across its entire range (i.e., globally) or distributed locally in a restricted range
GCN = Species of Greatest Conservation Need

(Source: Maryland State Wildlife Action Plan, 2015)

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4.0 PROGRAM ELEMENTS

This chapter discusses the elements of the ALC natural resource management program. The natural resource management goals and objectives are described in **Chapter 1**, **Table 1-1** and are carried through this chapter where management objectives, ongoing activities and new projects are described and are also summarized in **Appendix B**.

4.1 NATURAL RESOURCES MANAGEMENT PROGRAM

4.1.1 Current Management

This INRMP identifies the components of the ALC natural resources management program. The overarching goal for natural resource management is to implement a natural resources management program that reflects the principles of ecosystem management and ensures the sustainability of the military mission. There are several management plans, strategies and programs that are integrated to create a comprehensive and sustainable program that manages natural resources and supports the military mission. The natural resource management goals and objectives are listed in **Chapter 1** and found with management objectives throughout this chapter and in **Appendix B**.

Ongoing natural resource management programs are described in the following sections. Regular internal reviews of this INRMP occur annually and updates are completed as necessary. The ALC DPW uses this INRMP to guide mission-related activities and related programs to ensure sustainable use of resources while meeting the military mission.

Climate Change

This INRMP also considers global environmental effects, including the global atmosphere, in accordance with the requirements of EO 12114. DoDI 4715.03 requires this INRMP to assess the potential impacts of climate change on natural resources and to adaptively manage such resources to minimize adverse mission impacts.

The Army has identified climate change as a direct threat to the national security of the U.S. Installations must effectively reduce climate vulnerability through a variety of resilience measures tailored to the local threats and estimated consequences in ongoing natural resource planning.

The Army's Climate Assessment Tool was initially developed in 2018 in response to the National Defense Authorization Act (NDAA) for Section 335 requirements and subsequently launched in 2020 to aid installations in assessing the potential exposure to impacts from coastal and riverine flooding, drought, energy demand, heat, historical extreme conditions, land degradation and wildlife. The tool presents information on climate risks as a preliminary step toward understanding potential impacts to mission and operations. An initial version of this tool was made available to 73 installations, including ALC and BPRF. An updated version with data on more climate impacts is now available for deployment at 116 installations. Army policy requires natural resources managers at these installations to use the tool to understand projected climate threats to their

installations and be prepared to incorporate climate resilience measures into their natural resources master plans.

Greenhouse gases (GHG) are components of the atmosphere that contribute to the greenhouse effect and global warming. GHGs can occur naturally in the atmosphere or result from human activities, such as the burning of fossil fuels. Federal agencies, states, and local communities can address global warming by preparing GHG inventories and adopting policies that will result in a decrease of GHG emissions produced by humans.

According to the Kyoto Protocol, there are six GHGs: carbon dioxide (CO_2), nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (see **Table 4-1**). Although some GHG (CO_2, methane, and nitrous oxide) occur naturally in the atmosphere, human activities have changed GHG atmospheric concentrations. From the pre-industrial era (i.e., ending about 1750) to 2018, concentrations of CO_2 have increased globally by 46 percent. Within the United States, fuel combustion accounted for 92.8 percent of CO_2 emissions in 2018. Globally, approximately 32,840 million metric tons of CO_2 were added to the atmosphere through the combustion of fossil fuels in 2017, of which the United States accounted for approximately 15 percent (USEPA, 2020).

Table 4-1. Greenhouse Gases and Common Sources and Uses

Greenhouse Gas	Common Sources/Uses
Carbon dioxide (CO_2)	Mobile and stationary combustion
Methane	Coal mining, fuel combustion
Nitrous oxide	Fuel combustion, fertilizers
Hydrofluorocarbon gases	Refrigerants, fire suppressants, various manufacturing processes
Perfluorocarbon gases	Electrical equipment, various manufacturing processes, refrigerants, medicine
Sulfur hexafluoride	Electrical equipment, various manufacturing processes, tracer in air modeling, medicine

Source: USEPA, 2020

4.1.2 Proposed Management

ALC will continue the natural resource management program through implementation of existing plans and strategies, and through undertaking the proposed management activities and objectives listed throughout this chapter. The ALC Natural Resource Manager will coordinate with the AEC Natural Resources Community of Practice. The website can be viewed at: https://home.army.mil/aec/.

Other natural resources support will be provided by the DoD Natural Resources Program. The website can be viewed at: https://www.denix.osd.mil/nr/.

ALC will annually review and update this INRMP, as required in AR 200-1 (2007), and also coordinate updates with USFWS and MDNR. The INRMP must also be updated and coordinated for signatures from ALC, USFWS and MDNR at least every five years. The list of goals and objectives (**Appendix B**) can be used to guide the review and adjust programs, per the adaptive management process. ALC will also maintain cooperative agreements and regular coordination with USFWS and MDNR for the management of natural resources and for environmental compliance purposes.

Climate Change

According to the Nature Conservancy's Climate Wizard, the average temperature in Maryland could rise as much as six degrees by the year 2050 (The Nature Conservancy, 2018). As temperatures rise, more extreme weather can cause more intense rainstorms and flooding on ALC and BPRF. Shoreline erosion can be accelerated on BPRF. Warmer temperatures could also cause longer periods of drought which can create conditions that can lead to more frequent wildfires, the loss of native flora and fauna, and the increase of nonnative and invasive flora and fauna (NRDC, 2014).

Using the screening-level impact assessment (National Standard View) of the Army's Section 335 Climate Assessment Tool (https://corpsmapr.usace.army.mil/cm_apex/f?p=116), natural resource managers are able to view maps of projected installation vulnerability through 2050 and 2085 for each of eight impact types (coastal and riverine flooding, drought, energy demand, heat, historical extreme conditions, land degradation and wildlife).

Figure 4-1 provides a one-stop visualization of overall exposure to climate for ALC. Drought is the highest risk category for ALC. Figure 4-2 provides a similar visualization for BPRF. The four categories of most concern at BPRF include drought, wildfire, and riverine and coastal flooding, again with drought being the highest risk category.

In 2009, Maryland adopted the Greenhouse Gas Emissions Reduction Act of 2009 (GGRA). The Plan calls for 44 percent reduction in greenhouse gas emissions by 2030, surpassing the 40 percent reduction goal required by state laws (MDE, 2019). The Plan can be viewed at: https://mde.maryland.gov/programs/Air/ClimateChange/Pages/Greenhouse-Gas-Emissions-Reduction-Act-(GGRA)-Plan.aspx.

The Metropolitan Washington Council of Governments the *National Capital Region: Best Practices and Policies to Reduce Greenhouse Gases* in 2008. It describes programs to reduce greenhouse gases that have been adopted by localities in the National Capital Region and that are available as tools to communities seeking more sustainable options for growth and development (MWCG, 2008). The plan can be viewed at: https://www.mwcog.org/documents/2008/02/26/national-capital-region-best-practices-and-policies-to-reduce-greenhouse-gases-air-quality-greenhouse-gas/.

Projects that will help ALC prepare for climate change include the Shoreline Survey and Management Plan for BPRF (**Appendix J**), a future request to complete shoreline restoration at

BPRF and the Stream Survey for ALC (including restoration recommendations to repair and prevent further stream bank erosion). The Wildland Fire Management Plan can also prepare the installations for the possible increase in wildfires.

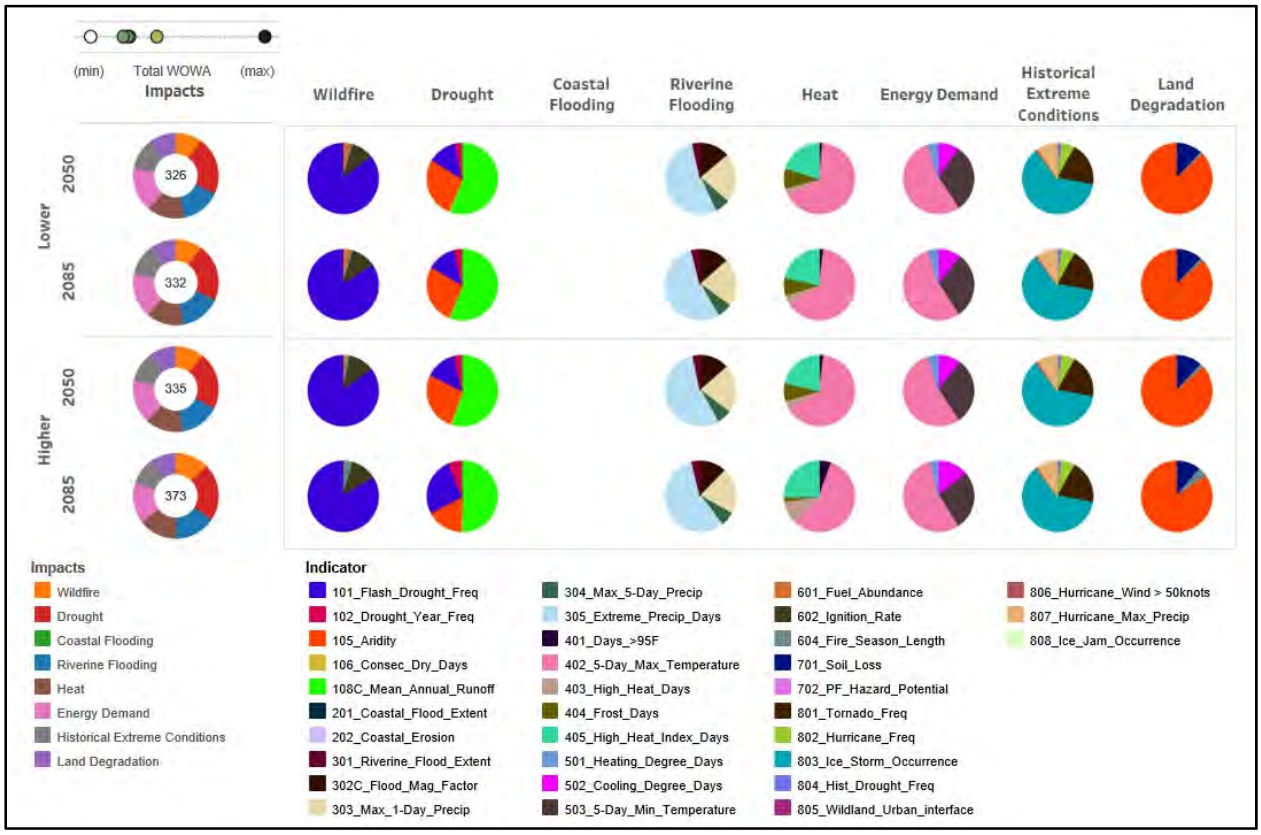


Figure 4-1. ALC Climate Risk Factors

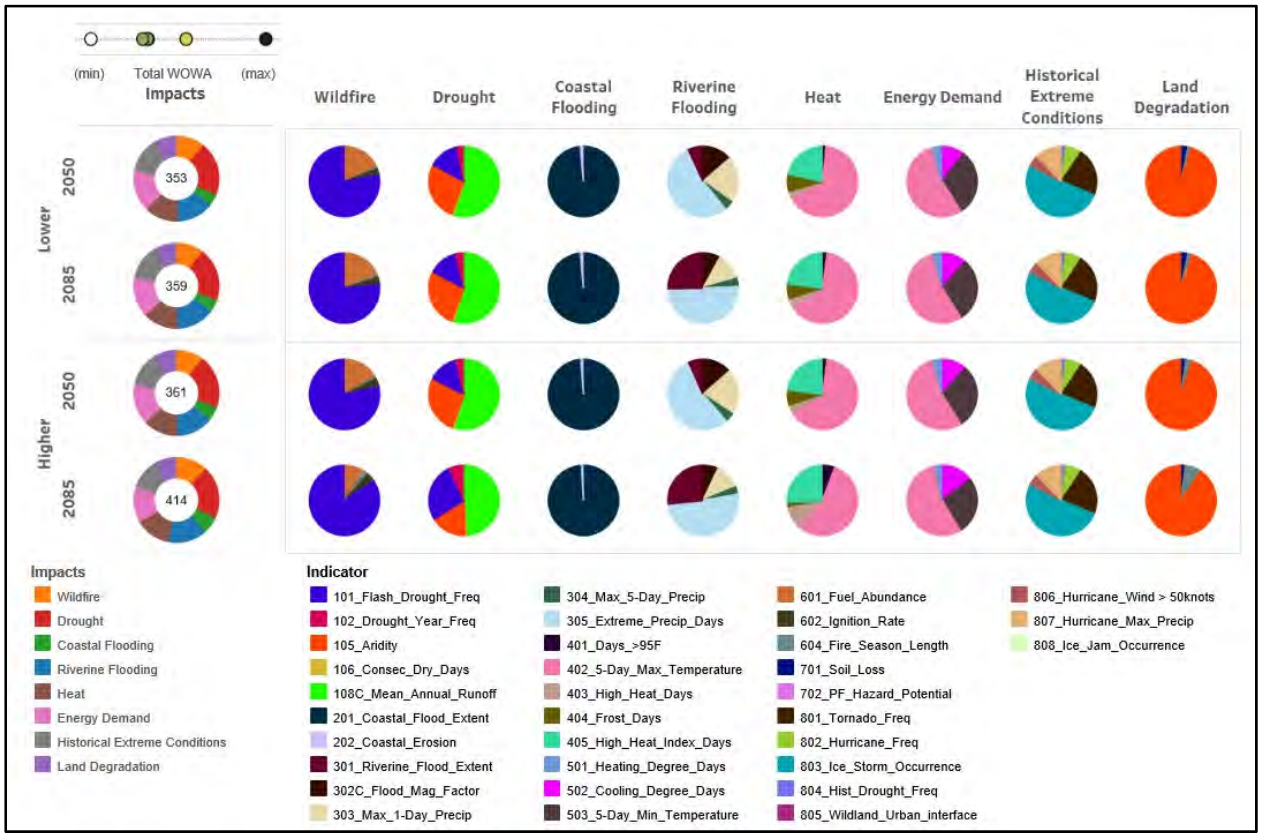


Figure 4-2. BPRF Climate Risk Factors

4.2 THREATENED AND ENDANGERED SPECIES MANAGEMENT

4.2.1 Current Management

The management goal for rare, threatened and endangered species on ALC and BPRF is to ensure protection of federal- and state-listed threatened and endangered species and species of special concern and undertake management measures that support conservation and recovery of these species consistent with the military mission. The objectives for this goal include:

- Identify and preserve these species in accordance with the ESA, Endangered Species Recovery Plans, U.S. ARs and guidance, and approved site-specific management plans, including ESMPs.

- Protect unique plant species identified as rare statewide or locally, but without legal protection status, to the extent practical without restricting key mission operations.

Ongoing efforts towards this goal include, a Rare, Threatened and Endangered Species Survey conducted on ALC and BPRF in August 2015 (**Appendix G**) and as part of the PLSs for this

INRMP in summer of 2020. No listed species, Federal or state, were observed during these surveys.

The bald eagle is no longer protected under the ESA, but is protected under the Bald and Golden Eagle Protection Act. A management plan was updated in 2016 for the bald eagle, which nests on BPRF. The plan provides guidance for BPRF personnel including the location of nest buffers and Standard Operating Procedures (SOPs) to ensure compliance with the Bald and Golden Eagle Protection Act (BGEPA).

Habitat exists at BPRF that would support populations of the small whorled pogonia, though the plant has not been observed. ALC has undertaken a proactive approach to identifying potential individuals of this federally-threatened species.

The Potomac River, adjacent to BPRF, may provide spawning habitat for sensitive fish species and the Federally-listed Atlantic sturgeon. ALC avoids in-river disturbance and coordinates with MDNR if disturbance may be required to complete the military mission.

ALC and BPRF contain habitat for the federally-threatened NLEB. A survey was conducted on both installations in the summer of 2019. The NLEB was found on ALC and BPRF via acoustic recordings during a previous 2016 survey, but not during the 2019 survey. There are currently no known hibernaculum or maternity trees on ALC or BPRF.

A spotted turtle was observed on BPRF in 2012, 2016 and 2018. If this species is listed, additional surveys will be conducted in the future.

The rusty patched bumble bee was listed as endangered in January 2017. This bee has historically been found east and west of the D.C. Metro Area. ALC consulted with the USFWS Ecological Services Office in April 2017 regarding the bee. USFWS said that no action was necessary at this time since there are no extant occurrences of the bee in Maryland.

4.2.2 Proposed Management

ALC will continue the current management measures for the protection of rare, threatened and endangered species. In addition, ALC will undertake the following management measures to meet the management goals and objectives:

- Regularly conduct surveys for federally- and state-listed rare, threatened and endangered species and species of concern at ALC and BPRF. If any species are located, coordinate with the USFWS and MDNR, as appropriate, and develop the appropriate level of management plan (i.e., ESMP, monitoring plan) for their protection.

- Follow the USFWS 30-day streamlined consultation process for any projects that could affect the NLEB.

- Plant more pollinator gardens on ALC and explore a garden for BPRF. Ban the use of neonicotinoid pesticides on ALC and BPRF. There are currently no neonicotinoid pesticides in the ALC pesticide inventory.
- Avoid disturbance to in-river habitat to protect spawning habitat for the federally protected Atlantic sturgeon. Disturbance to in-river habitat should be both seasonal and minimized. Generally, no in-stream work likely to result in suspended sediments within the water column is allowed in this area of the Potomac River between 15 February and 15 June, inclusive, of any year. In August 2017, the Potomac River was designated as Critical Habitat for the Chesapeake Bay Distinct population segment of the sturgeon.

- Monitor the PMB and avoid any disturbance to this rare habitat. Avoid an increase in sediments or nutrients to the bog from increased impervious area, fertilizers, and septic systems. Remove small trees encroaching this site, such as red maple, tulip tree and sycamore saplings that are less than four inches in diameter. Manually remove invasive species, specifically Japanese stiltgrass (*Microstegium vimineum*) in early August. Manage invasive species encroachment along the nearby road using herbicide. Coordinate invasive species control with the adjacent landowner and Maryland-National Capital Park and Planning. Also note that this site has a globally rare status and is considered a Wetland of Special State Concern, which includes a 100-foot upland buffer to this site.

- Consider designating the PMB as a Special Natural Area by the Garrison Commander.

4.3 WETLANDS MANAGEMENT

4.3.1 Current Management

EO 11990 requires that federal agencies minimize any significant action that contributes to the loss or degradation of wetlands and that action be initiated to enhance their natural value. DA policy is to avoid adverse impacts to existing aquatic resources and to offset those adverse impacts that are unavoidable. The Army also strives to achieve a goal of no net loss of values and functions to existing wetlands per DoDI 4715.03, and it allows no overall net loss of wetlands on Army-controlled lands. DA and ALC will also take a progressive approach toward protecting existing wetlands, rehabilitating degraded wetlands, restoring former wetlands, and creating wetlands in an effort to increase the quality and quantity of the nation's wetland resources.

The main goal for wetlands management at ALC is to protect the integrity of surface and groundwater resources. The primary objective for wetlands management is to maintain a policy of no net loss of wetlands habitat at ALC. Activities occurring both in and adjacent to wetlands that would negatively affect the habitats will be avoided, when possible, in a manner consistent with the CWA and Maryland regulations. Where impacts on wetlands cannot be avoided, ALC will coordinate with USACE and MDE to undertake permit actions, as appropriate.

Wetland delineations were completed on ALC and BPRF in 1994, 2011, 2018 and again in 2020 in conjunction with the PLS for this INRMP (**Appendix F**). Two of the wetlands in the 2018 survey were determined as jurisdictional through the USACE, Regulatory Branch. The 2020

survey has not been reviewed by the regulatory agencies, but the extent of delineated wetlands did not change from 2018 to 2020. Wetlands at ALC are mostly found along the floodplains of Paint Branch and Hillandale Run. Wetlands at BPRF cover much of the facility and are tidally influenced. Protection of these wetlands allows for quality fish and wildlife habitat and water quality benefits.

All activities that affect wetlands require an environmental analysis in accordance with requirements of AR 200-1 and 33 CFR Part 651, as well as applicable federal and state laws and regulations. Under Section 10 of the Rivers and Harbors Act of 1899, permits must be obtained before beginning any work or building any structures in a navigable water of the United States. Section 404 of the Clean Water Act requires permits for the discharge of dredge or fill material into waters of the United States, including wetlands. The regulations established in Title 33 of the CFR Parts 320 to 330, prescribe statutory authorities and general and special policies and procedures relevant to the review of applications for USACE permits. Before beginning any new work in waters of the United States, a district engineer must be contacted and a permit must be obtained, as appropriate.

Activities on BPRF must also be determined as consistent with the Maryland Tidal Wetland Act, Non-Tidal Wetlands Protection Act, and Chesapeake Bay Critical Areas Act. Activities within 25 feet of non-tidal and 100 feet of tidal wetlands must be coordinated with the Maryland, Non-Tidal Wetlands and Waterways Division.

4.3.2 Proposed Management

ALC will continue to avoid any impacts to wetland resources and perform activities consistent with the CWA and Maryland regulations. In order to continue the goal of no net loss of wetlands, ALC will undertake the following management measures:

- Maintain information and mapping of the wetlands located on ALC and BPRF for planning and training purposes. This information should be made available to all personnel involved in activities that could impact wetland resources.

- Monitor all wetland areas for possible adverse impacts resulting from mission activities, invasive species, or functional changes in wetland values or hydrology that may require remedial actions (for example, unwanted beaver dams).

- Maintain a 25-foot management buffer around all non-tidal wetlands and a 100-foot buffer around tidal wetlands. The buffer zone will be increased as necessary based on topography or where monitoring determines that current activities adjacent to a wetland are causing noticeable adverse impacts on the habitat. Activities within buffer zones should be limited to that which would cause little or no impact on or disturbance to the wetland. In cases where established activities already occur within buffer areas, and the activities cannot be reasonably changed, wetland conditions should be monitored to ensure that any impact is minimized.

- Continue current water quality management practices to protect wetlands from non-point source runoff.

- Periodically review installation programs that may potentially affect wetlands and develop appropriate planning procedures and guidelines to avoid the loss of wetland functions or habitat. The Natural Resources Manager will coordinate with other ALC Environmental Division staff to disseminate information on the location of wetlands and wetland conservation requirements.

4.4 LAW ENFORCEMENT OF NATURAL RESOURCES LAWS AND REGULATIONS

Natural resources law enforcement on ALC and BPRF is provided by MDNR Natural Resources Police. There are CLEOs at APG that can be consulted as needed. The ALC Natural Resources Manager works to assure legal compliance of military and civilian activities with regard to natural and cultural resource laws and regulations.

4.5 FISH AND WILDLIFE MANAGEMENT

4.5.1 Current Management

The primary goal of fish and wildlife management is to maintain the diversity of species and habitats currently found at ALC and BPRF, restore and enhance degraded habitats where possible, and promote sustainable management of resources in a manner consistent with ecosystem management principles and the military mission. The primary objective for maintaining fish and wildlife biodiversity is to protect present wildlife habitats from degradation. Sustainable management of fish and wildlife populations includes both direct measures to regulate the populations of game species as well as indirect habitat improvement measures designed to promote stable populations of important non-game species, such as forest-interior and grassland birds. Protection of migratory birds and bald eagles is also an objective of fish and wildlife management that is discussed in **Section 4.8**, Migratory Bird Management.

4.5.1.1 Non-Game Species

The primary goal for non-game species management at ALC is to sustain healthy populations of non-game species at levels compatible with land use objectives and the military mission. The primary means of achieving this goal is to maintain structurally and biologically diverse ecosystems at the installation. Forest Interior Dwelling bird habitat is present at both ALC and BPRF; management activities prevent impacts to this habitat and the bird species.

Numerous techniques for managing non-game species habitat have been identified in other sections of this document dealing with aquatic and terrestrial ecosystems.

Between 1992 and 1995, 15 wild turkeys were relocated from the United States Navy Dahlgren Research Facility to BPRF. The birds were collected using rocket nets and transported to BPRF by U.S. Army personnel. In the ensuing years, these birds have established a population at BPRF.

Non-game species management, as with forest interior and grassland birds, is also conducted with assistance from federal and state wildlife agencies. ALC currently manages the Canada goose population by participating in the USFWS resident goose egg and nest removal program. BPRF personnel maintain osprey nesting platforms at BPRF.

In 2017, 16 new Eastern bluebird boxes were installed on ALC as part as an Eagle Scout Service Project. The project is discussed in **Section 4.8**.

Beaches on BPRF provide likely terrapin and horseshoe crab spawning habitat and therefore permanent and seasonal disturbance to the beach should be minimized. In the event of the need to conduct permanent or seasonal disturbance, APG will contact MDNR Fisheries Service for guidance.

The waterfront adjacent to BPRF is a waterfowl concentration and staging area. Prior to the construction of any water-dependent facilities APG will contact the Maryland Wildlife and Heritage Service (WHS) for technical assistance regarding waterfowl.

4.5.1.2 Pollinators

Preventing continued losses of our country's pollinators requires immediate national attention, as pollinators play a critical role in maintaining diverse ecosystems and in supporting agricultural production. Some three-fourths of all native plants in the world require pollination by an animal, most often an insect, and most often a native bee. Pollinators, most often honey bees, are also responsible for one in every three bites of food we take, and increase our nation's crop values each year by more than 15 billion dollars. Unabated, these losses of our pollinators threaten agricultural production, the maintenance of natural plant communities, and the important services provided by those ecosystems, such as carbon cycling, flood and erosion control, and recreation.

In response to this threat, in June 2014, President Obama issued a memorandum establishing a Pollinator Health Task Force, co-chaired by the Secretary of Agriculture (USDA) and the Administrator of the USEPA. The Task Force created the National Strategy to Promote the Health of Honey Bees and Other Pollinators (Strategy), to promote the health of honey bees and other managed bees, wild bees (both native and introduced species), butterflies and other pollinating insects, and birds and bats. The Strategy was released by the White House on May 19, 2015.

In addition to USDA and USEPA, the Task Force was chartered to include representation from other departments including the DoD.

Building on the current state of the science, and with a renewed emphasis on expanding our understanding of the complex interactions among the various factors impacting pollinator health, the Strategy lays out current and planned Federal actions to achieve the following overarching goals:

• **Honey Bees:** Reduce honey bee colony losses during winter (overwintering mortality) to no more than 15% within 10 years.
• **Monarch Butterflies:** Increase the Eastern population of the monarch butterfly to 225 million butterflies occupying an area of approximately 15 acres (6 hectares) in the overwintering grounds in Mexico, through domestic/international actions and public-private partnerships, by 2020.

• **Pollinator Habitat Acreage:** Restore or enhance 7 million acres of land for pollinators over the next 5 years through Federal actions and public/private partnerships.

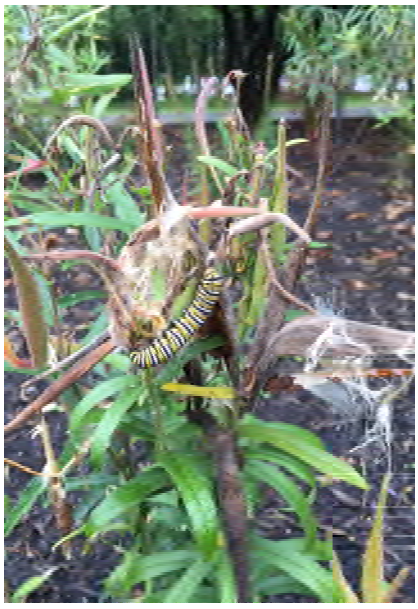
The Strategy also advances ambitious Federal commitments to increase and improve habitat for pollinators, both directly through the large variety of facilities and acreages of land managed by the Federal government, and indirectly through the leadership role that Federal agencies can play in interactions with states, localities, the private sector, and citizens. These actions range from planting pollinator gardens and improving land management practices at Federal facilities, to advancing the availability and use of pollinator-friendly seed mixes in land management, restoration, and rehabilitation actions nationwide. The entire Strategy can be viewed at: https://www.whitehouse.gov/blog/2015/05/19/announcing-new-steps-promote-pollinator-health.

A pollinator garden was installed on ALC near the front gate in June 2016 (**Photograph 4-1**). The ALC Pollinator Garden was certified as a Monarch Waystation (monarch habitat) by Monarch Watch in July 2016. Monarch Waystations are places that provide resources necessary for monarchs to produce successive generations and sustain their migration. The following plant species used in the garden and the fauna they benefit are listed below:

- Raydon's favorite aster (*Symphyotrichum oblingifolium*): bees, butterflies
- Bee balm (*Monarda disdyma*): bees, humming birds, butterflies
- Blazing star (*Liatrias spicata*): bees, humming birds, butterflies
- Butterfly weed (*Asclepias tuberose*): Monarch butterfly host and nectar, bees
- Joe-pye weed (*Eupatorium purpureum*): song birds, butterflies
- Native purple coneflower (*Euchinacea purpurea magnus*): song birds, hummingbirds, butterflies, bees
- Swamp milkweed (*Asclepais incarnate*): Monarch butterfly host and nectar, hummingbirds, bees.

Photograph 4-1. ALC Pollinator 2016 Garden

After one year, multiple Monarch butterfly caterpillars and chrysalises were observed in the garden. The photographs below (**Photographs 4-2 and 4-3**) show a Monarch butterfly chrysalis and caterpillar in observed in September 2017.



Photographs 4-2 and 4-3. Monarch Butterfly Chrysalis and Caterpillar in the ALC Pollinator Garden in 2017

4.5.1.3 Game Species

There is currently no fishing program at ALC or BPRF due to the lack of employee interest. Hunting for white-tailed deer has been taking place on BPRF since 1993. The hunting program satisfies the Forestry Management, Wildlife Management and Outdoor Recreation components of this INRMP.

White-tailed deer is the only wildlife species that is presently managed for consumptive use at BPRF. ALC is currently developing a wild turkey hunting program. There was a historic waterfowl hunting blind on BPRF and there are currently other waterfowl blinds in the vicinity of BPRF.

ALC developed a White-tailed Deer Management Plan (**Appendix N**) for ALC and BPRF with the assistance of the MDNR Deer Project Staff in October 2015 when the deer population was at levels significantly above the biological carrying capacity.

White-tailed deer currently exist on ALC and BPRF at population levels above the biological carrying capacity. The USDA Wildlife Services and MDNR have recommended 15 to 20 deer per square mile as a goal for optimal carrying capacity for a deer herd. ALC should have a deer herd of 5 to 10 deer and BPRF should have a herd of 50 to 60 animals.

Results of the white-tailed deer surveys conducted by USDA Wildlife Services using FLIR are shared with the MDNR each spring, and are also used to determine the number of deer that can be harvested from each installation. The surveys are conducted on drivable roads from vehicles just after sunset. The following table provides a summary of the FLIR survey data since 2015.

Table 4.2 Summary of White-tailed Deer Surveys from 2005 to 2020

Year	Number of Deer Counted on ALC	Number of Deer Counted on BPRF
2015	32	113
2016	20	112
2017	17	N/A
2018	6	87 (January) 57 (April)
2019	11	77
2020	23	78

Deer herd reduction projects with USDA Wildlife Services provide an additional management tool to achieve the goal of bringing the deer herds to carrying capacity. A deer herd reduction project with the USDA Wildlife Services at ALC was completed in the winter of 2015 and 49 deer were removed. In March 2017, a deer herd reduction project was conducted with the USDA Wildlife Services at BPRF and 31 deer were removed. Another reduction took place in March 2018 and 24 deer were harvested at ALC and 33 deer were harvested from BPRF. All deer harvested during these projects are donated to the Maryland Food Bank and are distributed in the corresponding counties.

The hunting of white-tailed deer is conducted at BPRF via a firearms season exemption for managed hunts from MDNR. The hunting season runs from October to December. The bag limit per person and the overall season bag limit is set using the results of the yearly spring white-tailed deer FLIR surveys. In 2020, hunters were allowed to harvest up to eight deer (four antlerless and two antlered). The overall bag limit in 2020 was 65 deer.

BPRF also hosts the MDNR "Becoming an Outdoors Woman" White-tailed Deer Hunting Workshop each November. The workshop consists of a one-day classroom and field workshop and an antlerless white-tailed deer hunt on the second day.

Shotgun is the only weapon authorized for hunting at BPRF. Ammunition used is slug only. Hunting is conducted from stationary stands (located north of the range) which provides a safe environment for the hunters. Stationary stands are more secure than portable stands (less risk of collapse and falls) and shooting from a tree stand at a downward angle provides an additional safety measure.

A wild turkey hunt is being proposed at BPRF. The bag limit and season would follow the MDNR guidelines.

CLEO are not stationed at ALC or BPRF due to the small size of the installations and due to budget constraints. The hunts at BPRF are conducted using Wildlife Conservation Officers that are appointed by the ALC Garrison Manager. If outside assistance was needed, the local police or sheriff's department would respond to BPRF.

The Rules and Regulations for the deer hunts and a sample hunting permit are included in the White-tailed Deer Management Plan in **Appendix N**. The Natural Resources Manager maintains survey and harvest records in the Conservation/ Deer Management Folder on the K drive.

4.5.1.4 Fisheries

Spawning areas for brown trout, an important sport fish, are found upstream of ALC in the upper part of Paint Branch (the area upstream of Fairland Road). The Montgomery County Council has designated this area as a Special Protection Area based on its trout spawning capability, high water quality, and the threat posed by the intensity of existing and future development in the watershed. To protect this valuable resource, no in-stream work is permitted between 1 October and 30 April, inclusive, of any year.

In October 2016 and April 2017, a fish survey took place at ALC as part of an overall stream assessment for the Paint Branch and Hillandale Tributary. The survey found over 20 different species of fish during both sampling events (**Photograph 4-4**). Paint Branch is home to three species that cannot tolerate poor water quality. They include the rosyside dace (*Clinostomus funduloides*), blue ridge sculpin (*Cottus caeruleomentum*), and northern hogsucker (*Hypentelium nigricans*). The final report for the surveys can be viewed in the Conservation/Stream Management/2016-2017 Stream Assessment Folder on the K drive.

Photograph 4-4. American Eel Observed on ALC During October 2016 Survey

In an effort to preserve striped bass (*Morone saxatilis*) and anadromous fish spawning sites downstream of BPRF, no in-stream work, which results in suspended sediments within the water column, will be conducted in the Potomac River between 15 February and 15 June on any given year, per MDNR. This area of the Potomac River is also pristine largemouth bass (*Micropterus salmoides*) habitat, where impacts to this habitat should be avoided.

Since 1961, the MDNR has been surveying in the Potomac River off Blossom Point for their Estuarine Finfish Recruitment Survey. Sampling consists of taking two hauls with a 100-foot beach seine at established sites, one day per month for three months (July through September). The sampling station off of BPRF has been one of the most productive sites along the Potomac for Atlantic silverside, juvenile striped bass and white perch (*Morone americana*).

In August 2017, critical habitat was designated in more than 3,968 miles of coastal river habitat from Maine to Florida for the Atlantic sturgeon. The Chesapeake Bay distinct population segment of the sturgeon is listed as endangered under the ESA. The waters of the Potomac River off of the coast of BPRF are part of this critical habitat designation. The designation of critical habitat does not include any new restrictions or management measures for recreational or commercial fishing operations, nor does it create any preserves or refuges. When a Federal agency funds, authorizes, or carries out activities that may affect critical habitat, it must work with NOAA Fisheries to avoid or minimize potential impacts to critical habitat (NOAA, 2017). This INRMP can also serve as an exemption to the critical habitat designation.

4.5.2 Proposed Management

Fish and wildlife management at ALC and BPRF is an integrated process that is undertaken by using an ecosystem management approach. Management measures specific to fish and wildlife

species are discussed here, while management measures related to these species habitat are discussed in other sections, such as wetlands management and forest resources. Proposed management measures for fish and wildlife management include:

- Continue to monitor populations of non-game species to determine mission related impacts to populations and habitat. Coordinate with appropriate agencies as necessary.

- Continue to implement the white-tailed deer hunting and the deer management program at BPRF to maintain a target herd density of 20 individuals per square mile (50 to 60 animals). Provide harvest records and coordinate with the USDA and MDNR on an annual basis.

- Complete annual surveys of the deer herd population at BPRF in conjunction with the MDNR and USDA Wildlife Services.

- Explore the reestablishment of food plots on BPRF away from the testing ranges for the benefit of turkey and deer species. Also include pollinator species mixes for areas that do not need to be mowed.

- Complete annual surveys of the deer herd population at ALC in conjunction with the MDNR and USDA Wildlife Services.

- Continue the deer management program that was started in the fall of 2015 at ALC to control the deer population within the biological carrying capacity which is a herd of 5 to 10 deer.

- Continue to press for gate upgrades (north and south boundaries) over the Paint Branch that do not allow deer to enter ALC. Press for fence upgrades on the border with FDA/GSA.

- Monitor the impact of deer browsing on native plant communities and timber resources.

- Continue to provide access to the MDNR to conduct the Estuarine Finfish Recruitment Survey.

- Coordinate as appropriate with other organizations and partnerships such as the Partners in Amphibians and Reptile Conservation (PARC) for technical assistance with management and conservation of herpetofauna. Maintain list serve membership. The website can be found at: https://parcplace.org/.

- Coordinate with DoD Partners in Flight (PIF). Maintain list serve membership. The website can be found at: https://partnersinflight.org/.

- Maintain membership and participate in training workshop provided by the National Military Fish and Wildlife Association (NMFWA). The website can be found at: https://www.nmfwa.org/.

- Maintain the Eastern bluebird nest boxes at ALC that were installed in 2017.

- Maintain the existing osprey nesting platforms at BPRF.

- Maintain and enhance various habitats on ALC and BPRF to sustain diversity in landscape, flora and fauna species and conserve native species. Aquatic, wetland, forest and open habitats are discussed in various sections throughout this chapter with habitat management measures that support the goals of fish and wildlife management.

- Maintain the pollinator gardens through weed management, mulch installation and by adding new species.

- Ensure habitat restoration projects use pollinator friendly mixes where feasible.

- Educate Garrison personnel on the environment and the importance of pollinators during National Pollinator Week and Earth Day events (**Photograph 4-5**).

- Continue to allow grassy areas to remain un-mowed at ALC and BPRF that do not pose a security or safety risk.

- Remove nonnative and invasive plant species on ALC and BPRF as funding is available.

- Continue to plant native perennial plant seed mixes at BPRF to promote growth of the forest understory. Protect tree saplings from deer browse with tree tubes and fencing.

- Update the Reptile and Amphibian Survey in 2022.

- Update the Avian Survey in 2023.

- Update the Bat Surveys in 2022.

- Update the ALC Stream Survey in 2023.

Photograph 4-5. Earth Day Walk During April 2017 Fish Survey at ALC

4.6 FORESTRY MANAGEMENT

4.6.1 Current Management

ALC does not contain forest land that can be managed for timber harvest and sale and therefore does not require the development of a Forest Management Plan. Projects for ALC can be found in the Habitat Management Plan (**Appendix P**) and in this INRMP.

ALC manages forest resources through the Forest Management Plan (2017), which can be viewed in the Forest Management Folder in the Conservation Folder on the K Drive and in **Appendix M**.

The goal for forestry management is to conserve and manage forest resources in a sustainable fashion that maintains biodiversity, ecological functions and values, as well as the military mission. Forestry management objectives include:

- Protect forest resources from unacceptable losses to damage agents and degradation resulting from insects and disease, invasive species, and wildfire.

- The objective of forest resources management for BPRF is for an optimum combination of uses (multiple-use management) including:

    - Wildlife habitat preservation and enhancement;
    - Forested habitat diversity;
    - Wetland, watershed, and groundwater protection;

- Protection of the shoreline and natural resources in support of the Chesapeake Bay Action Plan; and
- Preservation of existing historical and cultural resources.

Three forest inventories have been conducted at BPRF. The first was performed in 1981 by a certified professional forester, John Houser (hereafter referred to as the Houser survey). The second was performed in 1997 by John Tingle, a forest ecologist, from USACE Waterways Experiment Station. In 1988, a timber harvest (a pine pulpwood sale) occurred on the facility. The contract for the harvest produced $16,000 of income for the Army forestry program.

The third survey took place in 2016-2017 for the 2017 Forest Management Plan. The USACE Forester designated seven forest compartments and 25 management stands for the 2017 plan. Recommendations from the plan included the reduction of American holly (due to its invasive nature at BPRF), Virginia pine and sweet gum to allow for oak species regeneration, the reduction or removal of dead trees providing fuel for fires, prescribed burning and a reduction of the deer herd which will also allow for oak and other beneficial tree species regeneration. The deer herd at BPRF is close to the carrying capacity at this time, but the damage to the understory was significant due to years of the herd not being managed due to staffing reductions. Implementation of portions of this plan began in 2019 and the project focused on the reduction of American holly, Virginia pine and sweet gum with a diameter at breast height (DBH) of 5 inches or less. The project also focused on the removal of large areas of dead and dying trees near the testing range (at least 50% dead) but ensured an ample amount of snags and logs on the ground would remain for wildlife use. In areas away from the range that were not deemed a wildfire hazard, the target species were removed in a manner that allowed large areas untreated that were left for wildlife bedding and shelter areas with the goal of creating a mosaic of wildlife bedding and shelter areas. Understory saplings were tubed to ensure protection again deer browsing. The 2019 contract focused on the forest compartments that had the highest fire danger and the lowest wildlife habitat quality. The contract included invasive species management per the Invasive Species Management Plans for ALC and BPRF.

In late 2020, a new forest contract was awarded which continued the same management goals listed above but added the planting of 15 acres of native perennial plant mixtures for the Coastal Plain region that includes species that are beneficial to wildlife. The plantings were spread out over the treated forest compartments in areas that were at risk of invasive species growth.

There have been no major forest fires reported at the facility. Minor fires are generally restricted to the impact area and occur during various fuse test procedures. These are extinguished in accordance with the Fire Protection Plan and the Integrated Wildland Fire Management Plan (**Appendix O**) for the facility.

Gypsy moth (*Lymantria dispar*) infestations are a continuing threat to the hardwoods and could produce significant damage to the ALC's forest resources, on both ALC and BPRF. The moth is found throughout the State of Maryland in its preferred oak forest habitat. Annual aerial surveys for gypsy moth defoliation are conducted by the U.S. Department of Agriculture's Forest Service.

ALC also monitors for the emerald ash borer (EAB) (*Agrilus planipennis*) and spotted lanternfly (SLF) (*Lycorma delicatula*). ALC does not allow the removal of firewood from either ALC or BPRF.

The forested areas on both ALC and BPRF are considered suitable FIDS habitat by the MDNR and are managed to conserve this habitat.

4.6.2 Proposed Management

ALC will continue to manage forest resources by protecting forest habitat and employing the Forest Management Plan. Proposed management activities include:

- Continue to implement portions of the Forest Management Plan to include stand improvement objectives to manage for a diversity of species and uneven-aged management and oak species regeneration.

- Continue to plant new understory native species that are beneficial to wildlife.

- Continue to reduce the deer population at ALC and BPRF to help with oak regeneration and understory species regeneration.

- Continue to comply with the Maryland Forest Conservation Act (FCA) regulations for any construction or disturbances to forest resources.

- Continue to implement contract-required BMPs during forest management activities that include: no cutting of vegetation from April to August for the protection of NLEB and migratory birds, no mechanical removal of vegetation within 100 feet of tidal waters and wetlands, no mechanical removal of vegetation within 25 feet of nontidal wetlands and no equipment with a pounds-per-square-inch (PSI) power of greater than 7 allowed to be used.

- Implement provisions of the ESMP for the bald eagle when undertaking forest management activities. Forest management will be done in a manner consistent with minimizing impacts to bald eagles.

- Monitor forest resources for signs of disease, insect outbreaks, excessive damage from wildlife browsing, and wildfire fuel loads.

- Maintain and enhance wildlife habitat by retaining snags, den trees, and coarse woody debris within forest stands consistent with other natural resources objectives and the military mission.

- Prevent the occurrences of wildfires at ALC and BPRF by educating personnel on fire prevention techniques, reducing unnaturally high fuel loads, and restricting the types of activities that can be undertaken based on the level of fire danger in an area.

- Facilitate rapid suppression of wildfires by maintaining existing firebreaks and responding rapidly to contain the spread of wildfires when they do occur, thereby preventing further losses to natural resources and other Army property.

- Evaluate the feasibility of implementing a prescribed burn forest management program at BPRF to reduce natural fuel loads, control invasive species, and improve wildlife habitat. If found feasible, prepare a prescribed burn plan and obtain any necessary approvals or permits.

4.7 VEGETATIVE MANAGEMENT

Vegetative management at ALC is focused on enhancing and maintaining native species populations, eradicating and managing invasive species, and revegetating disturbed areas with native species. Through vegetative management, several INRMP goals are met: soil resources management, fish and wildlife management, habitat management, and invasive species management.

EO 13148, *Greening the Government Through Leadership in Environmental Management* (2000), and EO 13112, *Invasive Species* (1999), advises the use of native species and environmentally sound landscaping in vegetative management. Soil-disturbing activities may require revegetation with native plant species to re-establish herbaceous cover, prevent the spread of invasive species, and enhance habitat.

4.7.1 Current Management

The vegetated lands on ALC consist of undeveloped forest lands and turf and landscaped areas. The forested land management is described above in **Section 4.6**. The turf portion of the grounds includes Kentucky bluegrass (*Poa pratensis*), and fescue species (*Festuca spp*.) that are regularly mowed. The landscaped areas were planted based on a plan approved in 1973, with the objective of creating an attractive and cohesive environment that will promote the physical and psychological well-being of people who work on the facility. The landscaped plantings have matured and the desired effect of a campus-like setting has been achieved. There is also a landscaped courtyard on the second floor of the ALC building complex to provide aesthetic relief for the building inhabitants. In the past nonnative species were used for landscape plants. In the future, only native species will be used in landscaping projects on ALC or BPRF per the Plant Palette developed for the Area Development Plans and Vision Plans for ALC and BPRF.

BPRF has a relatively small amount of land classified as improved grounds due to the field activity and nature of the mission. The improved grounds areas surround the occupied buildings and contain a mixture of Kentucky bluegrass and fescue. Semi-improved grounds include impact areas and test areas that are dominated by a mixture of tall fescue, white clover, and annual and perennial grasses. There are no landscaped areas on BPRF. The management for the large forested areas is described in **Section 4.6**.

Management of the semi-improved grounds is labor-intensive and includes annual mowing in the late summer to early fall time period. This mowing frequency provides for a more diverse wildlife habitat for the many game and non-game species found on the installation, including ground nesting birds, rodents and reptiles, and allow for a significant reduction in fuel costs and equipment maintenance.

4.7.2 Proposed Management

ALC will continue the current management measures and grounds maintenance schedule as discussed above. Proposed management measures, include the following ongoing measures:

- Regular monitoring of the wildlife habitat on the semi-improved areas will be conducted to note progress or areas where a change in management may be necessary to improve the habitat or vegetation conditions while maintaining the mission.

- Monitor areas where soil-disturbing activities may have minimized extent of vegetation.

    - Use native, non-invasive species to restore any disturbed areas or areas requiring revegetation.

- Continue to maintain open fields and non-mowed areas to provide habitat for a wide variety of grassland birds, mammals, and herpetofauna at BPRF. Mowing decks can be raised to 10 to 12 inches and areas should be mowed from the center outward to allow wildlife to escape.

- Implement use of the Plant Palette to ensure native species and species that are beneficial to wildlife and pollinators are used in planting and restoration projects, and for the replacement of aging landscape plants.

4.8 MIGRATORY BIRD MANAGEMENT

4.8.1 Current Management

Migratory bird management is accomplished under the goals of the fish and wildlife management program to maintain the diversity of species and habitats currently found at ALC and BPRF to restore and enhance degraded habitats where possible. The current management activities for migratory bird management include monitoring populations of neotropical migratory birds at ALC and BPRF and monitoring of migratory bird habitat at ALC and BPRF. Avian surveys were conducted at ALC and BPRF in 2018 and have also been conducted as part of the Planning Level Surveys for the 2015 INRMP update and the 2022 update.

In June 2017, sixteen new Eastern blue bird nest boxes were built for ALC by Boy Scout Troop 1441 as part of an Eagle Scout Service Project (**Photograph 4-6**). Half of the boxes were installed by the troop during a volunteer event. The new boxes contain two entrance/exit holes protected by copper portals and predator guards on the support posts.

Photograph 4-6. Eastern Blue Bird Nest Box Being Installed June 2017 at ALC

4.8.2 Proposed Management

Ongoing and proposed management activities for migratory bird management include:

- Continue to monitor populations of the bald eagle at BPRF in accordance with the BGEPA. Coordinate efforts with MDNR and USFWS as appropriate. Ensure protection of the bald eagle habitat and nests. If any planned or ongoing activities cannot be conducted in compliance with the National Bald Eagle Management Guidelines (Eagle Management Guidelines), Natural Resources personnel will contact the USFWS Chesapeake Bay Ecological Services Field Office.

- Continue to implement the Bald Eagle Management Plan. Ensure the SOPs in collaboration with USFWS, are followed.

- Continue the partnership for yearly eagle nest monitoring with the Navy Research Laboratory. Aerial surveys are conducted via a contract managed by NAVFAC.

- Continue monitoring populations and habitat for neotropical migratory bird habitat at ALC and BPRF. Conduct an Avian Species Survey for ALC and BPRF in 2022. A survey was completed in 2018.

- Maintain the Eastern blue bird nest boxes on ALC.

- Maintain the osprey nest platforms at BPRF.

- Continue to consult with USFWS and MDNR on actions that may affect migratory birds protected under the MBTA. ALC will provide notice to USFWS of actions that are intended to intentionally take migratory birds, including but not limited to (1) banding or masking projects, (2) scientific collecting, (3) taxidermy, and (4) depredation control.

- Continue to restrict the removal of vegetation from March to August to protect habitat and nesting birds.

- Continue to protect and improve habitat for FIDS.

- Coordinate with DoD PIF as appropriate for technical support in managing neotropical migratory birds. PIF is concerned with the conservation of neotropical migratory birds and their habitats. Populations of these birds have been declining in recent years due to fragmentation of habitat on breeding grounds, deforestation, and adverse agricultural practices on wintering grounds, pesticide poisoning, nest parasitism, and the cumulative effects of habitat changes along migration routes. The goals of PIF are: (1) determine the status and specific causes of neotropical bird declines, (2) maintain stable populations of species not in decline; and (3) reverse declining population trends through habitat restoration and enhancement. Management opportunities include: (1) inventory, (2) on-the-ground management practices, (3) education, and (4) long-term monitoring to determine changes in populations of these birds on the installation. The website can be viewed at: https://partnersinflight.org/.

4.9 INVASIVE SPECIES MANAGEMENT

4.9.1 Current Management

The goal of the invasive species management program at ALC is to manage and prevent the spread of invasive species that threaten habitat and native species. ALC manages invasive species through the Invasive Species Management Plan (ISMP) for BPRF (USACE, 2013) and the ISMP for ALC (USACE, 2017) (**Appendix Q**). The ISMP identifies prevention as the first line of defense against the spread of invasive species to prevent them from colonizing on the facility. Methods of control or eradication for invasive species found on the facility vary from species to species. Generally, however, there are four methods of management: biological, chemical, manual and mechanical. Each management technique can be initiated as a standalone treatment. In most instances they can be used in conjunction with other management techniques for greater success. Additionally, the appropriate treatment may vary on a case by case basis, i.e., hand pulling Japanese honeysuckle (*Lonicera japonica*) may be practical for a small area, and impractical for a larger area.

ALC monitors and protects the headwaters of wetlands and intermittent streams from unnecessary disturbance in order to prevent invasive species from being transported downstream by flowing water.

4.9.2 Proposed Management

ALC will continue to manage invasive species as planned in the ISMP. Proposed management activities include:

- Continue to implement the ISMP for ALC and BPRF in conjunction with the Forest Management Support Contract.

- Monitor populations of invasive species to assess the success of ongoing treatment efforts and adapt management as necessary.

- Monitor areas where invasive species are likely to originate on the installation, such as along the fenceline. Continue to monitor both ALC and BPRF for introduction or spread of invasive species.

- Plant native species where ground disturbing activities provide an opening for invasive species to spread.

- If herbicides are used, use them in a manner to minimize impacts to sensitive animal and plant species and follow precautionary statements on labels regarding contamination of water if pesticides are applied near wetlands or bodies of water. Only herbicides that are on the ALC Pesticide Use List will be used on ALC and BPRF.

- Invasive species control should be done in a manner consistent with minimizing impacts to bald eagles.

- Remove invasive species from the Powder Mill Bog.

4.10 PEST MANAGEMENT

4.10.1 Current Management

The goal of the pest management program at ALC is to manage and prevent the spread of pests and invasive species that threaten habitat and native species. ALC manages pests through the Integrated Pest Management Plan (IPMP) (USACE, 2020). The objective of the IPMP is to employ the judicious use of both non-chemical and chemical control techniques to achieve effective pest management with minimal environmental consequence. Pest Management priorities at ALC include control of disease vectors, protection of real estate, control of nuisance pests, control of undesirable vegetation, protection of beneficial plants, and control of miscellaneous animal pests (i.e., birds, rodents and other mammals). The four primary control methods for pest management include:

- Mechanical and physical control (physical removal or exclusion of pest)

- Cultural control (altering the environment to make it less suitable or attractive to the pest)
- Biological control (use of other organisms to control a pest)

- Chemical control (use of pesticides)

ALC and BPRF lie within the USDA, Animal and Plant Health Inspection Service (APHIS) high-risk quarantine area for gypsy moth, a dangerous insect to forests and shade trees. Surveillance and control of gypsy moths is coordinated by the USDA Forest Service who conduct annual aerial surveys for gypsy moth defoliation at ALC and BPRF. The gypsy moth has not been a pest species at ALC in recent years.

All of ALC and BPRF are under a USDA quarantine to prevent the spread of the EAB, a beetle destructive to ash trees. The quarantine prohibits anyone from removing ash trees or any hardwood firewood out of quarantined counties. At this time firewood sales are not conducted on ALC or BPRF.

Pest management is targeted at:

- **Disease vectors and medically important pests**: ticks, bees, wasps, hornets, roaches, spiders, ants, mites, chiggers, rodents, birds, flies and mosquitos

- **Quarantine pests**: gypsy moth, EAB, SLF

- **Forest pests:** eastern tent caterpillar, pineshoot beetle, Asian long-horned beetle

- **Real property pests**: stored product pests, stink bug, boxelder bug

- **Weeds and invasive plant species**

- **Pests of ornamental and turf plants**

- **Structural pests:** Subterranean termites, wood boring beetle, wood decaying fungi

- **Vertebrate pests**: Canada geese, birds, feral animals

At the time of the update of this plan, weed control at ALC is being conducted by in-house pest controllers from APG. All other pest control is being conducted via contractors. Contracts for pest management are on file in the office of the IPMC. The current contracts related to pest management at ALC are the contract with Alexandria Pest Services and the contract for Canada goose management (non-chemical) with the Feather Free Zone. There are no contracts for chemical services at BPRF. The Forest Management Support contracts for ALC and BPRF include some chemical control for invasive plant species.

ALC has partnered with the U.S. Army Public Health Center (USAPHC) North at Fort Meade for tick borne disease vector surveys during deer harvests at ALC and managed hunts at BPRF. The ticks are identified and tested for disease vectors. No disease vectors were found at ALC to date, but the following vectors have been recorded at BPRF:

- *Ehrlichia ewingii* (causes Ehrlichiosis)
- *Borrelia burgorferi* (causes Lyme disease)
- *Borrelia miyamotoi* (Tick-borne Relapsing Fever)
- *Anaplasma phagocytophilum* (causes Anaplasmosis)

Copies of the reports can be found in the Integrated Pest Management Folder on the K Drive.

The Environmental Health Service from Walter Reed National Military Medical Center began surveying for mosquitoes in 2018. The surveys are conducted through traps and larval dips. The technicians can apply mosquito briquettes to areas that have standing water that cannot be removed and that are close to areas where the mosquitoes could impact ALC personnel.

4.10.2 Proposed Management

ALC will continue to implement the 2020 IPMP and manage pests primarily through mechanical, physical and cultural control with chemical controls employed when necessary. Proposed management activities include:

- Continue monitoring for pests and manage possible habitat or suitable conditions for pest activity. Continue to coordinate with Environmental Health Service from Walter Reed National Military Medical Center for ALC and BPRF.

- Acquire and deploy 4-Poster Machines in areas of high deer traffic to help reduce the tick population on BPRF. The 4-Poster provides the eradication of ticks without the use of spraying an insecticide over a wide area.

- Continue to conduct pest management controls in a sustainable, ecologically sound fashion as to not impact habitat for endangered species and fish and wildlife, nor degrade water resources and water quality.

- Assess problems with nuisance animals such as raccoons, groundhogs and beavers on a case-by-case basis and remove animals, if needed. If nuisance mammals become a more serious nuisance, a trapping program will be considered to control population levels.

- Regularly review the effectiveness of the IPMP and adapt management measures as necessary for optimal pest management.

4.11 LAND MANAGEMENT (SOIL EROSION)

4.11.1 Current Management

The primary goals of soil conservation and management at ALC are (1) to protect soil resources from erosion and (2) to prevent potential soil erosion impacts on water quality, habitat quality, and mission objectives. Soil erosion resulting from mission activities is not a significant problem at ALC or BPRF due to the flat to gently sloping topography. Storage magazines and bunkers have been vegetated with orchard and brome grasses, and the vegetative cover is maintained in good repair. Construction activities at ALC have been confined to previously developed areas, minimizing surface disturbances. However, because many soils in upland areas are poorly drained, soil erosion can occur in areas where the vegetative cover has been removed or where surface runoff is concentrated into channels, ditches, or drainage structures.

Soil erosion at ALC is a problem in the following areas: (1) along the eastern Patrol Road and (2) on the slopes adjacent to Paint Branch and the Hillandale Tributary. Soil erosion at BPRF is a problem in the following areas: (1) shoreline along the Potomac River and the Nanjemoy Creek and (2) in the explosives and pyrotechnics research area. ALC will continue the current policy of addressing problem erosion areas through periodic monitoring and inspections of grounds, roadways, and facilities. In addition, a management approach will be developed to avoid disturbing potential problem erosion areas, when possible, in a manner consistent with mission objectives.

4.11.2 Proposed Management

ALC will continue to monitor and inspect grounds, roadways and facilities for erosion and address these areas appropriately. In addition, proposed management activities for soil erosion and land management include:

- Maintain existing road ditches, culverts, and turnouts to ensure proper drainage and minimize the potential for the development of ruts, mud holes, and other erosion related problems. Where necessary, construct new ditches, culverts, or turnouts to divert water away from roads.

- Implement the Shoreline Study and Management Plan for BPRF (**Appendix J**). The management plan provides stabilization and restoration options.

- Per the Shoreline Study and Management Plan, install and maintain shoreline erosion minimization structures along the Potomac River and Nanjemoy Creek at BPRF as funding becomes available. These structures could include offshore breakwaters, revetments, and drainage systems. Non structures can include the planting of native vegetation to create a living shoreline. Following construction establish a monitoring system for assessing the impact of the structures on the aquatic resources, to include submerged aquatic vegetation, fish communities, and water quality.

- Stabilize and seed eroded roadsides and road cuts using native grasses and legumes, when feasible, in a timely manner to minimize impacts to adjacent habitats resulting from the transport and deposition of eroded sediment. During establishment of new vegetation, use geotextile fabrics and mulch to stabilize soil surfaces and prevent further erosion. Where re-establishment of vegetation is not possible, harden slopes and grades with rip-rap, stone, gravel, or other environmentally compatible materials to stabilize slopes.

- Maintain vegetated riparian buffer zones to prevent or minimize stream degradation associated with sediment and other pollutants in runoff. As noted by MDNR, the riparian buffers on ALC should be 200-feet on Paint Branch and 150-feet on tributaries of Paint Branch to protect brown trout habitat. A buffer of 100-feet on tidal waters should be maintained on BPRF for tidal waters.

- Implement the 2019 ALC Stream Assessment. An area of concern in this assessment is the unnamed stream running along Floral Drive near the back gate of ALC. The stream contains Fall Line Bog habitat. Implement low impact development practices and BMPs such as check dams, bank stabilization, drop structures, and water diversions to reduce erosion and sedimentation in upland areas prone to gully erosion or wash out.

- When soil disturbances are necessary to accomplish mission objectives, use BMP soil conservation measures (such as check dams, wind breaks, and diversions) to control erosion, sedimentation, and dust. Site any intensive land-disturbing activities, when possible, on soils with the least erosion potential based on an analysis of existing soil types, slopes, and vegetative cover.

- Monitor field research areas at BPRF for soil erosion problems and ensure that corrective actions for any soil erosion problems are implemented in a timely manner as to support the testing mission and sustainable use of lands.

4.12 AGRICULTURAL OUTLEASING

There are no agricultural or grazing outleases on ALC or BPRF, nor are any planned for the near future.

4.13 GEOGRAPHIC INFORMATION SYSTEM (GIS) MANAGEMENT

Information management is essential to the natural resources management and planning process. Geographic information system (GIS) is an important computer software tool that allows ALC to organize, evaluate, and spatially display natural resources on ALC and BPRF. GIS data layers can be used to demonstrate spatial locations of natural resources, plan for natural resources management activities, or plan for mission related activities to ensure avoidance of impacts to natural resources. ALC maintains GIS data shapefiles and geodatabase files of natural resource layers on the DPW servers. There is currently no GIS technician working in the DPW, so all GIS support is coordinated through APG.

4.14 OUTDOOR RECREATION

4.14.1 Current Management

Outdoor recreation at ALC includes the hunting program at BPRF. All recreational opportunities at BPRF are open and accessible to ALC employees, members of the U.S. Military, DoD employees, and employees of other Federal agencies. These opportunities currently include a white-tailed deer and turkey hunting program conducted in cooperation with the MDNR. See **Section 4.5.1.3** for details on the hunting program.

Due to security reasons, ALC is not open to the public for recreation. A fitness trail was installed in early 2015 at ALC and is open to employees at the installation. Parts of the perimeter road are also used by employees as a walking or running trail.

4.14.2 Proposed Management

As part of the current outdoor recreation program, future activities that ALC plans to undertake include:

- Develop and install environmental signs along the ALC Fitness Trail.
- Continue the white-tailed deer and turkey hunting program at BPRF.
- Update signage for visitors at BPRF.

4.15 BIRD AIRCRAFT STRIKE HAZARD

There are no bird aircraft strike hazard risks at ALC or BPRF due to the lack of aircraft.

4.16 WILDLAND FIRE MANAGEMENT

4.16.1 Current Management

The primary goals for fire management at ALC are to prevent unacceptable losses to military property from wildfire and to use prescribed burning to maintain healthy native ecosystems, where appropriate. The primary objectives to achieve these goals are to implement appropriate wildfire prevention and suppression measures.

There have been no major forest fires reported at ALC or BPRF. Minor fires are generally restricted to the impact area and occur during various fuse test procedures at BPRF. These are extinguished in accordance with the Fire Protection Plan for the facility.

An Integrated Wildland Fire Management Plan for ALC and BPRF was completed in 2018 (**Appendix O**). It was developed by the USACE, Baltimore District, with comments being provided by the APG Fire Department.

4.16.2 Proposed Management

ALC will continue to operate under the Fire Protection Plan for ALC and BPRF. The following general fire management measures will be undertaken at ALC; more specific measures will be developed as they are required for individual areas (such as specific burn plans) or fire hazards:

- Implement the 2018 Integrated Wildland Fire Management Plan and ensure cooperative agreements are clearly defined and up-to-date.

- Prevent the occurrences of wildfires at ALC. Wildfire prevention involves minimizing fire occurrence by educating personnel on fire prevention techniques, reducing unnaturally high fuel loads, and restricting the types of activities that can be undertaken based on the level of fire danger in an area. Fuel loads are evaluated during periodic inspections of natural habitats by the ALC Natural Resources Program Manager and during the field work by a certified Forester for the Forest Management Plan update.

- BPRF has two brush all-terrain vehicles (ATVs) for wildfire suppression. Wildfire suppression essentially entails maintaining existing firebreaks and responding rapidly to contain the spread of wildfires when they do occur to prevent further losses to natural resources and other Army property. BPRF and ALC would call for the assistance of the local fire department during a wildfire.

4.17 TRAINING OF NATURAL RESOURCE PERSONNEL

Training of natural resource personnel at ALC is an ongoing effort to ensure knowledge of natural resources management strategies, new regulations and policies, and other related programs are current. This is important to ensure ALC is compliant with environmental legislation and requirements and management activities continue to be adapted and improved.

The IPM program requires that personnel applying pesticides be appropriately trained and certified as well. Any certifications for performing management activities are kept current and, at present, only apply to the IPM program.

Natural resource personnel train military and installation personnel who also play a role in natural resource management at ALC. Conservation awareness training for installation personnel includes information on invasive and pest species management, protected species habitat, bald eagle conservation, and protection of aquatic and riparian resources through the riparian buffers and critical area zone. Personnel are made aware of the monitoring programs for soil erosion and invasive and pest species. Field personnel are provided a briefing at BPRF that includes visual and written information on how to identify potential listed species.

Continual coordination with USFWS, MDNR, and other state agencies can also help keep natural resource personnel current and proactive with natural resource management.

The training workshop for military natural resource managers provided by NMFWA each spring provides a valuable training opportunity. The website for NMFWA can be found at: https://www.nmfwa.org/.

4.18 COASTAL MANAGEMENT

ALC and BPRF are located within the Coastal Management Zone that is protected under the CZMA, as administered by the MDNR. The CZMA was enacted in 1972 to preserve, protect, or enhance the coastal resources of the U.S. for the use and enjoyment of present and future generations (CZMA, 1972). Under its authority, coastal states and territories were encouraged to develop Coastal Zone Management Programs (CZMP) in a partnership with the Federal government. Maryland developed a CZMP through MDNR and MDE that identifies the Coastal Zone as the counties along the Atlantic Ocean, Chesapeake Bay, coastal bays, as well as, the towns, cities and counties that contain and help govern the coastline. A key component of the Maryland CZMP is federal consistency, which requires that federal actions which are reasonably likely to affect any land or water use, or natural resource of a state's coastal zone be conducted in a manner that is consistent with Maryland CZMP.

The Maryland CZMP focuses its work on the complexity of resource management problems of the coast. It takes a comprehensive approach to problem solving, balancing the often competing and conflicting demands of coastal resource use, economic development, and conservation. The Maryland CZMP, like the national Program, focuses its program goals around three central themes:

- Sustainable coastal ecosystems
  - Sustain and improve coastal water quality
  - Protect, restore, and enhance coastal land and water habitats

- Sustainable coastal communities
  - Reduce threats and losses from coastal hazards
  - Sustain, develop, and revitalize ports, harbors, marinas and urban waterfronts
  - Provide public access to the coast
  - Provide appropriate sites for coastal dependent uses
  - Preserve historic, cultural, and esthetic coastal features

- Promoting government efficiency
  - Ensure Federal and state consistency with state policies
  - Simplify permit processes
  - Consider the national interests in the coasts, and provide orderly, predictable facility siting
  - Provide for local government and public participation

ALC and BPRF will ensure that all activities are consistent with the Maryland CZMP and work through the federal consistency process when there may be impacts to coastal resources. The goals

and management programs discussed within this INRMP are complementary to the goals of the Maryland CZMP.

In addition to the federal consistency requirement, Maryland has established the Critical Area Act where a Critical Area is defined as "all land within 1,000 feet of the mean high water line of tidal waters, or the landward edge of tidal wetlands and all waters of and lands under the Chesapeake Bay and Atlantic Coastal Bays and tributaries." The Critical Area Act establishes the Chesapeake Bay Critical Area and Atlantic Coastal Bays Critical Area Protection Programs and the Critical Area Commission to enable the State and local governments to jointly address the impacts of land development on habitat and aquatic resources.

The goals of the Critical Area Protection Programs are to:

- Minimize adverse impacts on water quality that result from pollutants that are discharged from structures or conveyances or that have run off from surrounding lands;
- Conserve fish, wildlife, and plant habitat in the Critical Area; and
- Establish land use policies for development in the Critical Area that accommodate growth and also address the fact that, even if pollution is controlled, the number, movement, and activities of persons in the Critical Area can create adverse environmental impacts.

The Critical Area Commission devised a set of criteria to minimize the adverse effects of human activities on water quality and natural habitats and foster consistent, uniform and more sensitive development activity within the Critical Area. In cooperation with the Critical Area Commission, the 61 local governments whose jurisdictions are partially or entirely within the Critical Area administer local critical area programs.

Much of BPRF is within the Critical Area. ALC manages lands, water resources and habitat within the spirit of the Critical Area Protection Program as demonstrated through the goals and management programs in this INRMP. Critical Area Commission staff will be contacted prior to any activities that cannot be avoided and may impact coastal resources or resources within the critical area.

4.19 FLOODPLAIN AND WATER RESOURCES MANAGEMENT

There are significant water resources on ALC and BPRF that contribute to the health and water quality of the Chesapeake Bay and provide aquatic and riparian habitat for several species. Water resources management includes surface water resources, such as streams and wetlands; groundwater resources; and stormwater management. ALC executes their water resources management program within the Federal and state regulatory programs and coordinates with appropriate agencies as necessary.

4.19.1 Current Management

The primary goal of floodplain and water resources management at ALC is to protect the integrity of surface and groundwater resources and aquatic habitats to maintain and enhance biodiversity and protect water quality. Objectives to meet this goal include:

- Protect aquatic and riparian resources by establishing and maintaining riparian management zones that limit activities within buffer zones around streams and wetlands to those activities that would cause little or no impact on water quality and aquatic habitats. Identify and restore degraded habitats when practical.

- Prevent the degradation of water quality from point and non-point sources of pollution to include sediments, nutrients, and chemical pollution.

- Achieve no net loss of wetlands.

Current ongoing management activities include:

- Avoid impacts to aquatic and riparian resources, to include the riparian buffer area, from mission-related activities to maintain diverse habitats and water quality.

- Employ pollution prevention strategies to protect aquatic and riparian resources through the IPMP by limiting use of pesticides and fertilizers.

- Consider non-point source pollution abatement during construction, operations, and land management plans and activities. Employ best management practices to prevent erosion, sedimentation and discharge of other pollutants to water resources.

- A stream protective buffer is maintained adjacent to Paint Branch and its tributaries. The State of Maryland designates these waterways as Class III – Natural Trout Waters. Montgomery County, Maryland guidelines for environmental management of development recommend a minimum buffer width of 200 feet from the stream bank when slope ranges are 25 percent or greater. This 200-foot buffer is applicable to Paint Branch.

- The United States Geological Survey (USGS) installed a water quality monitoring station in 2007 at ALC on Paint Branch that conducts 24-hour monitoring. The water quality parameters monitored include temperature, pH, specific conductance, dissolved oxygen and turbidity. Every other month, technicians from USGS come to ALC to collect data for the mentioned parameters to cross check the station. The technicians take samples for sediment and bacteria and they are sent to their main laboratory in Denver for processing. Water quality reports from the station have been published by USGS and are available on the DPW server in the Conservation/Stream Management folder. The real time and historical data for the station can be viewed online at: http://waterdata.usgs.gov/nwis/inventory/?site_no=01649190&agency_cd=USGS&.

- A Stream Assessment was conducted for Paint Branch, the Hillandale tributary and the unnamed tributary in 2016 and 2017 by the USACE, Baltimore District. The final report was delivered in January 2019. The assessment included physical and biological parameters. The physical stream corridor assessment identified a total of 23 problem sites within Paint Branch, Hillandale Run, and the unnamed tributaries to Paint Branch. Not all of these areas call for immediate action due to factors such as difficult access and low severity. A summary of the results of each of the problems sites identified during the physical stream assessment are provided in the Final Assessment located in the Conservation/Stream Management Folder on the K drive and in **Appendix I**.

  According to the assessment, the waterbodies of ALC support a relatively diverse community of invertebrates and fish considering their location in a highly developed area of the state. In total, 3,489 fish from 23 species were collected with several size classes present, indicating a diverse and naturally reproducing fish community in the waterbodies of ALC. Many species of invertebrates were collected, including several taxa considered by Maryland to be intolerant to pollution.

  According to the assessment, turbidity, dissolved oxygen, pH and temperature in Paint Branch, Hillandale Run and the unnamed tributary to Paint Branch were all well within the water quality standards for a Class III stream. All measured total nitrate and nitrite levels are well below the drinking water standard for nitrates, which is set at 10 mg/L. Maryland does not have phosphorus limits for surface waters, however, to prevent eutrophication, the USEPA recommends that total phosphorus levels do not exceed 0.1 mg/L in streams that do not enter a lake or reservoir. In the Fall 2016, the Hillandale Run slightly exceeded this recommended phosphorus level with a measured concentration of 0.17 mg/L but all other locations and sample events met this recommended level. Although a direct comparison to water quality standards is not applicable for all constituents and measurements, in general, the waterbodies of ALC appear to meet applicable criteria and are capable of supporting aquatic life. A copy of the final report is available in the Conservation/Stream Management Folder on the K drive.

- A Shoreline Survey and Management Plan for BPRF was completed in 2017 (**Appendix J**). The estimate is an almost 50-foot loss over the next 50 years. The Nanjemoy creek side is losing an average of 1-foot per year and the loss is an average of 1.7 feet per year on the Potomac River side. A copy of the final report is available in the Conservation/Blossom Point Shoreline Management/Shoreline Survey and Management Plan Folder on the K drive.

4.19.2 Proposed Management

ALC will continue ongoing water resources management efforts. The following management measures are proposed to protect and enhance surface and groundwater quality as well as aquatic and riparian habitats:

- Regularly review the results of the water quality monitoring from USGS. If degradation of water quality is determined to be occurring, actions will be taken to identify the source of contamination or pollution and implement appropriate remedial measures to cleanup contamination or minimize the pollutants and prevent further deterioration of water quality.

- Establish and maintain vegetated buffers around water bodies to maintain streambank and shoreline vegetation, reduce adverse impacts on water quality, and protect aquatic habitat.

    - Maintain a continuous tree canopy over streams in forested habitats to regulate mean summer stream temperatures and to provide a source of organic matter for aquatic biota.

    - Maintain buffers of continuous vegetation cover to stabilize stream banks and intercept nonpoint source runoff containing suspended sediments, nutrients, and pollutants. Wider buffers should be established in areas of steep slopes to protect water quality and aquatic habitat.

    - Retain a diverse composition of native plant species in the riparian areas, particularly with respect to overstory tree species. Use native vegetation to restore vegetated areas, stabilize banks, and control erosion. No bare soil areas should occur within the buffer.

    - Retain standing snags, den trees, potential den trees, and coarse woody debris (CWD) on the forest floor to maintain structurally diverse wildlife habitat and functional nutrient cycles. These provisions should apply both with designated riparian buffers and the broader floodplain communities. Allow naturally occurring CWD to remain in stream channels to provide structural diversity and aquatic habitat.

    - Avoid activities that would further fragment or reduce the size of existing riparian areas at ALC.

- Evaluate the feasibility of stream bank stabilization both economically and physically at ALC. Implement low impact development practices and BMPs such as check dams, bank stabilization, drop structures, regenerative stormwater conveyance systems, and water diversions to reduce erosion and sedimentation in upland areas prone to gully erosion or wash out.

    - Monitor the performance of BMPs in protecting aquatic habitats. Adjust workplans, project designs, and activities as necessary using principles of adaptive management to meet changing conditions or provide additional protective measures.

    - Limit timber harvesting and other silvicultural activities within riparian buffer zones for streams and other water bodies. Whenever possible, avoid stream crossings during logging operations and limit activities within buffer zones to those that would cause little or no impact on water quality and aquatic habitats.

- Employ low impact development BMPs where possible to improve water quality and reduce stormwater runoff.

- Any increase in impervious surface must be mitigated to avoid or minimize increase in stormwater runoff using low impact development practices or BMPs. All projects that increase impervious surface must be conducted in consistence with the Energy Independence and Security Act Section 438 and Maryland legislation. Implementing low impact development practices and BMPs to capture and treat runoff prior to discharge will help maintain and improve water quality and stormwater runoff volume.

- Limit pesticide and fertilizer use in riparian buffer zones. All pesticide use will follow objectives contained in the IPMP.

- Regularly review water resources management strategies defined above and mission-related activities to evaluate the condition of these resources and determine the need to adapt the management strategy to further enhance water quality and aquatic and riparian habitat.

- Secure funding to complete an EA and design for the severe erosion affecting newly discovered Magnolia Bog wetland habitat located near the ALC back gate (noted in the Final ALC Stream Assessment).

- Remove the large pieces of debris in Paint Branch on the northern border to improve flow and fish passage (noted in the Final ALC Stream Assessment). This project would require a permit from MDE if mechanical equipment was to be used. Research funding options for this project.

- As funding is available, implement the shoreline protection projects in the 2017 Shoreline Survey and Management Plan (**Appendix J**).

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5.0 IMPLEMENTATION

The implementation of this INRMP requires defined objectives and projects to meet the identified natural resource management goals, the use of cooperative agreements to successfully manage natural resources, and funding to execute projects that achieve the INRMP goals.

5.1 MANAGEMENT OBJECTIVES

Goals and objectives identify the most significant natural resources management programs with respect to the military mission at ALC. The goals and objectives were developed by ALC and provide a clear direction to focus natural resources management efforts and funds. The ten goals outlined in this INRMP cover all of the natural resources found on ALC and BPRF, with an ecosystem based approach for comprehensive management, and to meet the overarching goal of this INRMP and the ALC natural resources management program: to ensure that natural resources are managed to maintain ecosystem viability and ensure the sustainability of military lands and support the military mission. **Table 1-1** outlines these goals and objectives.

Appendix B outlines each goal, their objectives, and management activities and specific projects to achieve the goals and sustainably manage natural resources. The appendix also identifies the priorities of the objectives and projects, number 1 through 4, based on the DoDI 4715.03:

1. Recurring Natural Resources Conservation Management Requirements

    i) Administrative, personnel and other costs associated with managing the DoD Natural Resources Conservation Program that are necessary to meet applicable compliance requirements in Federal and State laws, regulations, EOs, and DoD policies, or in direct support of the military mission.

    ii) DoD components shall give priority to recurring natural resources conservation management requirements associated with the operation of facilities, installations, and deployed weapons systems. These activities include day-to-day costs of sustaining an effective natural resources management program, as well as annual requirements, including manpower, training, supplies, permits, fees, testing and monitoring, sampling and analysis, reporting and recordkeeping, maintenance of natural resources conservation equipment, and compliance self-assessments.

2. Current Compliance

    i) Installations currently out of compliance.

    ii) Signed compliance agreement consent order.

    iii) Meeting requirements with applicable Federal or State laws, regulations, standards, EOs, or DoD policies.

    iv) Immediate and essential maintenance of operational integrity or military mission sustainment.

v) Projects or activities that will be out of compliance if not implemented in the current program year. Those activities include:

(1) Environmental analyses for natural resources conservation projects, and monitoring and studies required to assess and mitigate potential impacts of the military mission on conservation resources.

(2) Planning documentation, master plans, compatible development planning, and INRMPs.

(3) Natural resources planning-level surveys.

(4) Reasonable and prudent measures included in incidental take statements of biological opinions, biological assessments, surveys, monitoring, reporting of assessment results, or habitat protection for listed, at-risk, and candidate species so that proposed or continuing actions can be modified in consultation with the USFWS or NOAA Fisheries Service.

(5) Mitigation to meet existing regulatory permit conditions or written agreements, and included in documents required by the DoD Chesapeake Bay Strategic Action Plan.

(6) Nonpoint source pollution or watershed management studies or actions needed to meet compliance dates cited in approved State coastal nonpoint source pollution control plans, as required to meet consistency determinations consistent with Coastal Zone Management.

(7) Wetlands delineation critical for the prevention of adverse impacts to wetlands, so that continuing actions can be modified to ensure mission continuity.

(8) Compliance with missed deadlines established in DoD executed agreements.

3. Maintenance Requirements. Includes those projects and activities needed to meet an established deadline beyond the current program year and maintain compliance. Examples include:

i) Compliance with future deadlines.

ii) Conservation, GIS mapping, and data management to comply with Federal, State, and local regulations, EOs, and DoD policy.

iii) Efforts undertaken in accordance with non-deadline specific compliance requirements of leadership initiatives.

iv) Wetlands enhancement to minimize wetlands loss and enhance existing degraded wetlands.

v) Conservation recommendations in biological opinions issued pursuant to the ESA.

4. 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. Examples include:

   i) Community outreach activities such as International Migratory Bird Day, Earth Day, National Public Lands Day, and Arbor Day activities.

   ii) Educational and public awareness projects, such as interpretive displays, oral histories, Watchable Wildlife areas, nature trails, wildlife checklists, and conservation teaching materials.

   iii) Restoration or enhancement of natural resources when no specific compliance requirement dictates a course or timing of action.

   iv) Management and execution of volunteer and partnership programs.

5.2 ACHIEVING NO NET LOSS

Land management at ALC, as with most DoD installations, is based on the concept that these lands were set aside to serve military training and testing purposes. The Sikes Act recognizes the sometimes-conflicting needs of military mission and environmental stewardship, and specifically states that military lands need to be managed for no net loss in the capability to support the military mission. ALC's challenge, therefore, is to balance the need to use its air, land, and water resources for military training and testing with its stewardship responsibility to conserve these resources for future generations. Toward that end, the principles of multiple use, sustained yield, biodiversity conservation, and the conservation of endangered and threatened species are key.

This INRMP is designed to identify potential environmental constraints, so that mission activities can be planned around these constraints, or agreement with resource agencies regarding impacts can be attained. This allows the mission to go forward, without the potential threat posed by the discovery and accidental taking of a previously unidentified resource.

5.3 USE OF COOPERATIVE AGREEMENTS

ALC currently cooperates with MDNR and other agencies on an as-needed basis for specific purposes. ALC maintains a partnership with MDNR Wildlife and Heritage Division for the management of the hunting program at BPRF. Non-game species management is also conducted with assistance from federal and state wildlife agencies. The MDNR provides professional wildlife biology advice and recommendations in regards to game species on the facility. White-tailed deer are the only wildlife species that are presently managed for consumptive use at BPRF.

5.4 FUNDING

All requirements set forth in this INRMP requiring the expenditure of APG funds are expressly subject to the availability of appropriations and requirements of the Anti-Deficiency Act (31 USC section 1341). No obligation undertaken by APG under the terms of this INRMP will require or be interpreted to require a commitment to expend funds not obligated for a particular purpose.

5.4.1 Implementation Funding Options

Natural resources management within the Army relies on a variety of funding mechanisms, some of which are self-generating and all of which have different application rules. Below are general discussions about different sources of funding to implement this INRMP.

5.4.2 Environmental Funds

APG personnel must complete the Annual Work Plan (AWP) each year to identify environmental requirements for the upcoming budget year and submit them for IMCOM and U.S. Army Environmental Center review. The AWP provides the primary means for identifying the current and projected environmental requirements and resources needed to execute the natural resources management program. The AWP satisfies Army reporting requirements, as specified in EO 12088, Office of Management and Budget Circular A-11 and other federal directives. The report is used for a variety of purposes: planning, programming, budgeting and forecasting costs; documenting past accomplishments and expenditures; tracking project execution and monitoring performance; refining and validating requirements for the budget year; and supporting the Program Objective Memorandum for outyear requirements.

Environmental funds are a special subcategory of Operations and Maintenance funds. They are set aside by the DoD for environmental purposes but are still subject to restrictions of Operations and Maintenance funds. Compliance with laws is the key to getting environmental funding. Environmental funds are most commonly used for projects that return the installation to compliance with federal or state laws, especially if noncompliance is accompanied by Notices of

Violation or other enforcement agency actions. “Must fund” classifications include mitigation identified within *Findings of No Significant Impact* and items required within Federal Facilities Compliance Agreements. This INRMP is a Federal Facilities Requirement Agreement, and several projects and programs within it are used to mitigate various military activities. In addition, 1997 amendments to the Sikes Act require implementation of INRMPs, which make implementation of this INRMP a priority for funding. The prioritization scheme detailed in **Section 5.1** from DoDI 4715.03 also indicates the funding priority with compliance being a “must fund” priority.

5.4.3 Operations and Maintenance Funds

Certain projects within this INRMP are either partially or fully funded with Operations and Maintenance funds. General facility pest management (exclusive of invasive weed control related to threatened and endangered species and other range-related pest management) is in this category. Operations and Maintenance funds are not included in budget estimates for this INRMP

6.0 RECORD OF ENVIRONMENTAL CONSIDERATION

Under the NEPA of 1969, Federal agencies are required to analyze and document the environmental consequences of proposed major actions. The intent of NEPA is to protect, restore or enhance the environment through well-informed Federal decisions. This act is premised on the assumption that providing timely information to the decision maker and the public concerning the potential environmental consequences of Proposed Actions will minimize or prevent the impact of federal decisions on the natural and human environment. Thus, the NEPA process includes the systematic, interdisciplinary evaluation of potential environmental consequences expected to result from implementation of a Proposed Action.

As stated in AR 200-1, *Environmental Protection and Enhancement*, "the Army is committed to environmental stewardship in all actions as an integral part of the Army mission", and will "conserve and preserve natural and cultural resources so they will be available for present and future generations to use". This INRMP has been prepared in accordance with AR 200-1 and 32 CFR Part 651 which states, "The Army is expected to manage those aspects of the environment affected by Army activities; comprehensively integrating environmental policy objectives into planning and decision-making". This document incorporates 32 CFR Part 651 requirements by integrating the installation's INRMP and the associated NEPA analysis, in this case a REC, for implementing the INRMP into this single document.

An EA was prepared in 2002 to document the foreseeable impacts on the natural and human environment of implementing the 2002 INRMP. The analysis performed for that EA found that no significant environmental impacts would result from the implementation of the INRMP, and an EIS was not required. Therefore, a FNSI was prepared and signed in 2004.

The current Proposed Action is the implementation of the updated INRMP. The purpose of the Proposed Action is to carry out the resource-specific management measures that will enable ALC to effectively manage the use and condition of natural resources located on ALC and BPRF. Implementation of the Proposed Action would protect and conserve the natural setting of ALC, while meeting other mission and community support requirements and complying with environmental regulations and policies. The implementation of projects from the INRMP could trigger the need for a REC or EA. Projects will be evaluated on a case-by-case basis.

The REC is included on the following pages.

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As stated in AR 200-1, *Environmental Protection and Enhancement*, "the Army is committed to environmental stewardship in all actions as an integral part of the Army mission", and will "conserve and preserve natural and cultural resources so they will be available for present and future generations to use". This INRMP has been prepared in accordance with AR 200-1 and 32 CFR Part 651 which states, "The Army is expected to manage those aspects of the environment affected by Army activities; comprehensively integrating environmental policy objectives into planning and decision-making". This document incorporates 32 CFR Part 651 requirements by integrating the installation's INRMP and the associated NEPA analysis, in this case a REC, for implementing the INRMP into this single document.

An EA was prepared in 2002 to document the foreseeable impacts on the natural and human environment of implementing the 2002 INRMP. The analysis performed for that EA found that no significant environmental impacts would result from the implementation of the INRMP, and an EIS was not required. Therefore, a FNSI was prepared and signed in 2004.

The current Proposed Action is the implementation of the updated INRMP. The purpose of the Proposed Action is to carry out the resource-specific management measures that will enable ALC to effectively manage the use and condition of natural resources located on ALC and BPRF. Implementation of the Proposed Action would protect and conserve the natural setting of ALC, while meeting other mission and community support requirements and complying with environmental regulations and policies. The implementation of projects from the INRMP could trigger the need for a REC or EA. Projects will be evaluated on a case-by-case basis.

The REC is included on the following pages.

RECORD OF ENVIRONMENTAL CONSIDERATION

Project Title: Implementation of the *Integrated Natural Resources Management Plan 2022-2026 Adelphi Laboratory Center (ALC) and Blossom Point Research Facility (BPRF).*

Description of the Proposed Action: The U.S. Army Garrison, Aberdeen Proving Ground (APG) plans to implement the above-referenced Integrated Natural Resources Management Plan (INRMP) through the year 2026 to provide for the formal continuation of an integrated and comprehensive method for managing natural resources on ALC and BPRF. The INRMP defines roles and responsibilities for natural resource management within these installations and provides the basis for addressing all applicable legal requirements and best management practices consistent with achievement of the goals, objectives and projects of the installations' military missions.

Duration of the Proposed Action: The INRMP will take effect when signed by the APG Garrison Commander and will remain in effect until it is superseded in the future by a new or revised INRMP.

Reason for Using Record of Environmental Consideration: The proposed action qualifies for a categorical exclusion from National Environmental Policy Act (NEPA) documentation in accordance with 32 CFR Part 651 (1 July 2002), Appendix B, Section II, (b)(3) "Preparation of regulations, procedures, manuals, and other guidance documents that implement, without substantive change, the applicable HQDA or other federal agency regulations, procedures, manuals, and other guidance documents that have been environmentally evaluated (subject to previous NEPA review)." The EA prepared in 2002 to document the foreseeable impacts on the natural and human environment of implementing the 2002 INRMP found that no significant environmental impacts would result from the implementation of the INRMP, and a FNSI was prepared and signed in 2004. Therefore, in accordance with the above categorical exclusion, this REC is being prepared to update the existing EA.

Impacts of the Proposed Action: Potential environmental consequences associated with implementing the INRMP would result in either no effects or beneficial effects for the resource areas. Compared to the No Action Alternative, environmental conditions at ALC and BPRF would improve as a result of implementing the proposed INRMP. Expected consequences of affected resource areas for the Proposed Action are presented in the following paragraphs.

a. Physiography and Topography. The Proposed Action would not affect physiography or topography.

b. Geology. The Proposed Action would not affect geologic resources.

c. Petroleum and Mineral Resources. The Proposed Action would not affect petroleum or mineral resources that may be found on the installations. There are no plans to find or develop such resources on ALC or BPRF.

d. Soils. Beneficial effects would be expected. The Proposed Action includes an integrated program for planning land use, evaluation of land use effects, and maintenance and repair of

damaged lands. Brief periods of increased erosion may occur during damaged sites' maintenance and rehabilitation activities, but these would be more than compensated through increased environmental awareness while training and testing; repair and maintenance of the testing areas; and including natural resources implications in military project planning. The Proposed Action offers more effective protection and mitigation for damages incurred to soils due to the military mission than does the No Action Alternative.

e. Water Resources. Beneficial effects would be expected. The Proposed Action includes an integrated program for planning land use, evaluating land use effects, and the management and repair of damaged lands. The Proposed Action describes projects to evaluate and reduce the potential of erosion by maintaining training lands. Brief periods of increased sedimentation may occur during repair and construction activities, but these should be more than compensated for by the reduction in sedimentation to wetlands resulting from including natural resources implications in military project planning. The Proposed Action also includes maintaining a riparian buffer and protecting coastal resources through conservation and habitat enhancement opportunities. The Proposed Action offers more effective protection and mitigation for damages incurred to potential wetlands and area water resources due to the military mission than does the No Action Alternative.

f. Noise Environment. The Proposed Action would not affect installation noise environments. Proposed natural resources management would not create significant noise.

g. Climate. The Proposed Action would not affect climate.

h. Flora

General. Beneficial effects would be expected. The Proposed Action would provide management of floral resources at ALC and BPRF. The INRMP uses an ecosystem-based management strategy to achieve biological diversity conservation, in accordance with the DoD Instruction (DoDI) 4715.03 (2011). It emphasizes the use of native species, as emphasized in DoDI 4715.03 and EO 13148 (2000).

The Proposed Action includes management plans to protect wetlands at ALC and BPRF and a buffer around them, as required by the Maryland Department of the Environment (MDE). The Proposed Action includes specific actions to manage ecosystems, including monitoring flora resources, identification of potential sensitive ecological areas, and an integrated approach to pest management. These programs include minimizing damage to wildlife habitat from testing activities and other users through habitat protection and monitoring.

Special Status Flora. There are no known federally-listed flora on ALC and BPRF. However, the Proposed Action includes monitoring for small-whorled pogonia (*Isotria medeoloides*) on BPRF. If federally-listed species are identified, management will be identical under both alternatives due to legally mandated requirements associated with the Endangered Species Act (ESA). There are five state-listed species that have previously been observed on ALC: ten-angled pipewort (*Eriocaulon decangulare*), Long's rush (*Juncus longii*), snakemouth orchid (*Rose pogonia*) (*Pogonia ophioglossoides*), capitate beakrush (*Rhynchospora cephalantha*), and bog goldenrod

(*Solidago uliginosa*). Continual monitoring and management for these species is included in this INRMP, and is beneficial to these species.

Wetlands. Implementation of the Proposed Action would protect wetlands and a buffer area around wetlands on ALC and BPRF to prevent or minimize potential impacts that result from training and other mission-related activities.

i. Fauna

General. Beneficial effects would be expected. Implementation of the Proposed Action would improve habitat conditions, which would be beneficial to wildlife populations. Monitoring and enhancement of degraded habitats would be conducted.

Special Status Fauna. The northern long-eared bat (*Myotis septentrionalis*) (NLEB), a federally-listed threatened species, was acoustically detected on both ALC and BPRF during 2016 surveys, but not during the 2019 bat surveys. There are no other known federally- or state-listed fauna on ALC or BPRF. There is a management plan for the bald eagle (*Haliaeetus leucocephalus*), which is protected under the Bald and Golden Eagle Protection Act. Habitat exists for the rainbow snake (*Farancia e. erytrogramma*) on BPRF, though it has not been observed. The area of the Potomac River near BPRF provides spawning habitat for the protected Chesapeake Bay Population of the Atlantic sturgeon (*Acipenser oxyrinchus*), and in 2017 the Potomac River was designated as critical habitat for the Atlantic sturgeon. Implementation of the Proposed Action would provide a greater degree of protection and management for species protected under the ESA.

j. Cultural Resources. ALC and BPRF contain sites that have been determined to be eligible for listing in the National Historic Register of Historic Places; however, risks to significant cultural resources are minimal. Review of projects through the NHPA Section 106 process and the NEPA process are used to ensure protection of potential cultural resources while implementing the INRMP.

k. Land Use. Under the Proposed Action, no changes to on-site land uses or land use patterns would occur. Because land uses on-site would not be expected to change, land use patterns in the surrounding area would not be affected.

l. Socioeconomic Environment. The Proposed Action would not have any significant effects on socioeconomic factors in general installation regions.

m. Environmental Justice. EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* [59 Federal Regulation No. 32], issued in February 1994, provides that "*each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations*". The Proposed Action would be confined to ALC and BPRF lands. The Proposed Action would not have significant or disproportionate adverse effects on minority or low-income populations.

n. Environmental Health and Safety Risks for Children. EO 13045, *Protection of*

Children from Environmental Health Risks and Safety Risks, [62 Federal Regulation No. 78] was issued in April 1997. This EO directs each federal agency to "*ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health or safety risks*". Sensitive areas for exposure to children are schools and family housing areas. Environmental health and safety risks are attributable to products that a child might come in contact with or ingest as well as safety around ALC and BPRF. Proposed natural resources management is within boundaries of ALC and BPRF. The Proposed Action would not have significant or disproportionate adverse effects on children or pose health or safety risks.

o. Cumulative Impacts. A cumulative effect is defined as an effect on the environment that results from the incremental effect of the action when added to other past, present and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor, but collectively significant, actions taking place locally or regionally over a period of time.

Implementation of the INRMP would result in a comprehensive environmental strategy for ALC and BPRF that improves the management approach for natural resources on the installations and meets legal and policy requirements consistent with national natural resources management philosophies. Implementation would improve existing environmental conditions at ALC and BPRF, as shown by the potential for beneficial effects in **Table 6-1**. Over time, adoption of the Proposed Action would enable ALC to achieve its goal of maintaining ecosystem viability and ensuring sustainability of desired military training area conditions.

There are no known changes planned for ALC or BPRF military missions or to the intensity and extent of testing that presently occurs on ALC or BPRF. While growth and development can be expected to continue outside the installations that may adversely affect the local environment, the cumulative effects of this growth and development will be minimized on resources on the installation by the implementation of the proposed management measures contained in the INRMP.

Approval: O'SULLIVAN.ARNOLD.VICTOR.JR.1043658600 Digitally signed by O'SULLIVAN.ARNOLD.VICTOR.JR.1043658600 Date: 2022.05.27 09:26:34 -04'00'

Date: **27 May 2022**

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APPENDIX A:
ACRONYMS

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ACRONYMS

ACUB	Army Compatible Use Buffer
AEC	Army Environmental Command
ALC	Adelphi Laboratory Center
APG	Aberdeen Proving Ground
APHIS	Animal and Plant Health Inspection Service
AR	Army Regulation
ARL	Army Research Laboratory
ATV	All-Terrain Vehicle
AWP	Annual Work Plan
BMP	Best Management Practice
BPRF	Blossom Point Research Facility
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CLEO	Conservation Law Enforcement Officers
CWA	Clean Water Act
CWD	Coarse Woody Debris
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
DA	Department of the Army
DBH	Diameter at Breast Height
DoD	Department of Defense
DoDI	Department of Defense Instruction
DPW	Directorate of Public Works
EA	Environmental Assessment
EAB	Emerald Ash Borer
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
ESMP	Endangered Species Management Plan
ESOH	Environment, Safety, and Occupational Health
FIDS	Forest Interior Dwelling Bird Species
FLIR	Forward Looking Infrared Camera
FNSI	Finding of No Significant Impact
GERB	Garrison Environmental Requirements Build
GHG	Greenhouse Gases
GIS	Geographic Information System
GSA	General Services Administration
HEL	Highly Erodible Land
HQDA	Headquarters, Department of the Army
IDA	Intensely Developed Areas
INRMP	Integrated Natural Resources Management Plan
IPMP	Integrated Pest Management Plan
ISMP	Invasive Species Management Plan
LDA	Limited Development Area
MBSS	Maryland Biological Stream Survey

MBTA	Migratory Bird Treaty Act
MDNR	Maryland Department of Natural Resources
MDE	Maryland Department of the Environment
MHT	Maryland Historic Trust
MMRP	Military Munitions Response Program
MOA	Memoranda of Agreement
MOU	Memorandum of Understanding
MSL	Mean Sea Level
NAVFAC	Naval Facilities Engineering Systems Command
NBS	National Bureau of Standards
NDAA	National Defense Authorization Act
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NMFWA	National Military Fish and Wildlife Association
NLEB	Northern Long-Eared Bat
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NSWC	Naval Surface Warfare Center
PARC	Partners in Amphibians and Reptile Conservation
PIF	Partners in Flight
PLS	Planning Level Survey
PMB	Powder Mill Bog
PSI	Pounds Per Square Inch
RAB	Restoration Advisory Board
RCA	Resource Conservation Areas
REC	Record of Environmental Consideration
ROD	Record of Decision
RTE	Rare, Threatened and Endangered
SAIA	Sikes Act Improvement Act
SAV	Submerged Aquatic Vegetation
SHPO	State Historic Preservation Officer
SLF	Spotted Lanternfly
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFDA	U.S. Food and Drug Administration
USFWS	U.S. Fish and Wildlife Service
WHS	Wildlife and Heritage Service

APPENDIX B:
Natural Resources Management Goals, Objectives and Projects

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ALC/BPRF INRMP Goals, Objectives, and Projects

Goal	Objective	Project	Project Cost	Implementation Timeframe	Project Priority
Goal 1: Natural Resource Management Implement a natural resources management program that reflects the principles of ecosystem management and ensures the sustainability of the military mission.	Manage natural resources consistent with environmental laws, regulations and legislation, for Federal, State, DoD or Army rules.	Continually review environmental legislation and ensure compliance. Coordinate with appropriate agencies as necessary.	In-House	Ongoing	1
	Use adaptive management strategies to protect, conserve and enhance native fauna and flora with an emphasis on priority species and native biodiversity enhancement.	Review this INRMP annually to include review of all natural resource management programs, and adapt and update as necessary.	In-House	Annually	1
Goal 2: Rare, Threatened and Endangered Species Ensure protection of federally listed threatened and endangered species and species of special concern and undertake management measures that support conservation and recovery of these species.	Identify and preserve these species in accordance with the Endangered Species Act (ESA), Endangered Species Recovery Plans, U.S. Army regulations and guidance, approved site-specific management plans, including Endangered Species Management Plans (ESMP).	Avoid disturbance to in-river habitat to protect spawning habitat for the potentially federally protected Atlantic sturgeon (*Acipenser oxyrinchus*).	In-House	Ongoing	2
		Perform rare, threatened and endangered species survey for federal and state listed species and update management strategy based on findings and consultation with USFWS and MD DNR.	$55K	FY2023	2
	Protect unique plant species and habitat identified as rare statewide or locally, but without legal protection status, to the extent practical without restricting key mission operations.	Monitor the Powder Mill Bog and avoid any disturbance to this rare habitat. Avoid an increase in sediments or nutrients to the bog from increased impervious area, fertilizers, and septic systems. Remove small trees encroaching this site, such as red maple, tulip tree and sycamore saplings that are less than four inches in diameter. Manually remove invasive species, specifically Japanese stiltgrass in early August. Manage invasive species encroachment along the nearby road using herbicide. Coordinate invasive species control with the adjacent landowner and Maryland-National Capital Park and Planning.	Monitoring = In-House Species Removal = $20K	Monitoring = Ongoing Species Removal = FY2023	2
Goal 3: Habitat Management Protect and enhance all habitats on ALC and BPRF, particularly sensitive and ecologically significant habitats, in a manner that promotes healthy, sustainable ecological communities.	Monitor all missions/activities for possible adverse impacts to soil resources, water quality and the ecological integrity of aquatic and terrestrial habitats. Adapt management as necessary.	Regularly monitor and inspect habitats for degradation and address causes of degradation. Monitor the impact of deer browsing on native plant communities and timber resources	In-House	Ongoing	3
		Maintain and enhance wildlife habitat by retaining snags, den trees, and coarse woody debris within forest stands consistent with other natural resources objectives and the military mission.	In-House	Ongoing	3
		Update Habitat Management Plan.	$55K	FY2023	4
		Replace plants and torn fencing in ALC Pollinator Garden.	$5K	Annually	2
		Maintain vegetated riparian buffer zones to prevent or minimize stream degradation associated with sediment and other pollutants in runoff.	In-House	Ongoing	2
		Conduct stream bank stabilization for areas at ALC identified in Stream Assessment.	TBD	FY2023	3

ALC/BPRF INRMP Goals, Objectives, and Projects

Goal	Objective	Project	Project Cost	Implementation Timeframe	Project Priority
Goal 4: Water Resources Protect the integrity of surface and groundwater resources and aquatic habitat to maintain and enhance biodiversity and protect water quality.	Protect aquatic and riparian resources by establishing and maintaining riparian management zones that limit activities within buffers zones around streams and wetlands to those activities that would cause little to no impact on water quality and aquatic habitats. Identify and restore degraded habitats when practical.	Any increase in impervious surface must be mitigated to avoid or minimize increase in stormwater runoff using low impact development practices or BMPs. All projects that increase impervious surface must be conducted in consistence with the Energy Independence and Security Act Section 438 and Maryland legislation. Implementing low impact development practices and BMPs to capture and treat runoff prior to discharge will help maintain and improve water quality and stormwater runoff volume.	To be included in project construction costs and scheduled with any land improvement or construction activities.		2
		Regularly review water resources management strategies defined above and mission-related activities to evaluate the condition of these resources and determine the need to adapt the management strategy to further enhance water quality and aquatic and riparian habitat.	In-House	Ongoing	1
		Conduct Paint Branch Assessment and Fish Survey at ALC.	$50K	FY2023	2
	Prevent the degradation of water quality from point and non-point sources of pollution to include sediments, nutrients, and chemical pollution.	Continue water quality monitoring program with USGS. Regularly review the results of the water quality monitoring and address and degradation issues.	In-House	Ongoing	2
	Achieve no net loss of wetlands.	Avoid impacts to wetlands and mitigate when unavoidable. Coordinate these efforts with USACE and MD DNR.	In-House	Ongoing	3
		Conduct Wetland Delineations at ALC as needed.	$40K	TBD	3
	Protect and improve the stability and resiliency of the BPRF shoreline and prevent further loss of land.	Implement BPRF Shoreline Management Plan.	R 1-$4,500,000 R 2- $3,500,000 R 3- $3,500,000	TBD	3

Goal	Objective	Project	Project Cost	Implementation Timeframe	Project Priority
Goal 5: Fish and Wildlife Maintain the diversity of species and habitats currently found at ALC and BPRF, restore and enhance degraded habitats where possible, and promote sustainable management of resources in a manner consistent with ecosystem management principles and the military mission.	Maintain fish and wildlife biodiversity, especially native species, through protecting present wildlife habitats from degradation. Reduce habitat fragmentation and restore native grassland, forest and wetland communities.	Update Habitat Management Plan.	Same as previously mentioned		
		Implement riparian buffers and demarcate their boundary. Include this buffer in planning for construction, testing, and training activities.	Same as previously mentioned		
		Implement Forest Management Plan at ALC and BPRF, to include stand improvement prescriptions to manage for a diversity of species and uneven-aged management.	$131,144 $132,405 $133,666 $134,927	FY2021 FY2022 FY2023 FY2024	2
	Provide for migratory bird and bald eagle protection.	Continue to perform surveys and monitor populations of the bald eagle at BPRF, in conjunction with NAVFAC, in accordance with the ESMP and the Bald and Golden Eagle Protection Act. Coordinate efforts with MD DNR and USFWS as appropriate. Ensure protection of the bald eagle habitat and nests. If any planned or ongoing activities cannot be conducted in compliance with the National Bald Eagle Management Guidelines (Eagle Management Guidelines), BPRF personnel will contact the USFWS or the Chesapeake Bay Ecological Services Field Office.	$5,210 $5,700 $6,200 $6,700 $7,200	FY2022 FY2023 FY2024 FY2025 FY2026	1
		Provide annual nest monitoring reports to USFWS Chesapeake Bay Field Office and MD DNR.	In-House	Annually	1
	Sustain healthy populations of game and nongame species at levels compatible with land use objectives and the military mission.	Monitor habitat and populations of non-game species to determine mission related impacts to populations and habitat. Coordinate with appropriate agencies as necessary, particularly for bald eagles, migratory waterfowl, neotropical migratory birds, FIDS, protected fish species and other species of concern. Coordinate as appropriate with other organizations and partnerships such as the Partners in Amphibians and Reptile Conservation (PARC) for herpetofauna and Partners in Flight for migratory birds.	In-House	Ongoing	2
		Re-institute wildlife food plots at BPRF.	$10K	Annually	4
		Continue the recreational hunting program at BPRF and monitor species populations to adapt hunting permits, as necessary. Continue to implement the white-tailed deer hunting program at BPRF to maintain a target herd density of 20 individuals per square mile. Provide harvest records and coordinate with the MD DNR on an annual basis.	$35K	Ongoing	4
		Conduct a hunting program for wild turkey at BPRF.	$20K-$40K	Annually	3

ALC/BPRF INRMP Goals, Objectives, and Projects

Goal	Objective	Project	Project Cost	Implementation Timeframe	Project Priority
		Complete regular surveys (including FLIR surveys) of the deer herd populations and explore option for a deer management program at ALC and BPRF.	$3,800 $3,900 $4,000 $4,100 $4,200	FY2022 FY2023 FY2024 FY2025 FY2026	3
		Maintain osprey nesting platforms at BPRF.	$15K/year	Ongoing	2
		Maintain bluebird trail at ALC.	$15K/year	Ongoing	4
		Conduct Avian Surveys at ALC and BPRF.	$50K $55K	FY2023 FY2028	2
		Conduct Bat Surveys at ALC and BPRF.	$50K $51K	FY2022 FY2025	2
		Conduct Reptile and Amphibian Surveys at ALC and BPRF.	$50K $55K	FY2022 FY2027	4
Goal 6: Forest Resources Conserve and manage forest resources in a sustainable fashion that maintains biodiversity, ecological functions and values, as well as the military mission.	Protect forest resources from unacceptable losses to damage agents and degradation resulting from insects and disease, invasive species, and wildfire.	Continue to implement the Integrated Pest Management Program. Survey for Emerald Ash Borer and gypsy moth; control as necessary.	Implementation = In-House Surveys = $20K/year	Ongoing	2
	Carry on the objective of forest resources management at BPRF for an optimum combination of uses (multiple-use management) including: - Wildlife habitat preservation and enhancement; - Wetland, watershed, and groundwater protection; - Possible timber production; - Protection of the shoreline and natural resources in support of the Chesapeake Bay Action Plan; - Preservation of existing historical and cultural resources.	Continue to monitor forest resources for signs of disease, excessive damage from wildlife browsing and mission activities, and wildfire fuel loads. Maintain existing firebreaks.	In-House	Ongoing	2
		Maintain and enhance wildlife habitat by retaining snags, den trees, and coarse woody debris within forest stands consistent with other natural resources objectives and the military mission.	Same as previously mentioned		
		Implement Forest Management Plan at BPRF, to include stand improvement prescriptions to manage for a diversity of species and uneven-aged management.	Same as previously mentioned		
		Continue to comply with the Forest Conservation Act regulations for any construction or disturbances to forest resources.	In-House	Ongoing	2

ALC/BPRF INRMP Goals, Objectives, and Projects

Goal	Objective	Project	Project Cost	Implementation Timeframe	Project Priority
Goal 7: Pest and Invasive Species Manage and prevent the spread of pests and invasive species that threaten habitat and native species.	Employ judicious use of both non-chemical and chemical control techniques to achieve effective pest management with minimal environmental consequence.	Continue to implement the Integrated Pest Management Program and the Invasive Species Management Plan. Monitor and assess progress of invasive and pest species management activities, and adapt as necessary. Avoid impacts to other species and habitat from invasive and pest management.	In-House	Ongoing	2
	Identify, monitor and control invasive and pest species and habitat.	Regularly monitor for invasive and pest species and address as appropriate. Monitor for new areas of invasive species and spread of invasive and pest species on ALC and BPRF. Continue to survey for Emerald Ash Borer and gypsy moth and control as necessary.	In-House	Ongoing	3
		Implement Canada Geese Management at ALC.	$8,550 $9,000 $9,225 $9,450	FY2021 FY2022 FY2023 FY2024	3
		Conduct Beaver Survey and Management Plan at BPRF.	$35K	FY2022	4
	Carry on pest management priorities at ALC and BPRF to include control of disease vectors, protection of real estate, control of nuisance pests, control of undesirable vegetation, protection of beneficial plants, and control of miscellaneous animal pests (such as birds, rodents, and other mammals).	Regularly review the effectiveness of the Invasive Species Management Plans and update as needed.	Review = In-House Updates = $50K/each	Review = Annually Updates = BPRF - FY2023 ALC - FY2024	2
		Update Integrated Pest Management Plan.	$45K	FY2026	2
		Utilize 4-Poster Deer Self-Treatment Machine at ALC for tick-borne disease prevention.	$5K	Annually	4
		Perform Tick Surveys at ALC and BPRF with Army PHC.	In-House	Ongoing	3
Goal 8: Soil Resources Manage soil resources in a sustainable manner and protect soils from erosion and destabilization through preventative and restoration efforts and prevent potential soil erosion impacts on water quality, habitat quality, and mission objectives.	Monitor soils regularly for erosion and address problem areas as appropriate.	Regularly monitor stream banks, roadsides, and other areas subject to erosive forces for erosion. Maintain existing road ditches, culverts, and turnouts to prevent erosion.	In-House	Ongoing	2
		Conduct stream bank stabilization for areas at ALC identified in Stream Assessment.	Same as previously mentioned		
	Protect soil resources from disturbances from earth-moving activities, construction and natural erosive forces through use of best management practices (BMPs).	Implement low impact development BMPs to slow stormwater runoff to reduce soil erosion.	Varies	As needed	3
	Use native species for erosion control.	Plant native species in bare soil areas and in areas subject to erosive forces. Stabilize and seed eroded roadsides and road cuts in a timely manner to minimize impacts of erosion. Use geotextile fabrics and mulch to stabilize soil surface. Harden slopes and grades with rip-rap, stone or gravel when planting is not feasible.	$5K/year	As needed	2
	Continue to provide outdoor recreational opportunities to the extent that they do not conflict with the military mission or compromise	Continue the recreational hunting program at BPRF and monitor species populations to adapt hunting permits, as necessary.	Same as previously mentioned		

ALC/BPRF INRMP Goals, Objectives, and Projects

Goal	Objective	Project	Project Cost	Implementation Timeframe	Project Priority
Goal 9: Community Outreach Encourage relationship with the local community on ALC and BPRF, as appropriate, without interruption to the military mission.	environmental values.	Install educational signs on the Fitness Trail at ALC.	$10K	FY2024	4
	Make a positive contribution to local conservation efforts and the community by participating in educational opportunities and providing information on issues affecting ALC, BPRF and the region.	Develop educational brochures for staff, testing teams, and public with information about natural resources on site.	$10K	FY2024	4
		Conduct Earth Day Activities at ALC and BPRF.	In-House	Annually	4
Goal 10: Fire Management The primary goal for fire management at ALC is to prevent unacceptable losses to military property from wildfire.	Implement appropriate wildfire prevention and suppression measures.	Prevent the occurrences of wildfires at ALC by educating personnel on fire prevention techniques, reducing unnaturally high fuel loads, and restricting the types of activities that can be undertaken based on the level of fire danger in an area. Facilitate rapid suppression of wildfires by maintaining existing firebreaks and responding rapidly to contain the spread of wildfires when they do occur, thereby preventing further losses to natural resources and other Army property.	In-House	Ongoing	1
		Evaluate the feasibility of implementing a prescribed fire plan at BPRF to reduce natural fuel loads, control invasive species, and improve wildlife habitat. Implement burning if found feasible though Forest Plan implementation.	TBD	Ongoing	4

APPENDIX C:
Agency Coordination Letters

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DEPARTMENT OF THE ARMY
U.S. ARMY INSTALLATION MANAGEMENT COMMAND
ADELPHI LABORATORY CENTER
2800 MILL POWDER ROAD
ADELPHI MARYLAND 20783-1197

July 10, 2020

Mr. Chris Guy
U.S. Fish and Wildlife Service
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401-7307

Dear Mr. Guy:

The U.S. Army Garrison Aberdeen Proving Ground is updating an existing Integrated Natural Resources Management Plan (INRMP). The INRMP addresses natural resources management at the Adelphi Laboratory Center located in Prince George's and Montgomery Counties, Maryland, and the Blossom Point Research Facility located in Charles County, Maryland (Encls 1 and 2).

To update the INRMP, Aberdeen Proving Ground will review existing information about natural resources at each site, revise, and augment this information as necessary, and propose appropriate courses of action to improve and protect these resources. The INRMP will be prepared in accordance with appropriate current Department of Defense and Army guidance, focusing on management opportunities in a manner consistent with the mission of the facilities. In accordance with Army regulations, documentation is required through the National Environmental Policy Act process in order to implement the INRMP. It is anticipated a Record of Environmental Consideration will be required to implement the updated INRMP.

Aberdeen Proving Ground is inviting the U.S. Fish and Wildlife Service's participation in the update to initiate an open dialog regarding priorities for natural resources management in Maryland at the Adelphi Laboratory Center and Blossom Point Research Facility.

Aberdeen Proving Ground requests any information the U.S. Fish and Wildlife Service has on the presence of federally protected species listed under the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). Please verify the requirements of Section 7 of the ESA and the U.S. Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) will be met for the two project areas as part of the Record of Environmental Consideration.

Please provide comments within 30 days to Mrs. Bridget Kelly Butcher, U.S. Army Garrison Adelphi Laboratory Center, 2800 Powder Mill Road, IMAL-PWE, Adelphi, Maryland 20783-1197, bridget.c.kellybutcher.civ@mail.mil, 240-694-7258.

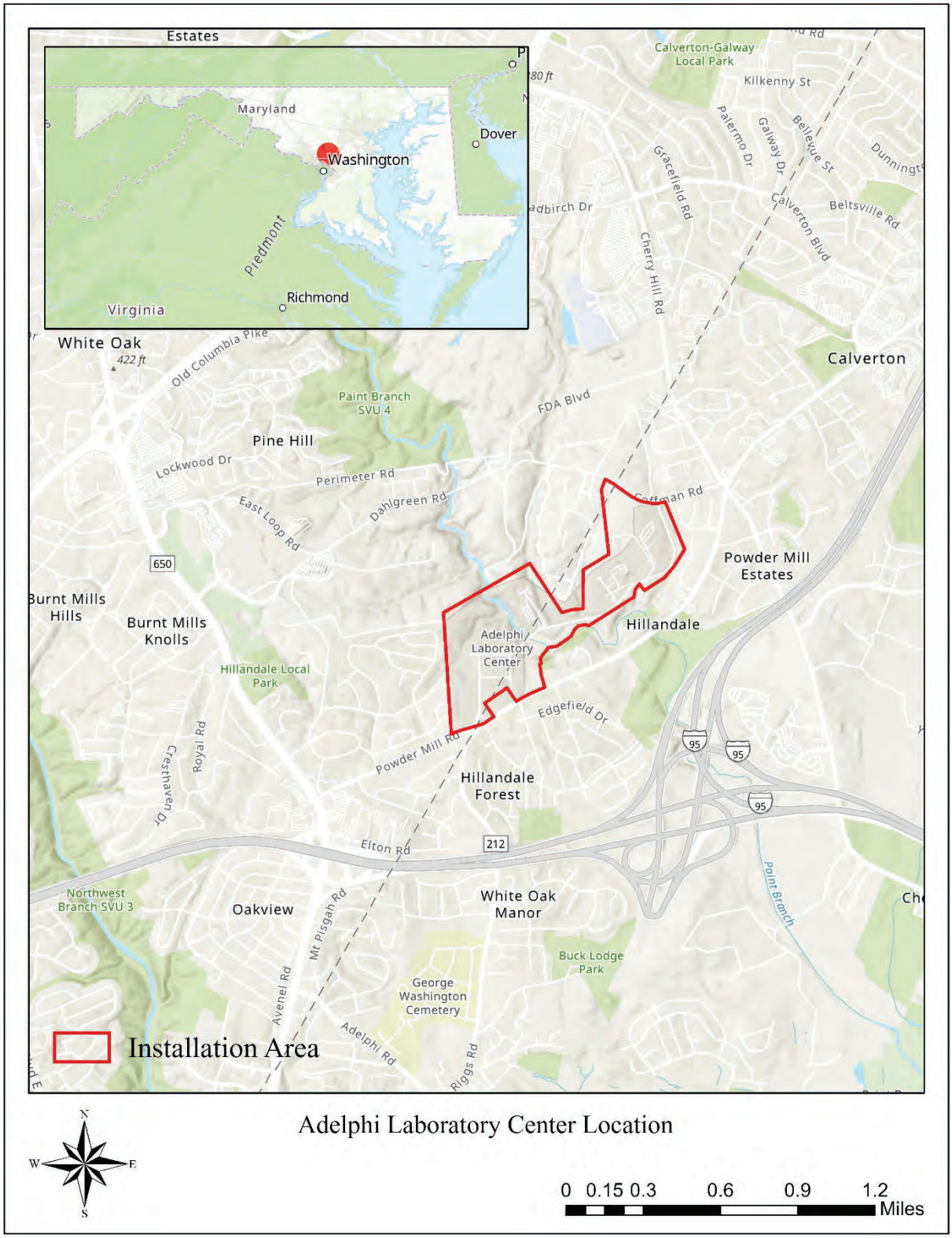
Sincerely,

DEEL.AMY.ELIZABETH.1010776348 Digitally signed by DEEL.AMY.ELIZABETH.1010776348 Date: 2020.07.10 10:45:50 -04'00'

Vance G. Hobbs
Director, Environmental Division
Directorate of Public Works

Enclosures

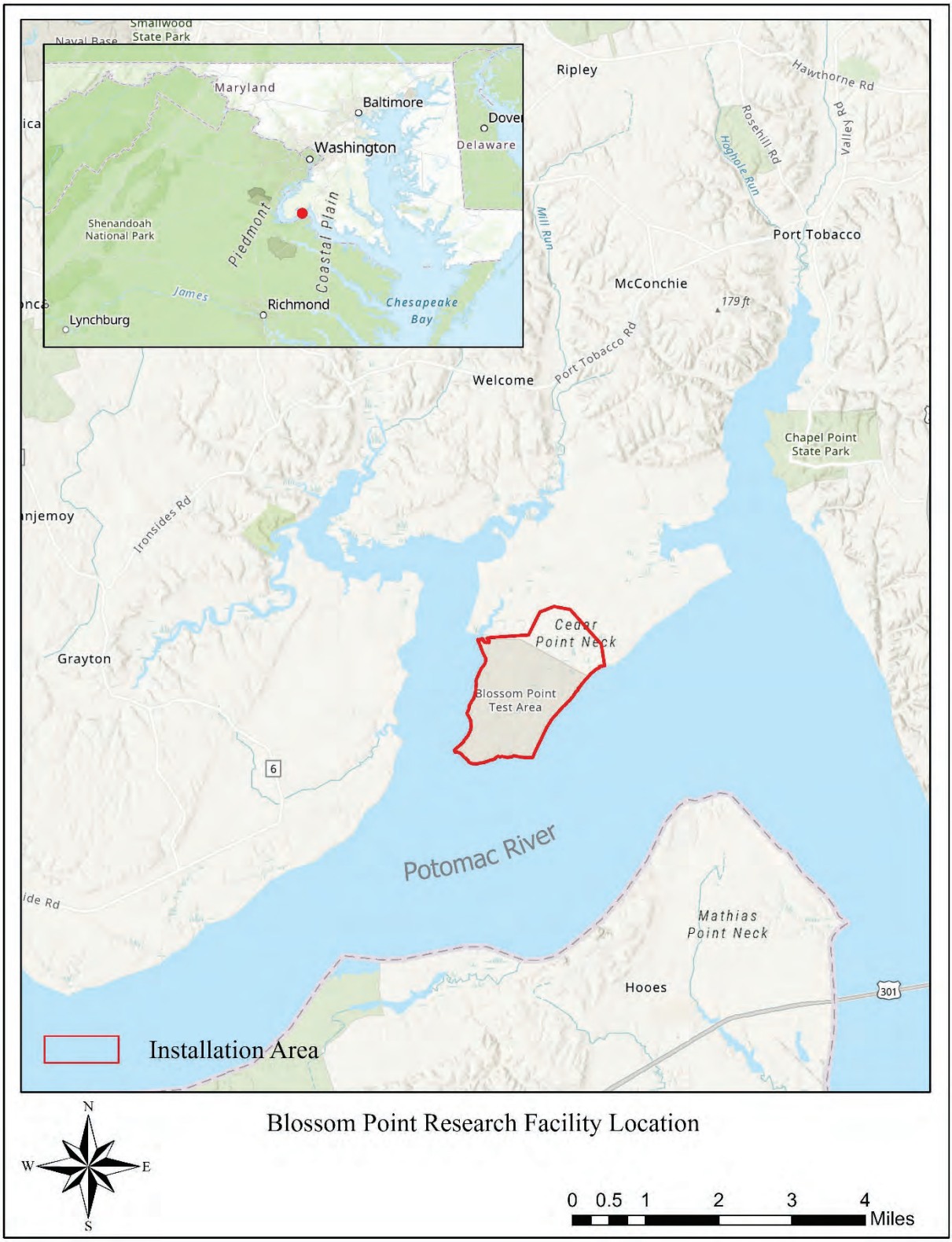
Adelphi Laboratory Center Site Location Map



Adelphi Laboratory Center Location

Enclosure 1

Blossom Point Research Facility Site Location Map



Enclosure 2

United States Department of the Interior
U.S. Fish & Wildlife Service
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401
410/573 4575

Online Certification Letter

Today's date: 1 February 2021
Project: ALC/BPRF INRMP Update

Dear Applicant for online certification:

Thank you for using the U.S. Fish and Wildlife Service (Service) Chesapeake Bay Field Office online project review process. By printing this letter in conjunction with your project review package, you are certifying that you have completed the online project review process for the referenced project in accordance with all instructions provided, using the best available information to reach your conclusions. This letter, and the enclosed project review package, completes the review of your project in accordance with the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (ESA).This letter also provides information for your project review under the National Environmental Policy Act of 1969 (P.L. 91-190, 42 U.S.C. 4321-4347, 83 Stat. 852), as amended. A copy of this letter and the project review package must be submitted to this office for this certification to be valid. This letter and the project review package will be maintained in our records.

Based on this information and in accordance with section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.), we certify that except for occasional transient individuals, no federally proposed or listed endangered or threatened species are known to exist within the project area. Therefore, no Biological Assessment or further section 7 consultation with the U.S. Fish and Wildlife Service is required. Should project plans change, or if additional information on the distribution of listed or proposed species becomes available, this determination may be reconsidered.

This response relates only to federally protected threatened or endangered species under our jurisdiction. For additional information on threatened or endangered species in Maryland, you should contact the Maryland Wildlife and Heritage Division at (410) 260-8573. For information in Delaware you should contact the Delaware Division of Fish and Wildlife, Wildlife Species Conservation and Research Program at (302) 735-8658. For information in the District of Columbia, you should contact the National Park Service at (202) 339-8309.

The U.S. Fish and Wildlife Service also works with other Federal agencies and states to minimize loss of wetlands, reduce impacts to fish and migratory birds, including bald eagles, and restore habitat for wildlife. Information on these conservation issues and how development projects can avoid affecting these resources can be found on our website (www.fws.gov/chesapeakebay)

We appreciate the opportunity to provide information relative to fish and wildlife issues, and thank you for your interest in these resources. If you have any questions or need further assistance, please contact Chesapeake Bay Field Office Threatened and Endangered Species program at (410) 573-4527.

Sincerely,

Genevieve LaRouche
Field Supervisor

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Chesapeake Bay Ecological Services Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401-7307
Phone: (410) 573-4599 Fax: (410) 266-9127
http://www.fws.gov/chesapeakebay/
http://www.fws.gov/chesapeakebay/endsppweb/ProjectReview/Index.html

In Reply Refer To: February 01, 2021
Consultation Code: 05E2CB00-2021-SLI-0581
Event Code: 05E2CB00-2021-E-01433
Project Name: ALC/BPRF INRMP Update

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. This species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Chesapeake Bay Ecological Services Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401-7307
(410) 573-4599

Project Summary

Consultation Code: 05E2CB00-2021-SLI-0581
Event Code: 05E2CB00-2021-E-01433
Project Name: ALC/BPRF INRMP Update
Project Type: ** OTHER **
Project Description: Adelphi Laboratory Center and Blossom Point Research Facility INRMP Update

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@38.421781949999996,-77.09212216497298,14z

Counties: Charles, Montgomery, and Prince George's counties, Maryland

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 1 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis*	Threatened

No critical habitat has been designated for this species.

This species only needs to be considered under the following conditions:

- Projects with a federal nexus that have tree clearing = to or > 15 acres: 1. REQUEST A SPECIES LIST 2. NEXT STEP: EVALUATE DETERMINATION KEYS 3. SELECT EVALUATE under the Northern Long-Eared Bat (NLEB) Consultation and 4(d) Rule Consistency key

Species profile: https://ecos.fws.gov/ecp/species/9045

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1A
- PFO1C
- PFO1E
- PFO1R
- PFO1S
- PSS1R
- PSS1T
- PSS1C

RIVERINE

- R3UBH
- R4SBC
- R5UBH

ESTUARINE AND MARINE DEEPWATER

- E1UBL
- E1UBL6

ESTUARINE AND MARINE WETLAND

- E2EM1P
- E2EM1P6
- E2EM2N

FRESHWATER EMERGENT WETLAND

- PEM1A

FRESHWATER POND

- PUBHx

DEPARTMENT OF THE ARMY
U.S. ARMY INSTALLATION MANAGEMENT COMMAND
ADELPHI LABORATORY CENTER
2800 MILL POWDER ROAD
ADELPHI MARYLAND 20783-1197

July 10, 2020

Ms. Lori Byrne
Wildlife and Heritage Service
Department of Natural Resources
580 Taylor Avenue
Tawes Office Building E-1
Annapolis, MD 21401-2352

Dear Ms. Byrne:

The U.S. Army Garrison Aberdeen Proving Ground is updating an existing Integrated Natural Resources Management Plan (INRMP). The INRMP addresses natural resources management at the Adelphi Laboratory Center located in Prince George's and Montgomery Counties, Maryland, and the Blossom Point Research Facility located in Charles County, Maryland (Encls 1 and 2).

To update the INRMP, Aberdeen Proving Ground will review existing information about natural resources at each site, revise, and augment this information as necessary, and propose appropriate courses of action to improve and protect these resources. The INRMP will be prepared in accordance with appropriate current Department of Defense and Army guidance, focusing on management opportunities in a manner consistent with the mission of the facilities. In accordance with Army regulations, documentation is required through the National Environmental Policy Act process in order to implement the INRMP. It is anticipated a Record of Environmental Consideration will be required to implement the updated INRMP.

Aberdeen Proving Ground is inviting the Department of Natural Resources' participation in the update to initiate an open dialog regarding priorities for natural resources management in Maryland at the Adelphi Laboratory Center and Blossom Point Research Facility. Aberdeen Proving Ground requests any information the Department of Natural Resources may have on the presence of state protected species of animals and plants.

Please provide comments within 30 days to Mrs. Bridget Kelly Butcher, U.S. Army Garrison Adelphi Laboratory Center, 2800 Powder Mill Road, IMAL-PWE, Adelphi, Maryland 20783-1197, bridget.c.kellybutcher.civ@mail.mil, 240-694-7258.

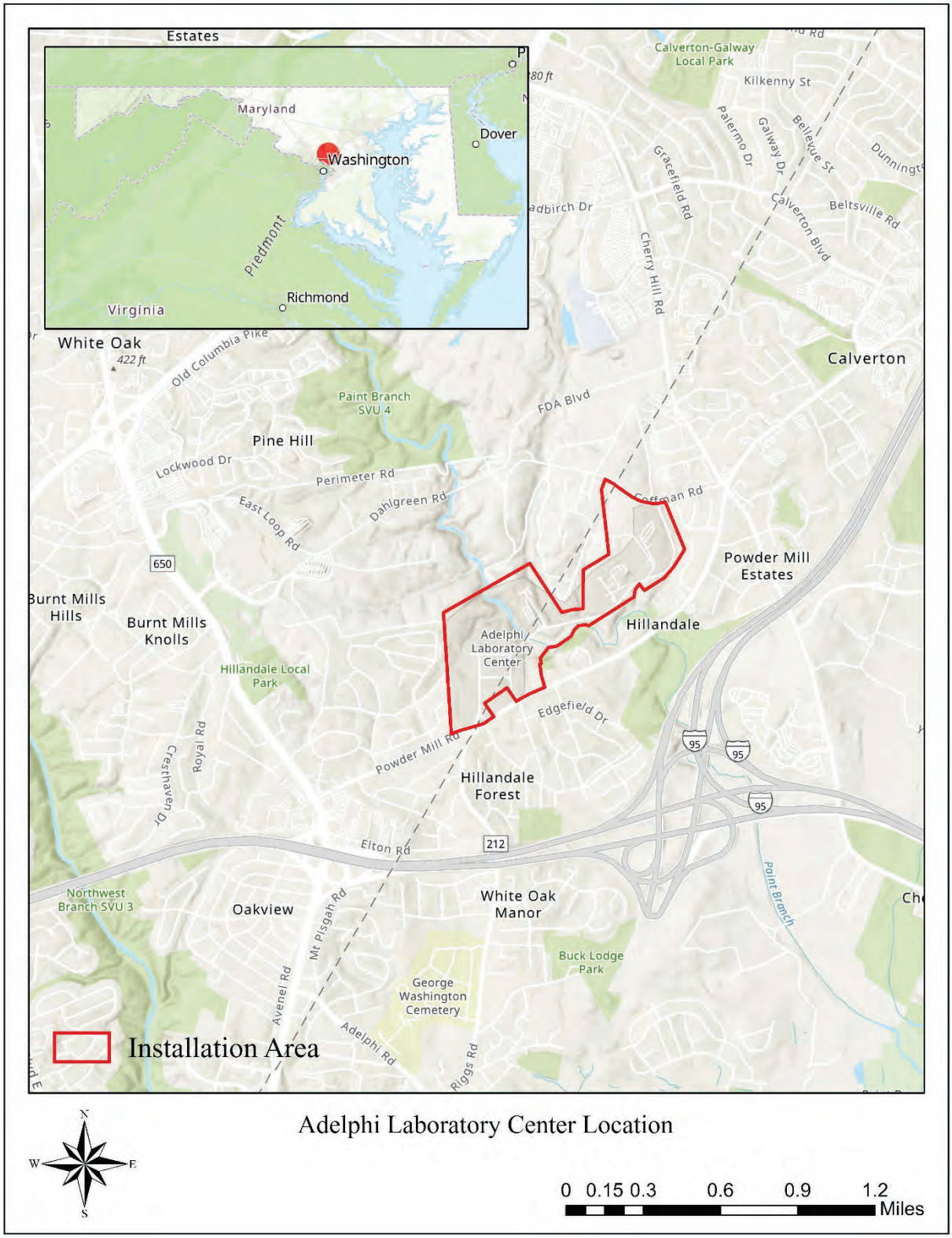
Sincerely,

DEEL.AMY.ELIZABETH.1010776348
Digitally signed by DEEL.AMY.ELIZABETH.1010776348
Date: 2020.07.10 11:22:44 -04'00'

Vance G. Hobbs
Director, Environmental Division
Directorate of Public Works

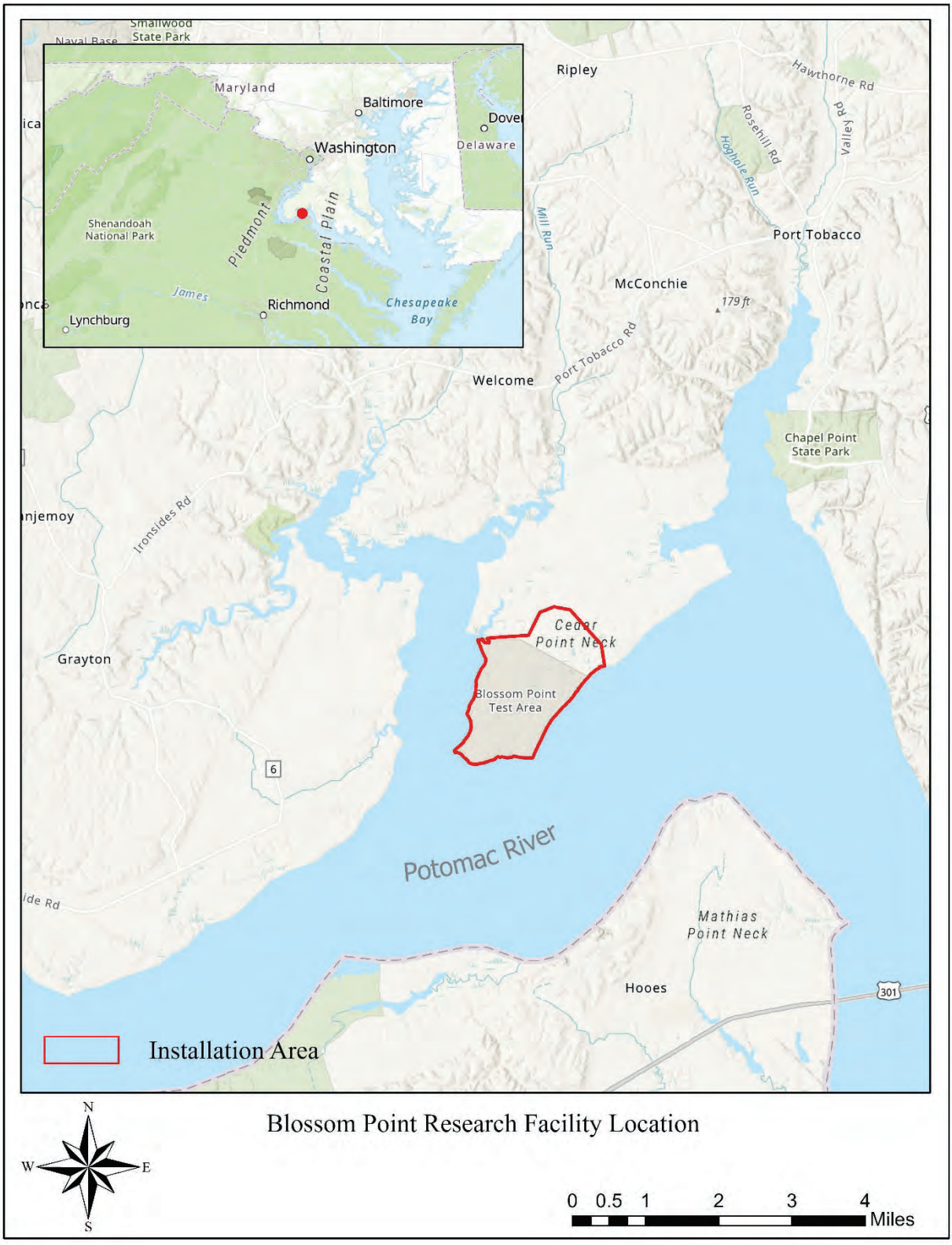
Enclosures

Adelphi Laboratory Center Site Location Map



Enclosure 1

Blossom Point Research Facility Site Location Map



Enclosure 2

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Larry Hogan, Governor
Boyd Rutherford, Lt. Governor
Jeannie Haddaway-Riccio, Secretary

September 15, 2020

Ms. Bridget Kelly Butcher
Department of the Army
Adelphi Laboratory Center
2800 Powder Mill Road
Adelphi, Maryland 20783-1138

RE: Environmental Review - INRMP for Adelphi Laboratory Center and Blossom Point Research Facility, Prince George's, Montgomery and Charles Counties, Maryland.

Dear Ms. Butcher:

For the **Adelphi Laboratory Center**, the Wildlife and Heritage Service has determined that there is a small remnant fall-line terrace gravel bog on the project site, located in the eastern portion of the property, which is known to support occurrences of rare, threatened or endangered species. Known as Powder Mill Bog, it is the only remaining bog of several which comprised a Powder Mill Bog complex, but the other bogs have been drained or filled during the commercial and residential development of this suburban area. This wetland supports a population of highly rare Ten-angle Pipewort (*Eriocaulon decangulare*) and a population of state-listed endangered Capitate Beakrush (*Rhynchospora cephalantha*), as well as several other watchlist plant species and possible rare odonates.

Also, our remote analysis suggests that the forested area on this property contains Forest Interior Dwelling Bird habitat. Populations of many bird species which depend on this type of forested habitat are declining in Maryland and throughout the eastern United States. Interested landowners can contact us for further voluntary guidelines to help conserve this important habitat.

For the **Blossom Point Research Facility**, the open waters that are adjacent to or part of the site are known historic waterfowl concentration areas. If there is to be any construction of water-dependent facilities please contact Josh Homyack of the Wildlife and Heritage Service at (410) 827-8612 x100 or josh.homyack@maryland.gov for further technical assistance regarding waterfowl.

Also, our remote analysis suggests that the forested area on this property contains Forest Interior Dwelling Bird habitat. Populations of many bird species which depend on this type of forested habitat are declining in Maryland and throughout the eastern United States. Conservation of this habitat is mandated within the Chesapeake Bay Critical Area and should be incorporated into any plans.

Thank you for allowing us the opportunity to review this project. If you should have any further questions regarding this information, please contact me at (410) 260-8573.

Sincerely,

Lori A. Byrne

Lori A. Byrne,
Environmental Review Coordinator
Wildlife and Heritage Service
MD Dept. of Natural Resources

ER# 2020.1126.mo/pg/ch
Cc: K. McCarthy, DNR
J. Homyack, DNR
C. Jones, CAC

DEPARTMENT OF THE ARMY
U.S. ARMY INSTALLATION MANAGEMENT COMMAND
ADELPHI LABORATORY CENTER
2800 MILL POWDER ROAD
ADELPHI MARYLAND 20783-1197

July 10, 2020

Mr. Mark Murray-Brown
Greater Atlantic Regional Fisheries Office
NOAA Fisheries Service
55 Great Republic Drive
Gloucester, MA 01930-2276

Dear Mr. Murray-Brown:

The U.S. Army Garrison Aberdeen Proving Ground is updating an existing Integrated Natural Resources Management Plan (INRMP). The INRMP addresses natural resources management at the Adelphi Laboratory Center located in Prince George's and Montgomery Counties, Maryland, and the Blossom Point Research Facility located in Charles County, Maryland (Encls 1 and 2).

To update the INRMP, Aberdeen Proving Ground will review existing information about natural resources at each site, revise, and augment this information as necessary, and propose appropriate courses of action to improve and protect these resources. The INRMP will be prepared in accordance with appropriate current Department of Defense and Army guidance, focusing on management opportunities in a manner consistent with the mission of the facilities. In accordance with Army regulations, documentation is required through the National Environmental Policy Act process in order to implement the INRMP. It is anticipated a Record of Environmental Consideration will be required to implement the updated INRMP.

Aberdeen Proving Ground is inviting NOAA Fisheries Service's participation in the update to initiate an open dialog regarding priorities for natural resources management in Maryland at the Adelphi Laboratory Center and Blossom Point Research Facility.

Aberdeen Proving Ground requests any information the NOAA Fisheries Service has on the presence of federally protected species listed under the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). The U.S. Fish and Wildlife Service will conduct a consultation on terrestrial plant and animal species and the Maryland Department of Natural Resources will address state-listed terrestrial and aquatic species. Blossom Point Research Facility, located on Cedar Point Neck between the Potomac River and Nanjemoy Creek, has the potential to provide habitat for marine Endangered Species Act-listed species under NOAA Fisheries Service's jurisdiction. The Endangered Species Act Section 7 Mapper available on NOAA

Fisheries Service's website maps the Potomac River, in the reaches adjoining Blossom Point Research Facility, as migrating, foraging, and overwintering grounds for juvenile and adult shortnose sturgeon (*Acipenser brevirostrum*) and as migrating and foraging habitat for juvenile, sub-adult and adult Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*). The Potomac River is designated as critical habitat for the Atlantic sturgeon. Please verify the requirements of Section 7 of the Endangered Species Act and the U.S. Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) will be met for the two project areas as part of the Record of Environmental Consideration.

Please provide comments within 30 days to Mrs. Bridget Kelly Butcher, U.S. Army Garrison Adelphi Laboratory Center, 2800 Powder Mill Road, IMAL-PWE, Adelphi, Maryland 20783-1197, bridget.c.kellybutcher.civ@mail.mil, 240-694-7258.

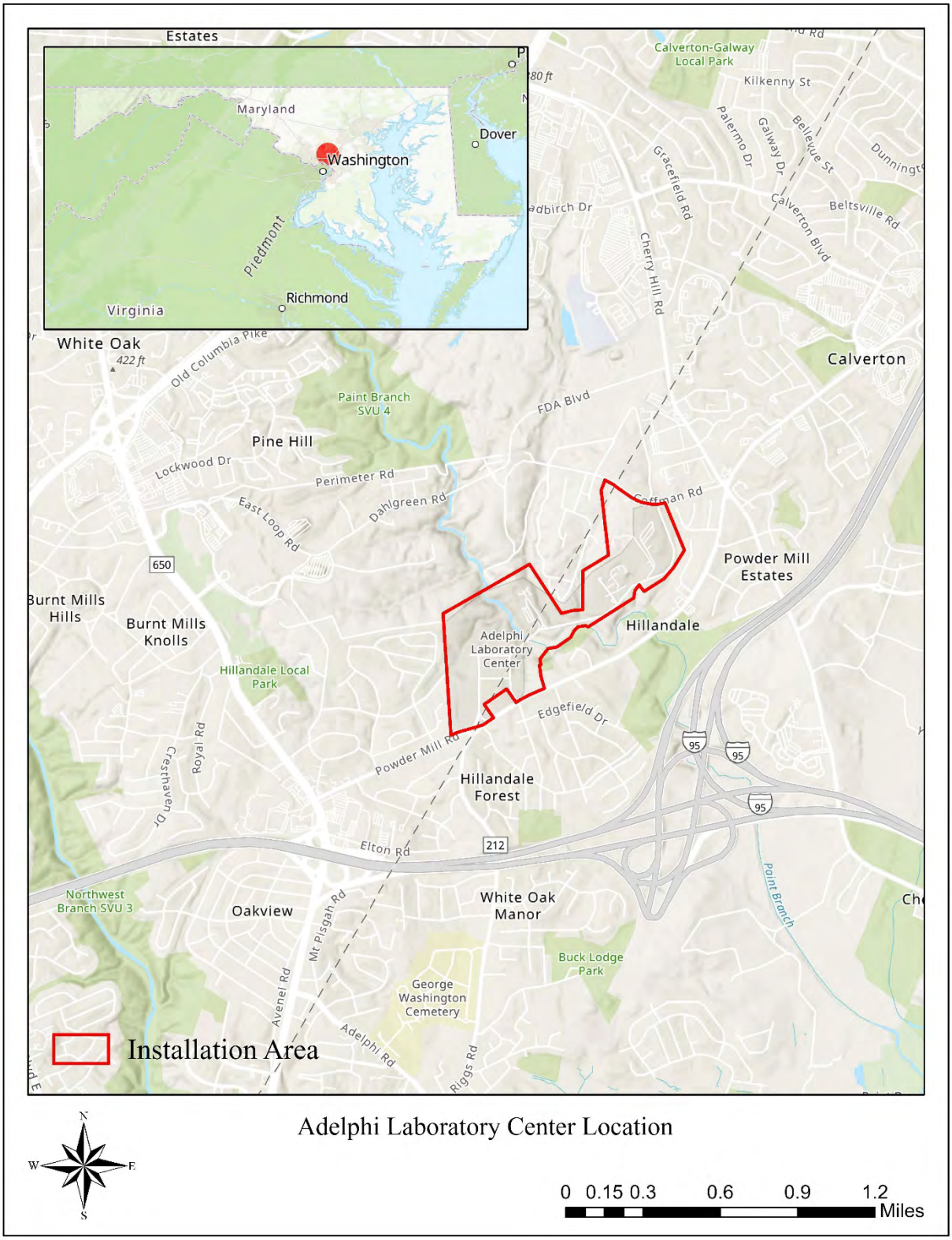
Sincerely,

DEEL.AMY.ELIZABETH.1010776348 Digitally signed by DEEL.AMY.ELIZABETH.1010776348 Date: 2020.07.10 10:42:44 -04'00'

Vance G. Hobbs
Director, Environmental Division
Directorate of Public Works

Enclosures

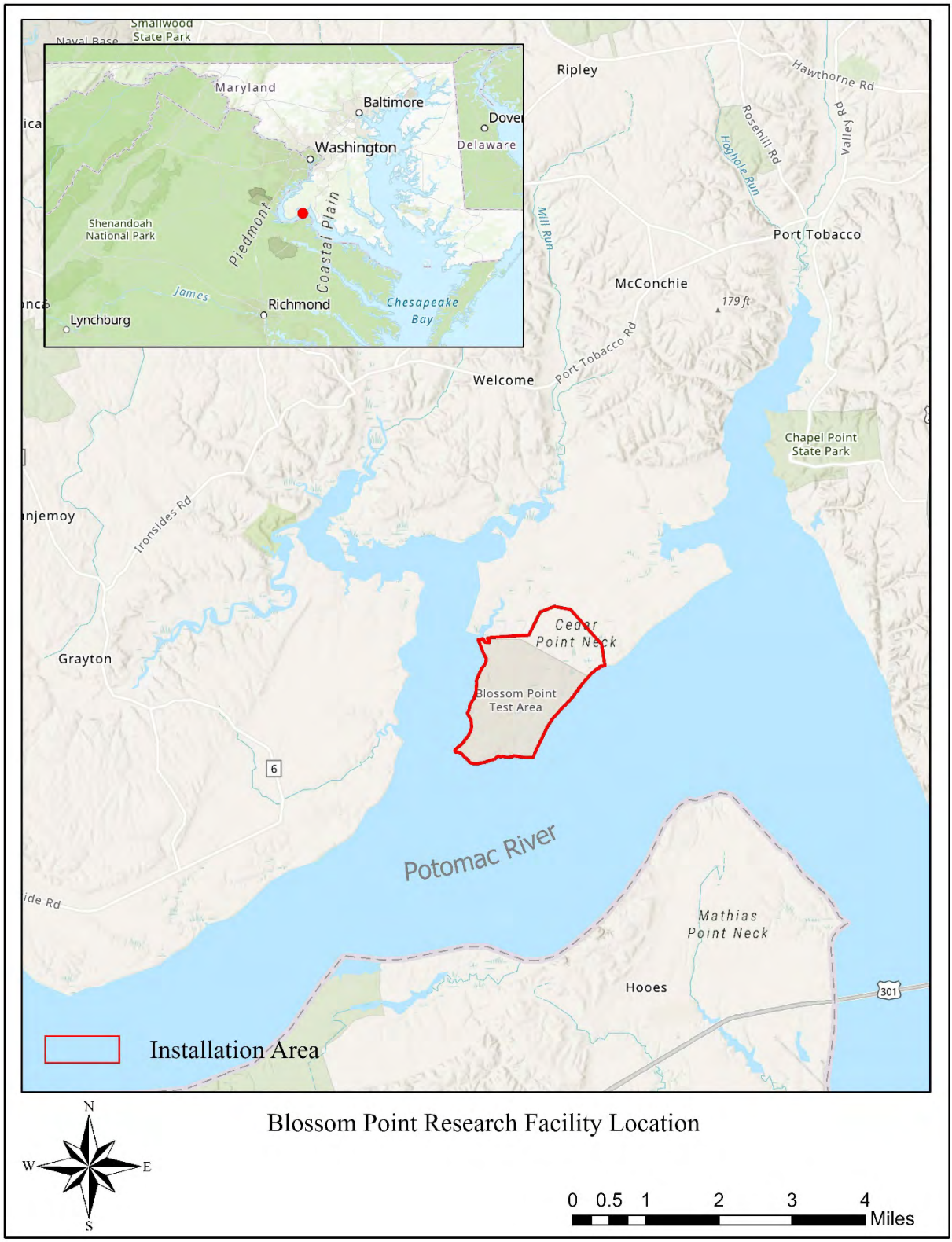
Adelphi Laboratory Center Site Location Map



Adelphi Laboratory Center Location

Enclosure 1

Blossom Point Research Facility Site Location Map



Enclosure 2

From:	Kelly Butcher, Bridget C CIV USARMY ID-SUSTAINMENT (USA)
To:	Hopper, Brian D CIV (US); Murray Brown, Mark A CIV (US)
Cc:	Smith, Erica J CIV USARMY CENAB (USA)
Subject:	RE: [Non-DoD Source] Re: Adelphi Lab Center INRMP Agency Coordination
Date:	Friday, July 10, 2020 2:46:28 PM

Hi Brian,

Great- I look forward to working with you as well.

Thanks!
Bridget

From: Brian D Hopper - NOAA Federal [brian.d.hopper@noaa.gov]
Sent: Friday, July 10, 2020 2:34 PM
To: Murray Brown, Mark A CIV (US)
Cc: Kelly Butcher, Bridget C CIV USARMY ID-SUSTAINMENT (USA)
Subject: [Non-DoD Source] Re: Adelphi Lab Center INRMP Agency Coordination

All active links contained in this email were disabled. Please verify the identity of the sender, and confirm the authenticity of all links contained within the message prior to copying and pasting the address to a Web browser.

Hi Bridget,

I would be happy to assist with the INRMP review process. I look forward to working with you.

Regards,
-Brian

On Fri, Jul 10, 2020 at 2:22 PM Mark Murray-Brown - NOAA Federal <mark.murray-brown@noaa.gov < Caution-mailto:mark.murray-brown@noaa.gov > > wrote:

> Bridget - Thank you for your correspondence regarding the subject INRMP. Your GARFO ESA Section 7 POC on this action is Mr Brian Hopper. He will be in touch with you if he has any questions
>
> ---------- Forwarded message ---------
> From: **Kelly Butcher, Bridget C CIV USARMY ID-SUSTAINMENT (USA)**
> <bridget.c.kellybutcher.civ@mail.mil < Caution-mailto:bridget.c.kellybutcher.civ@mail.mil > >
> Date: Fri, Jul 10, 2020 at 1:50 PM
> Subject: Adelphi Lab Center INRMP Agency Coordination
> To: Murray Brown, Mark A CIV (US) <mark.murray-brown@noaa.gov < Caution-mailto:mark.murray-brown@noaa.gov > >
> Cc: Holthaus, Serena A CTR USARMY ID-SUSTAINMENT (USA)
> <serena.a.holthaus.ctr@mail.mil < Caution-mailto:serena.a.holthaus.ctr@mail.mil > >, Smith, Erica J CIV USARMY CENAB (USA) <Erica.J.Smith@usace.army.mil < Caution-mailto:Erica.J.Smith@usace.army.mil > >
>
> Hi Mr. Murray-Brown,
>
> Please find our request for agency coordination for the 5-year review of the INRMP for Adelphi Laboratory Center. Adelphi is now a sub-installation under Aberdeen Proving Ground. We will continue to keep our INRMPs separate to make things easier.

Thank you,

Bridget

Bridget Kelly Butcher

Conservation Specialist

APG/Adelphi Laboratory Center

Cell Phone: 240-694-7258

Email: bridget.c.kellybutcher.civ@mail.mil < Caution-mailto:bridget.c.kellybutcher.civ@mail.mil > <Caution-mailto:bridget.c.kellybutcher.civ@mail.mil < Caution-mailto:bridget.c.kellybutcher.civ@mail.mil > >

--

Mark Murray-Brown
ESA Section 7 Coordinator
Protected Resources Division
NOAA National Marine Fisheries Service
Greater Atlantic Regional Fisheries Office
55 Great Republic Drive
Gloucester MA 01930
(978) 281-9306

For ESA Section 7 guidance and updates on listed species presence and critical habitat analysis please see:
Caution-Blockedwww.greateratlantic.fisheries.noaa.gov/protected/section7/index.html < Caution-https://www.greateratlantic.fisheries.noaa.gov/protected/section7/index.html >

To submit a request for technical information or ESA section 7 consultation please send to:
nmfs.gar.esa.section7@noaa.gov < Caution-mailto:nmfs.gar.esa.section7@noaa.gov >

--

Brian D. Hopper
Protected Resources Division
NOAA Fisheries
Greater Atlantic Regional Fisheries Office
200 Harry S Truman Parkway
Suite 460
Annapolis, MD 21401
410 267 5649
Brian.D.Hopper@noaa.gov < Caution-mailto:brian.d.hopper@noaa.gov >
Caution-Blockedhttp://www.greateratlantic.fisheries.noaa.gov/ < Caution-http://www.greateratlantic.fisheries.noaa.gov/ >

DEPARTMENT OF THE ARMY
U.S. ARMY INSTALLATION MANAGEMENT COMMAND
U.S. ARMY GARRISON ABERDEEN PROVING GROUND
BUILDING 4510, 6429 BOOTHBY HILL AVENUE
ABERDEEN PROVING GROUND MARYLAND 21005-5001

Chief Glenna Wallace
Eastern Shawnee Tribe of Oklahoma
PO Box 350
Seneca, MO 64865

DEC 10 2021

Dear Chief Wallace:

The U.S. Army Garrison Aberdeen Proving Ground would like to initiate coordination with the Eastern Shawnee Tribe of Oklahoma related to the five-year update of an existing Integrated Natural Resources Management Plan (INRMP). The INRMP addresses natural resources management at two of Aberdeen Proving Ground's site's which include the Adelphi Laboratory Center located in Prince George's and Montgomery Counties, Maryland, and the Blossom Point Research Facility located in Charles County, Maryland (Enclosures 1 and 2).

The INRMP defines roles and responsibilities for natural resource management within the installations and provides a basis for addressing all applicable legal requirements and best management practices consistent with achievement of the needs, goals, and objectives of the installations' military missions. The INRMP also provides natural resources related goals and proposed projects such as flora and fauna species surveys for the next five years.

In the event that there is a discovery of any unreported archaeological resources or historic property (16 United States Code § 470aa et seq.), Native American sacred site and/or traditional cultural property during the implementation of the INRMP, Aberdeen Proving Ground would implement its "accidental discovery" plan described in the Integrated Cultural Resources Management Plan to comply with the National Historic Preservation Act, Archaeological Resources Protection Act of 1979, Native American Graves Protection and Repatriation Act, American Indian Religious Freedom Act, 36 Code of Federal Regulations Part 79, and Executive Order 13007, *Indian Sacred Sites*. If prehistoric or historic artifacts that could be associated with Native American, early European, or American settlement are encountered at any time during an INRMP project, Aberdeen Proving Ground would cease all activities involving subsurface disturbance in the vicinity of the discovery until the Aberdeen Proving Ground Cultural Resources Manager, Maryland State Historic Preservation Officer, and selected Native American Tribes are contacted to properly identify and appropriately treat discovered items in accordance with applicable state and Federal law(s).

Implementation of these measures would ensure that the five-year INRMP update would have no adverse effect on historic properties or cultural resources.

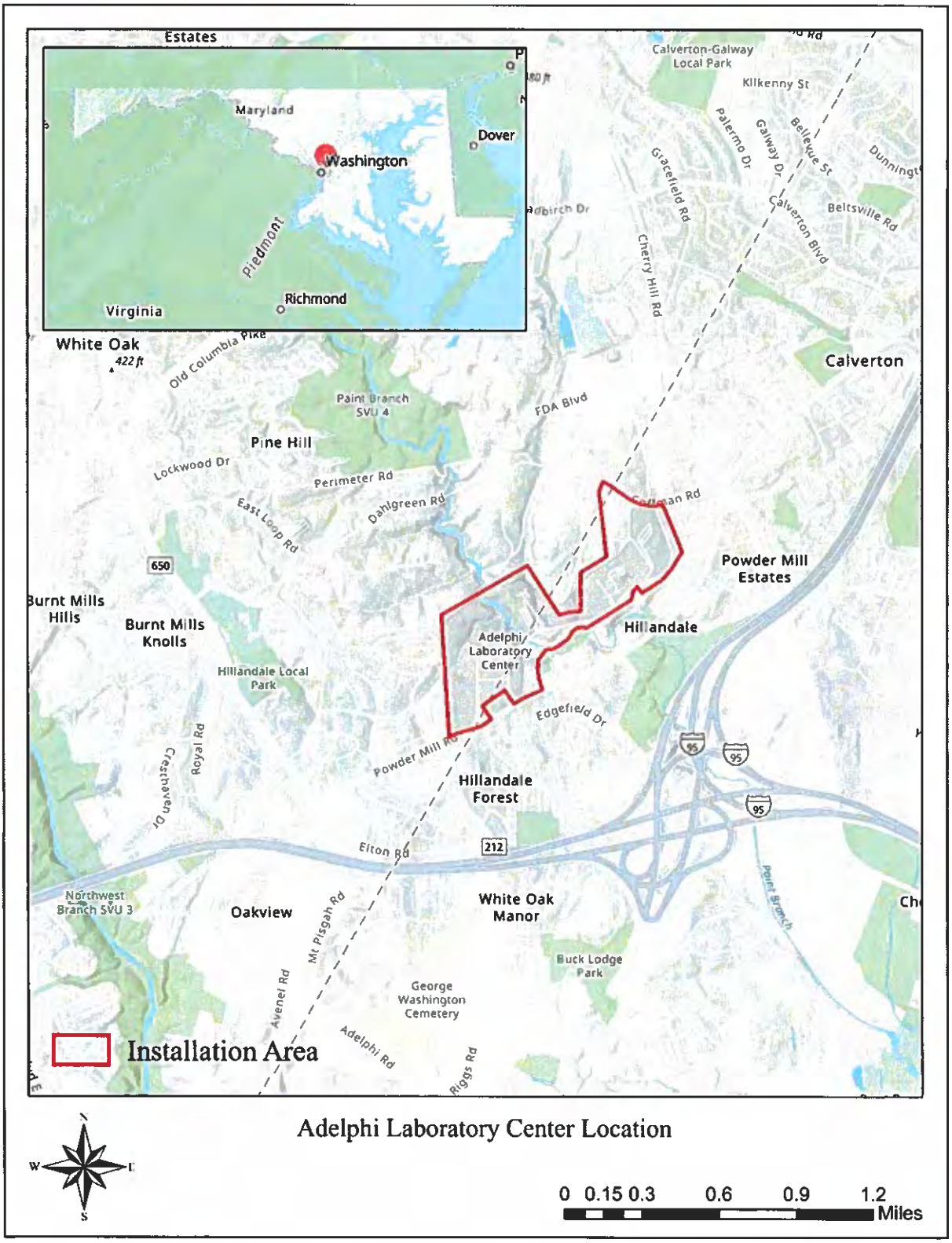
Aberdeen Proving Ground would appreciate your written response within 30 days of receipt of this letter. Please respond to: Bridget Kelly Butcher, Adelphi Laboratory Center, AMIM-ALP-E, 2800 Powder Mill Road, Adelphi, MD 20783 or bridget.c.kellybutcher.civ@army.mil.

Sincerely,

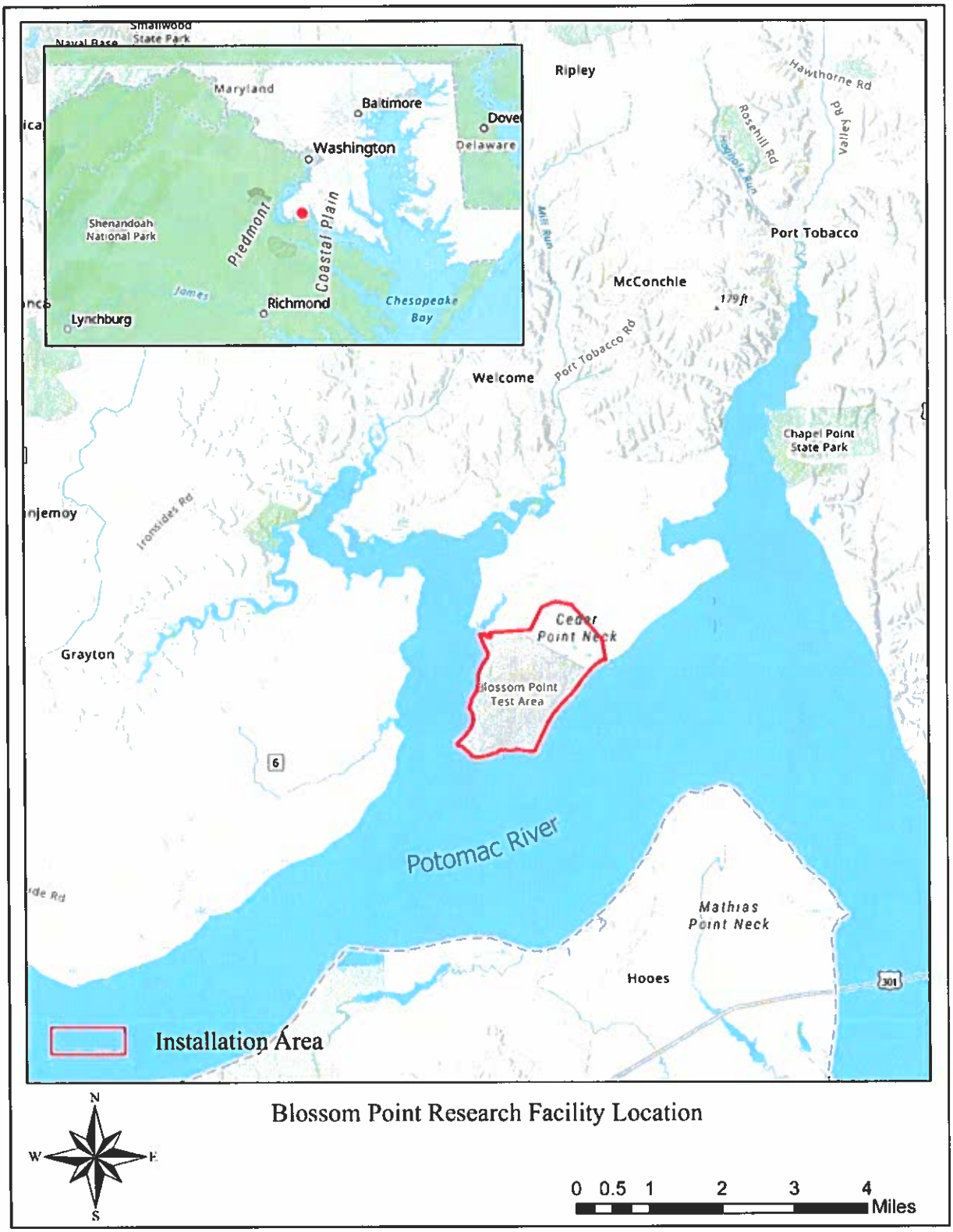
Vance G. Hobbs
Chief, Environmental Division
Directorate of Public Works

Enclosures

Enclosure 1: ALC Site Location Map



Enclosure 2: BPRF Site Location Map



Blossom Point Research Facility Location

DEPARTMENT OF THE ARMY
U.S. ARMY INSTALLATION MANAGEMENT COMMAND
U.S. ARMY GARRISON ABERDEEN PROVING GROUND
BUILDING 4510, 6429 BOOTHBY HILL AVENUE
ABERDEEN PROVING GROUND MARYLAND 21005-5001

Mr. Paul Barton
Tribal Historic Preservation Officer
Eastern Shawnee Tribe of Oklahoma
12705 S. 705 Road
Wyandotte, OK 74370-3148

[illegible] 10 2021

Dear Mr. Barton:

The U.S. Army Garrison Aberdeen Proving Ground would like to initiate coordination with the Eastern Shawnee Tribe of Oklahoma related to the five-year update of an existing Integrated Natural Resources Management Plan (INRMP). The INRMP addresses natural resources management at two of Aberdeen Proving Ground's site's which include the Adelphi Laboratory Center located in Prince George's and Montgomery Counties, Maryland, and the Blossom Point Research Facility located in Charles County, Maryland (Enclosures 1 and 2).

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Aberdeen Proving Ground would appreciate your written response within 30 days of receipt of this letter. Please respond to: Bridget Kelly Butcher, Adelphi Laboratory Center, AMIM-ALP-E, 2800 Powder Mill Road, Adelphi, MD 20783 or bridget.c.kellybutcher.civ@army.mil.

Sincerely,

Vance G. Hobbs
Chief, Environmental Division
Directorate of Public Works

Enclosures

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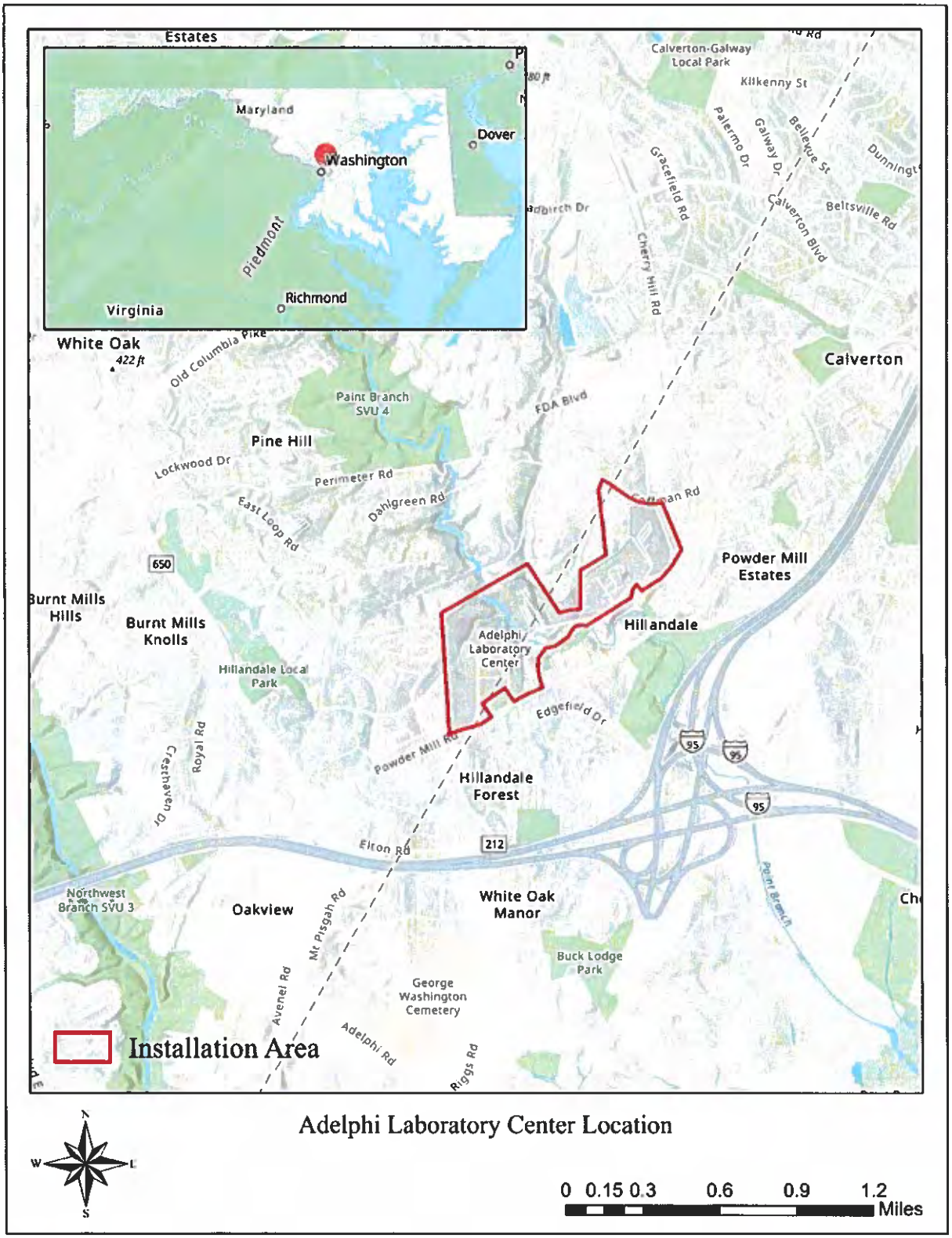
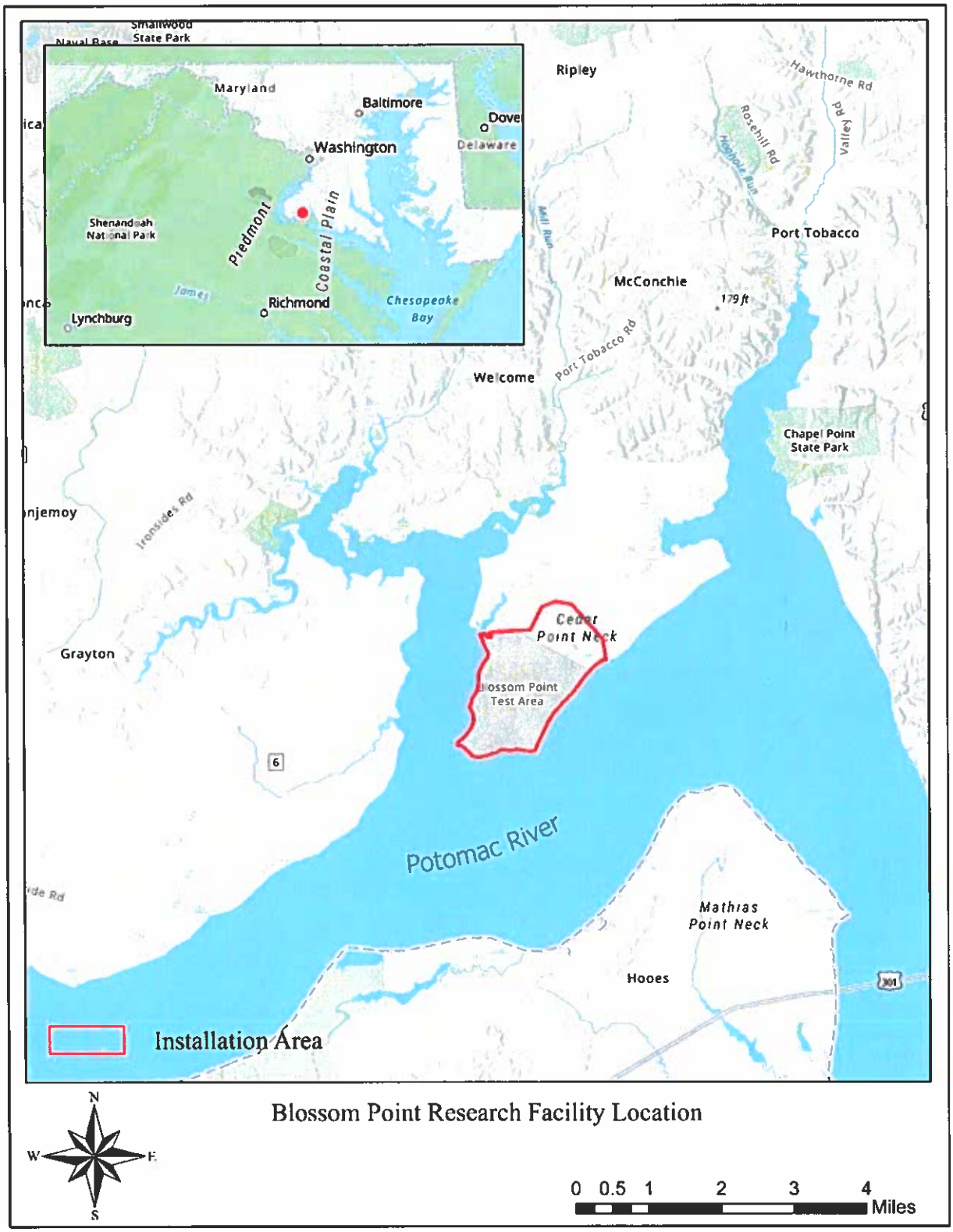


Enclosure 2: BPRF Site Location Map



DEPARTMENT OF THE ARMY
U.S. ARMY INSTALLATION MANAGEMENT COMMAND
U.S. ARMY GARRISON ABERDEEN PROVING GROUND
BUILDING 4510, 6429 BOOTHBY HILL AVENUE
ABERDEEN PROVING GROUND MARYLAND 21005-5001

DEC 10 2021

Chief William L. Fisher
Seneca-Cayuga Nation
PO Box 453220
Grove, OK 74345-3220

Dear Chief Fisher:

The U.S. Army Garrison Aberdeen Proving Ground would like to initiate coordination with the Seneca-Cayuga Nation related to the five-year update of an existing Integrated Natural Resources Management Plan (INRMP). The INRMP addresses natural resources management at two of Aberdeen Proving Ground's site's which include the Adelphi Laboratory Center located in Prince George's and Montgomery Counties, Maryland, and the Blossom Point Research Facility located in Charles County, Maryland (Enclosures 1 and 2).

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Implementation of these measures would ensure that the five-year INRMP update would have no adverse effect on historic properties or cultural resources.

Aberdeen Proving Ground would appreciate your written response within 30 days of receipt of this letter. Please respond to: Bridget Kelly Butcher, Adelphi Laboratory Center, AMIM-ALP-E, 2800 Powder Mill Road, Adelphi, MD 20783 or bridget.c.kellybutcher.civ@army.mil.

Sincerely,

Vance G. Hobbs
Chief, Environmental Division
Directorate of Public Works

Enclosures

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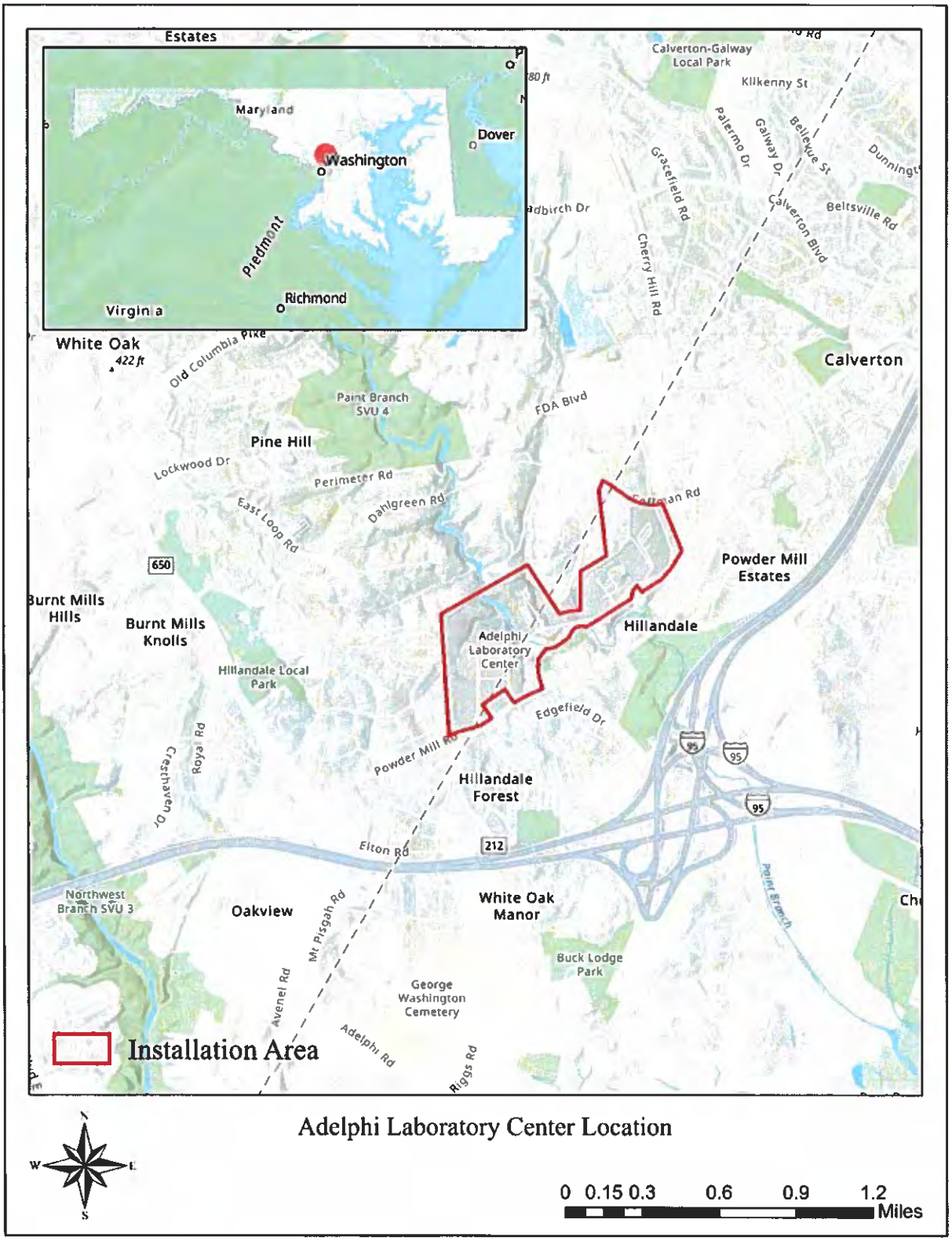
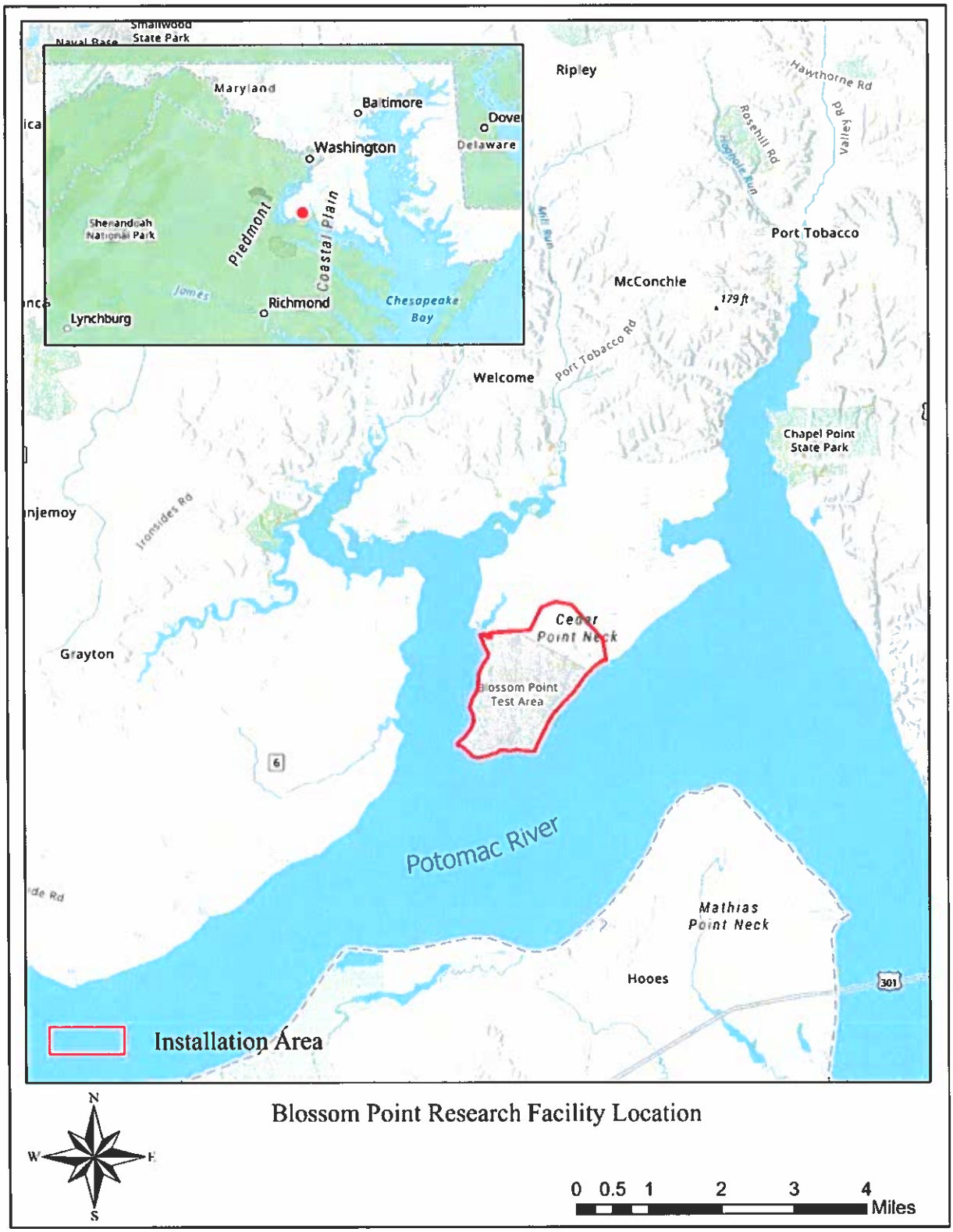


Adelphi Laboratory Center Location

Enclosure 2: BPRF Site Location Map



DEPARTMENT OF THE ARMY
U.S. ARMY INSTALLATION MANAGEMENT COMMAND
U.S. ARMY GARRISON ABERDEEN PROVING GROUND
BUILDING 4510, 6429 BOOTHBY HILL AVENUE
ABERDEEN PROVING GROUND MARYLAND 21005-5001

DEC 10 2021

Mr. William Tarrant
Tribal Historic Preservation Officer
Seneca-Cayuga Nation
PO Box 453220
Grove, OK 74345-3220

Dear Mr. Tarrant:

The U.S. Army Garrison Aberdeen Proving Ground would like to initiate coordination with the Seneca-Cayuga Nation related to the five-year update of an existing Integrated Natural Resources Management Plan (INRMP). The INRMP addresses natural resources management at two of Aberdeen Proving Ground's site's which include the Adelphi Laboratory Center located in Prince George's and Montgomery Counties, Maryland, and the Blossom Point Research Facility located in Charles County, Maryland (Enclosures 1 and 2).

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Implementation of these measures would ensure that the five-year INRMP update would have no adverse effect on historic properties or cultural resources.

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Sincerely,

Vance G. Hobbs
Chief, Environmental Division
Directorate of Public Works

Enclosures

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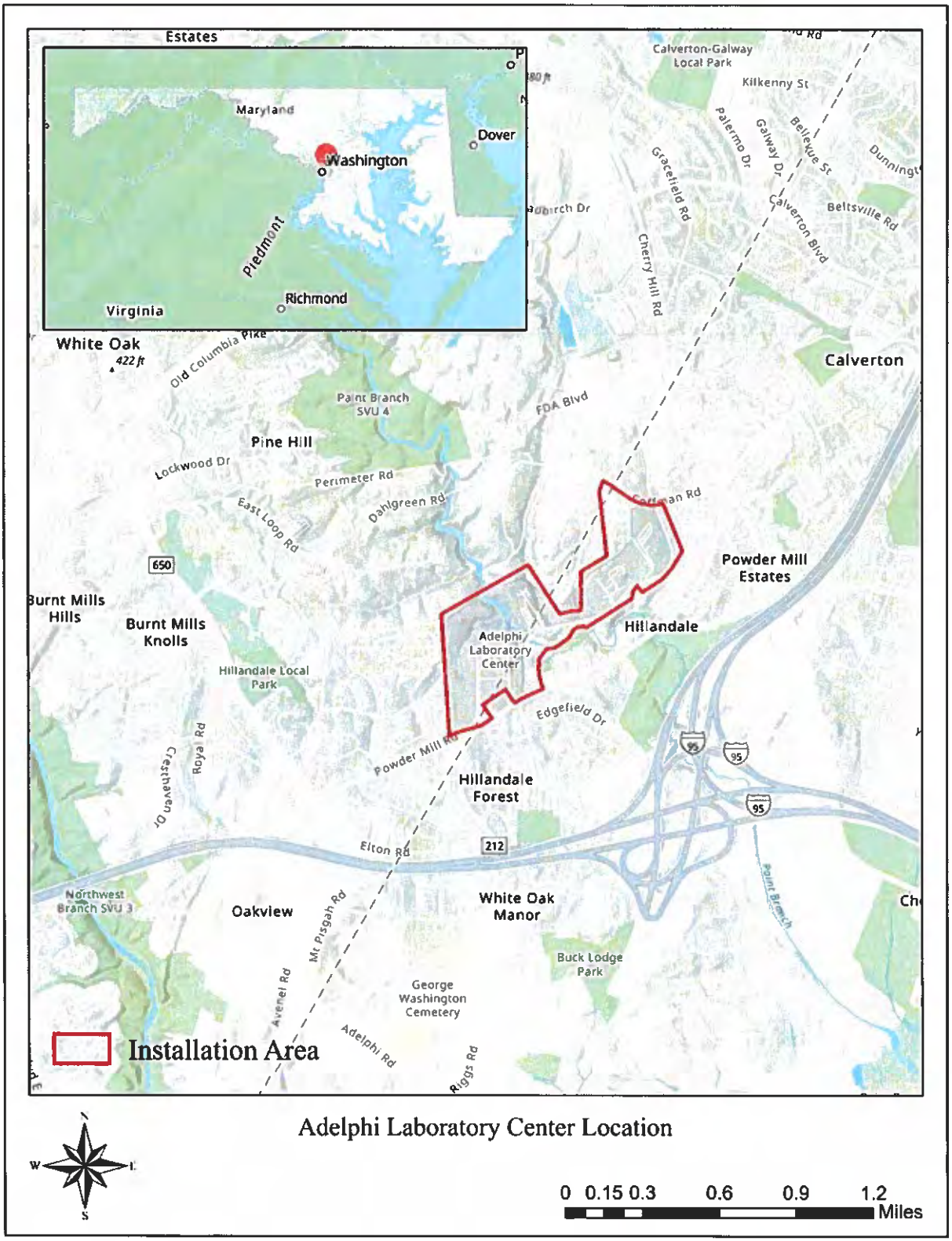
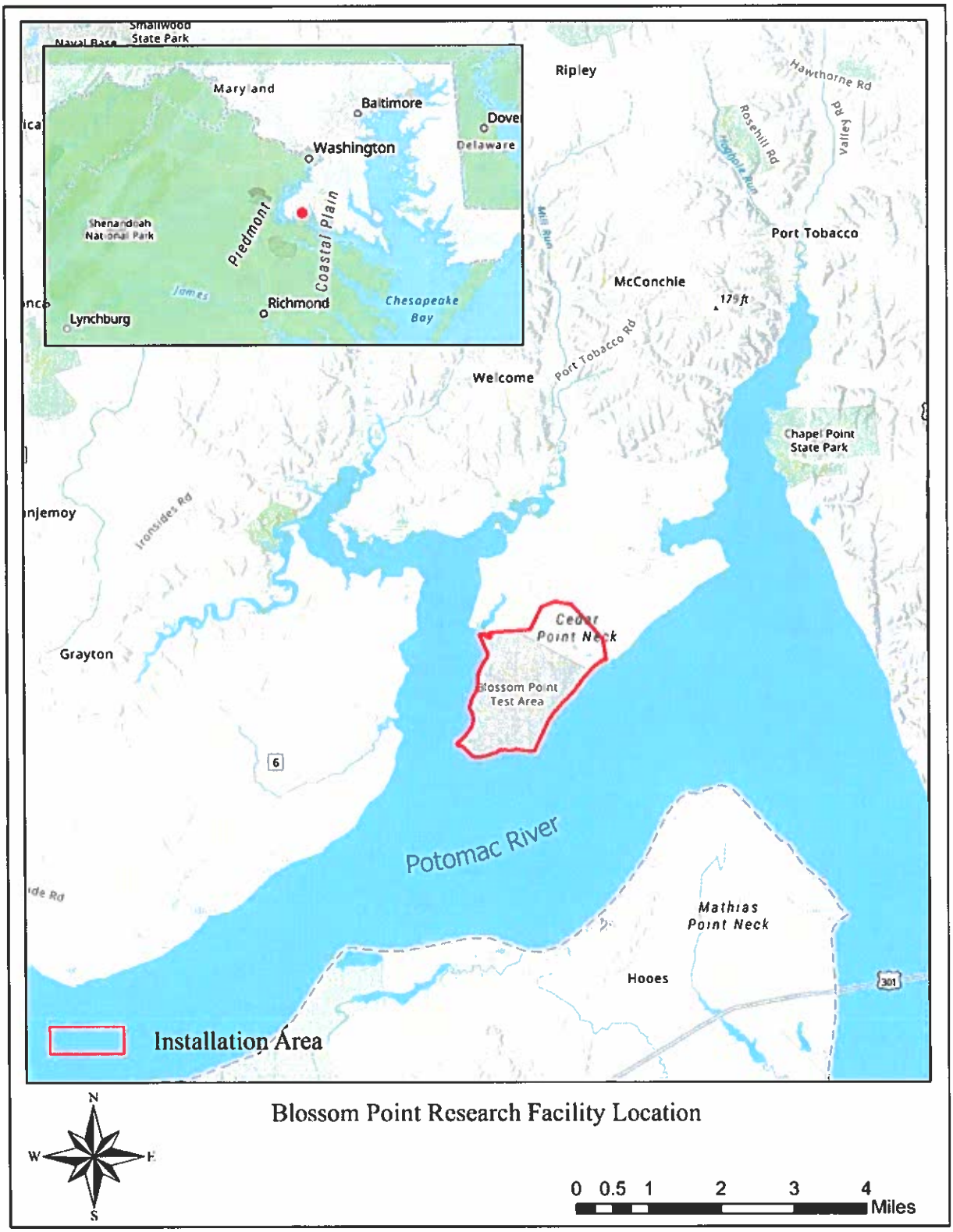


Adelphi Laboratory Center Location

Enclosure 2: BPRF Site Location Map



DEPARTMENT OF THE ARMY
U.S. ARMY INSTALLATION MANAGEMENT COMMAND
U.S. ARMY GARRISON ABERDEEN PROVING GROUND
BUILDING 4510, 6429 BOOTHBY HILL AVENUE
ABERDEEN PROVING GROUND MARYLAND 21005-5001

Mr. Micco Emarthla
Tribal Historic Preservation Officer Director
Seneca-Cayuga Tribe of Oklahoma
23701 S. 655 Road
10 Hwy.
Grove, OK 74344

Dear Mr. Emarthla:

The U.S. Army Garrison Aberdeen Proving Ground would like to initiate coordination with the Seneca-Cayuga Tribe of Oklahoma related to the five-year update of an existing Integrated Natural Resources Management Plan (INRMP). The INRMP addresses natural resources management at two of Aberdeen Proving Ground's site's which include the Adelphi Laboratory Center located in Prince George's and Montgomery Counties, Maryland, and the Blossom Point Research Facility located in Charles County, Maryland (Enclosures 1 and 2).

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Implementation of these measures would ensure that the five-year INRMP update would have no adverse effect on historic properties or cultural resources.

Aberdeen Proving Ground would appreciate your written response within 30 days of receipt of this letter. Please respond to: Bridget Kelly Butcher, Adelphi Laboratory Center, AMIM-ALP-E, 2800 Powder Mill Road, Adelphi, MD 20783 or bridget.c.kellybutcher.civ@army.mil.

Sincerely,

Vance G. Hobbs
Chief, Environmental Division
Directorate of Public Works

Enclosures

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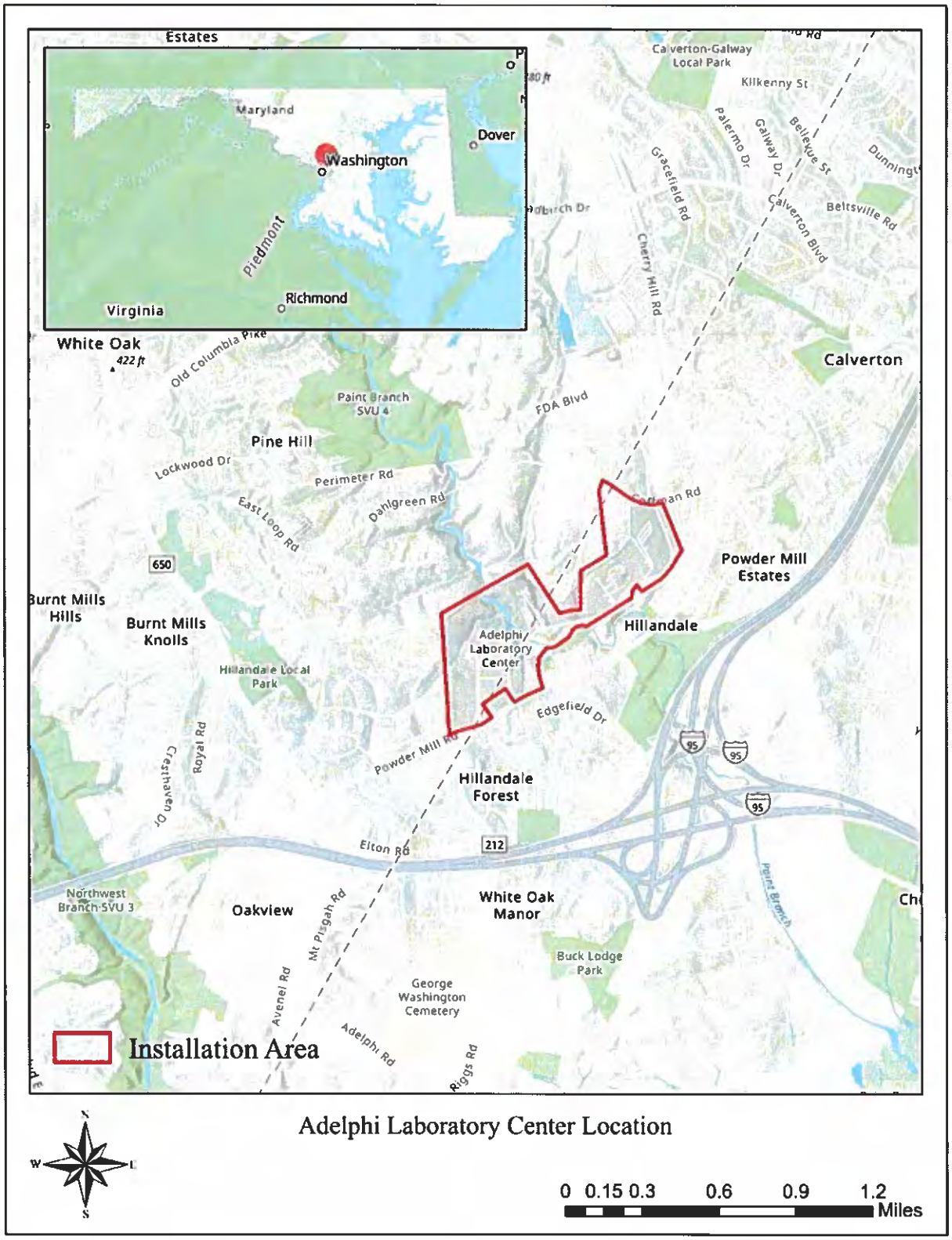
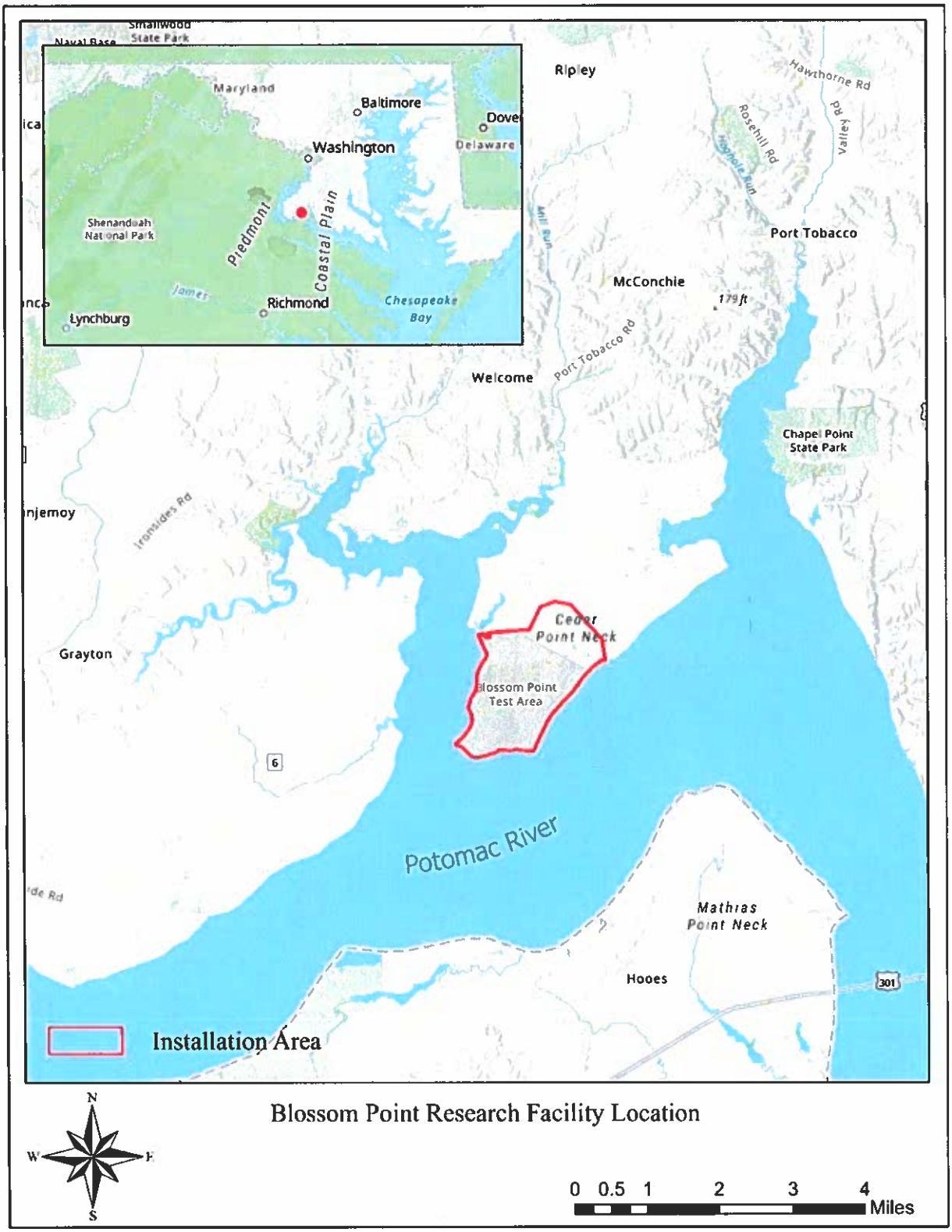


Adelphi Laboratory Center Location

Enclosure 2: BPRF Site Location Map



DEPARTMENT OF THE ARMY
U.S. ARMY INSTALLATION MANAGEMENT COMMAND
U.S. ARMY GARRISON ABERDEEN PROVING GROUND
BUILDING 4510, 6429 BOOTHBY HILL AVENUE
ABERDEEN PROVING GROUND MARYLAND 21005-5001

Chief Chet Brooks
Delaware Tribe of Indians
5100 Tuxedo Blvd.
Bartlesville, OK 74006

DEC 10 2021

Dear Chief Brooks:

The U.S. Army Garrison Aberdeen Proving Ground would like to initiate coordination with the Delaware Tribe of Indians related to the five-year update of an existing Integrated Natural Resources Management Plan (INRMP). The INRMP addresses natural resources management at two of Aberdeen Proving Ground's site's which include the Adelphi Laboratory Center located in Prince George's and Montgomery Counties, Maryland, and the Blossom Point Research Facility located in Charles County, Maryland (Enclosures 1 and 2).

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Implementation of these measures would ensure that the five-year INRMP update would have no adverse effect on historic properties or cultural resources.

Aberdeen Proving Ground would appreciate your written response within 30 days of receipt of this letter. Please respond to: Bridget Kelly Butcher, Adelphi Laboratory Center, AMIM-ALP-E, 2800 Powder Mill Road, Adelphi, MD 20783 or bridget.c.kellybutcher.civ@army.mil.

Sincerely,

Vance G. Hobbs
Chief, Environmental Division
Directorate of Public Works

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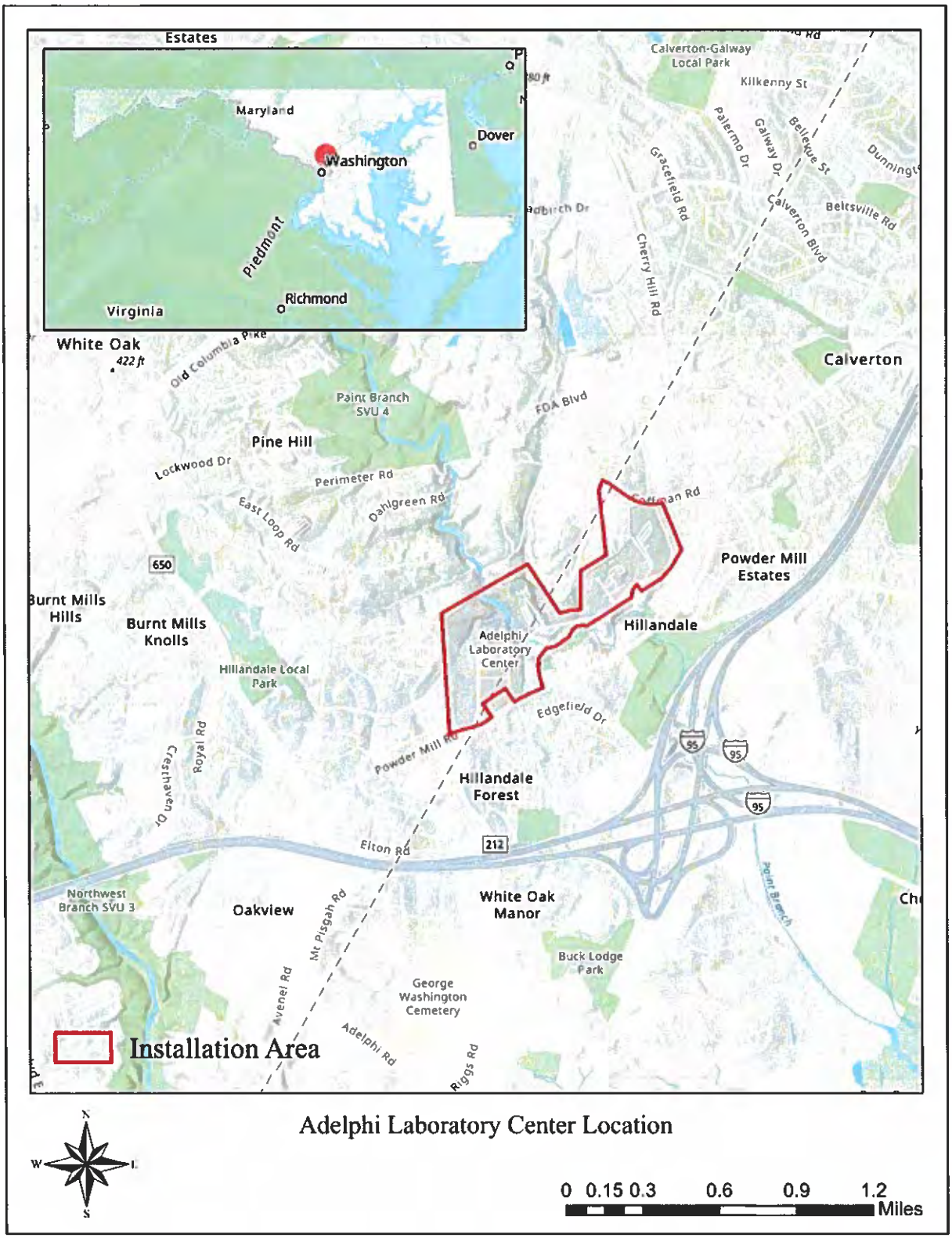

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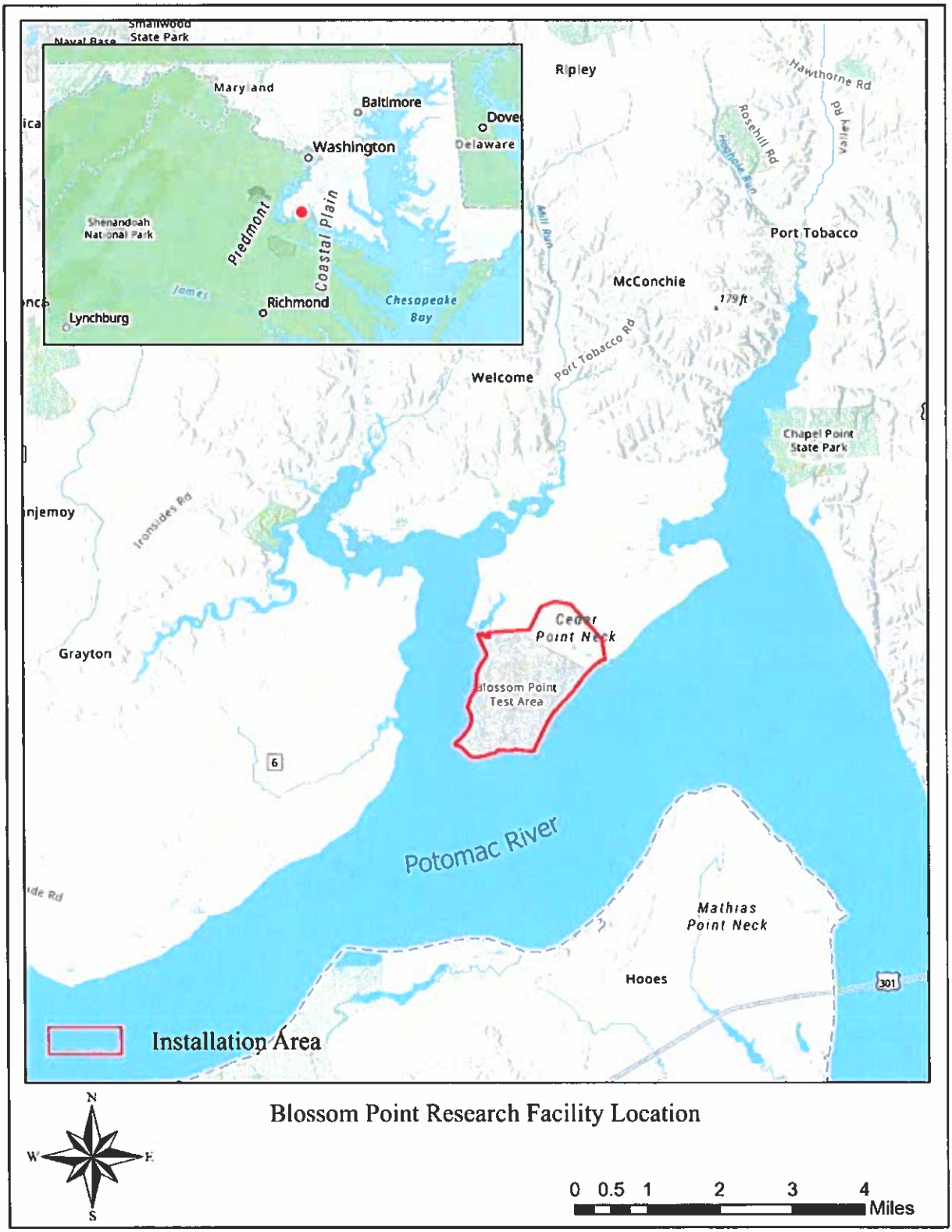

DEPARTMENT OF THE ARMY
U.S. ARMY INSTALLATION MANAGEMENT COMMAND
U.S. ARMY GARRISON ABERDEEN PROVING GROUND
BUILDING 4510, 6429 BOOTHBY HILL AVENUE
ABERDEEN PROVING GROUND MARYLAND 21005-5001

DEC 10 2021

Mr. Curtis Zunigha
Cultural Director
Delaware Tribe of Indians
5100 Tuxedo Blvd.
Bartlesville, OK 74006

Dear Mr. Zunigha:

The U.S. Army Garrison Aberdeen Proving Ground would like to initiate coordination with the Delaware Tribe of Indians related to the five-year update of an existing Integrated Natural Resources Management Plan (INRMP). The INRMP addresses natural resources management at two of Aberdeen Proving Ground's site's which include the Adelphi Laboratory Center located in Prince George's and Montgomery Counties, Maryland, and the Blossom Point Research Facility located in Charles County, Maryland (Enclosures 1 and 2).

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Sincerely,

Vance G. Hobbs
Chief, Environmental Division
Directorate of Public Works

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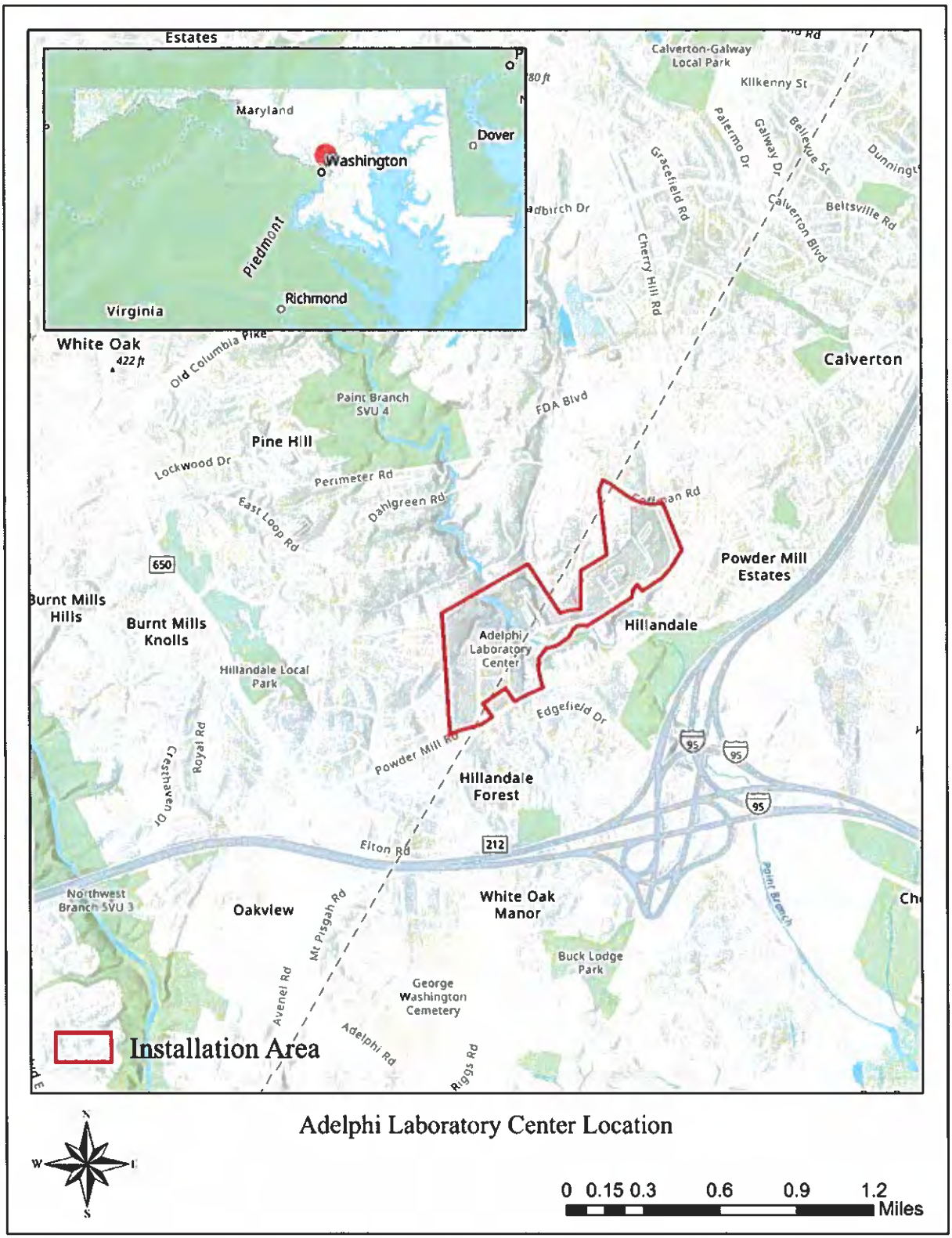

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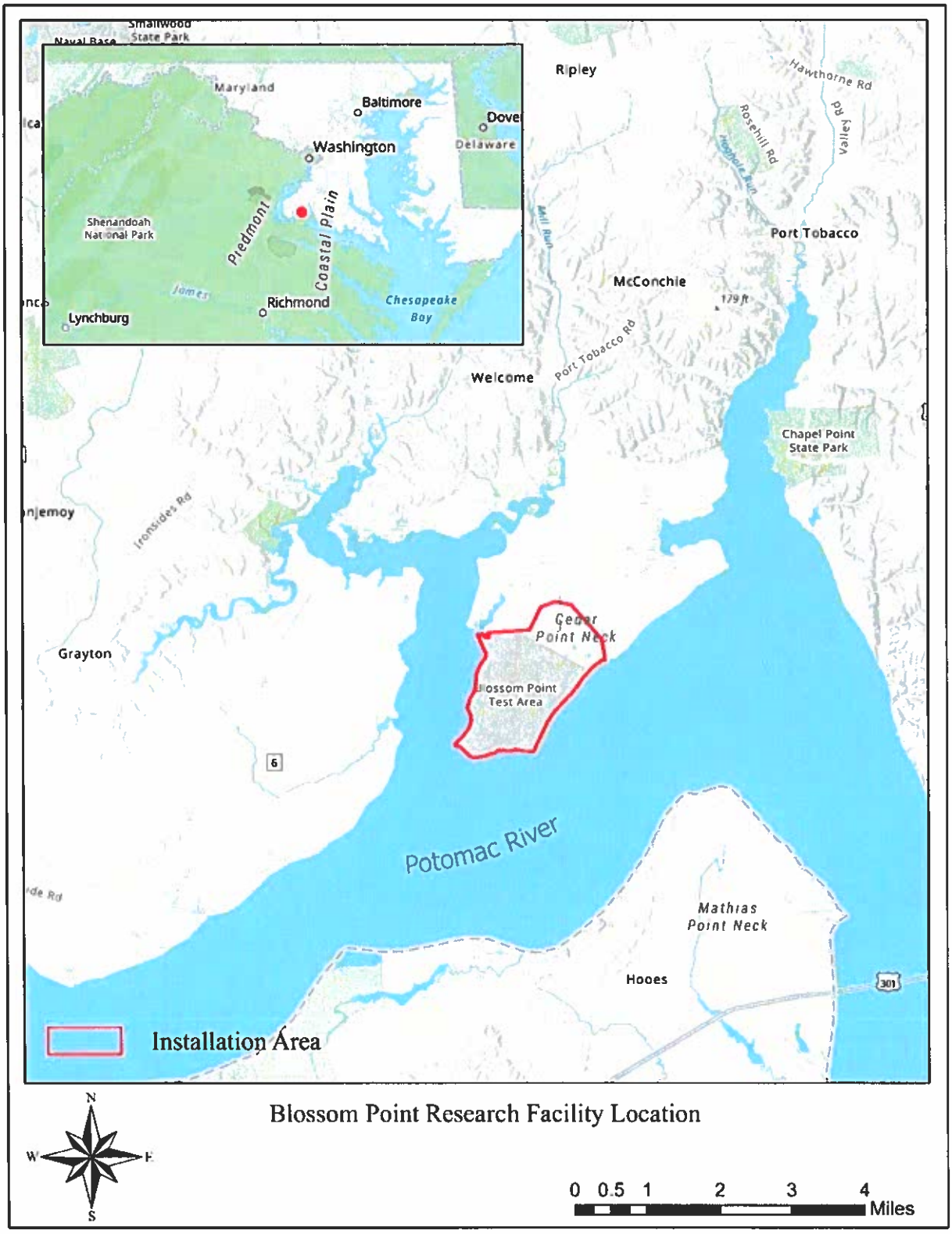

DEPARTMENT OF THE ARMY
U.S. ARMY INSTALLATION MANAGEMENT COMMAND
U.S. ARMY GARRISON ABERDEEN PROVING GROUND
BUILDING 4510, 6429 BOOTHBY HILL AVENUE
ABERDEEN PROVING GROUND MARYLAND 21005-5001

DEC 10 2021

Ms. Susan Bachor
Archaeologist
Delaware Tribe Eastern Office
126 University Circle
East Stroudsburg, PA 18301

Dear Ms. Bachor:

The U.S. Army Garrison Aberdeen Proving Ground would like to initiate coordination with the Delaware Tribe Eastern Office related to the five-year update of an existing Integrated Natural Resources Management Plan (INRMP). The INRMP addresses natural resources management at two of Aberdeen Proving Ground's site's which include the Adelphi Laboratory Center located in Prince George's and Montgomery Counties, Maryland, and the Blossom Point Research Facility located in Charles County, Maryland (Enclosures 1 and 2).

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Sincerely,

Vance G. Hobbs
Chief, Environmental Division
Directorate of Public Works

Enclosures

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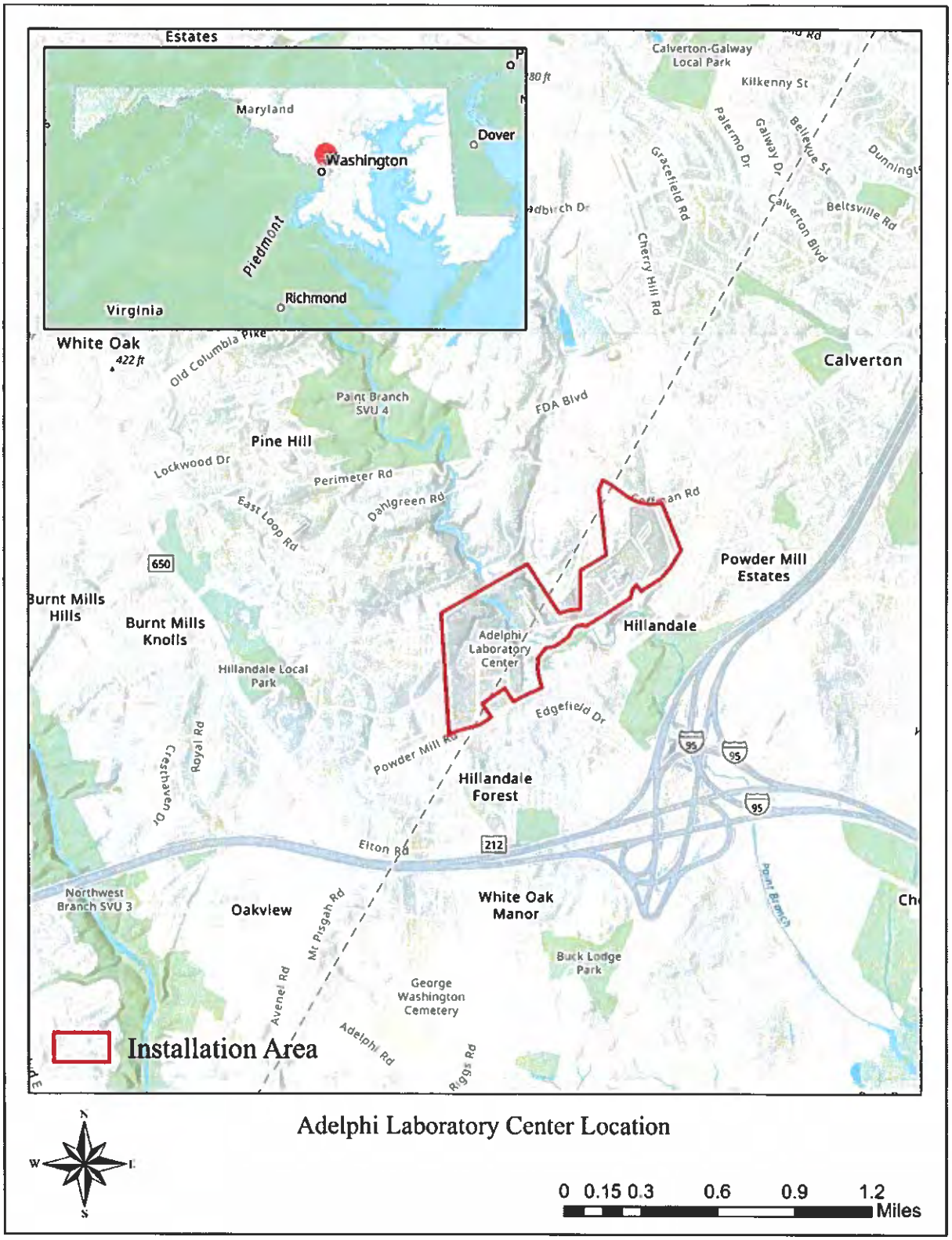
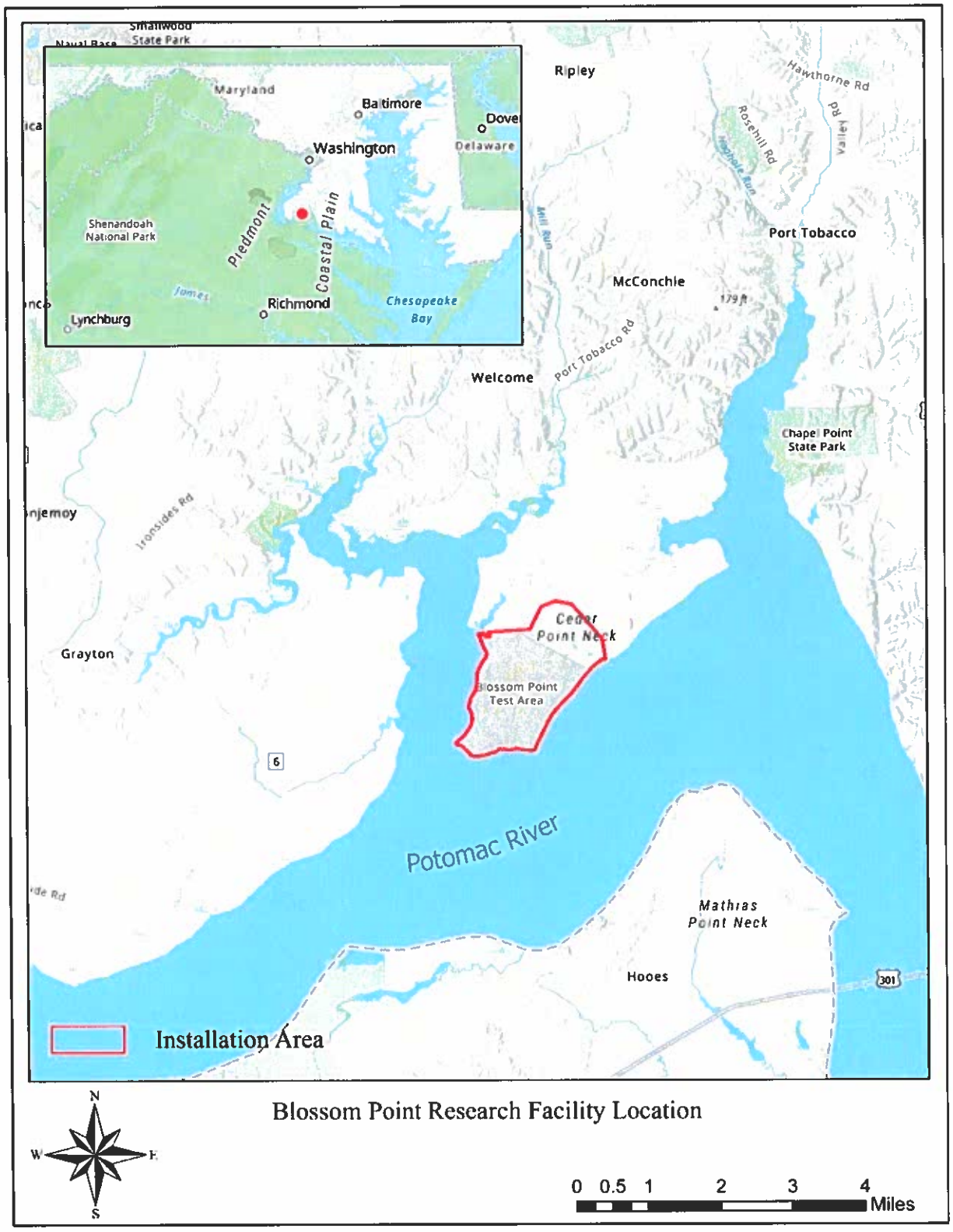


Adelphi Laboratory Center Location

Enclosure 2: BPRF Site Location Map



DEPARTMENT OF THE ARMY
U.S. ARMY INSTALLATION MANAGEMENT COMMAND
U.S. ARMY GARRISON ABERDEEN PROVING GROUND
BUILDING 4510, 6429 BOOTHBY HILL AVENUE
ABERDEEN PROVING GROUND MARYLAND 21005-5001

DEC 10 2021

Dr. Brice Obermeyer
Historic Preservation
Delaware Tribe of Indians
1 Kellog Circle
Emporia, KS 66801

Dear Dr. Obermeyer:

The U.S. Army Garrison Aberdeen Proving Ground would like to initiate coordination with the Delaware Tribe of Indians related to the five-year update of an existing Integrated Natural Resources Management Plan (INRMP). The INRMP addresses natural resources management at two of Aberdeen Proving Ground's site's which include the Adelphi Laboratory Center located in Prince George's and Montgomery Counties, Maryland, and the Blossom Point Research Facility located in Charles County, Maryland (Enclosures 1 and 2).

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Implementation of these measures would ensure that the five-year INRMP update would have no adverse effect on historic properties or cultural resources.

Aberdeen Proving Ground would appreciate your written response within 30 days of receipt of this letter. Please respond to: Bridget Kelly Butcher, Adelphi Laboratory Center, AMIM-ALP-E, 2800 Powder Mill Road, Adelphi, MD 20783 or bridget.c.kellybutcher.civ@army.mil.

Sincerely,

Vance G. Hobbs
Chief, Environmental Division
Directorate of Public Works

Enclosures

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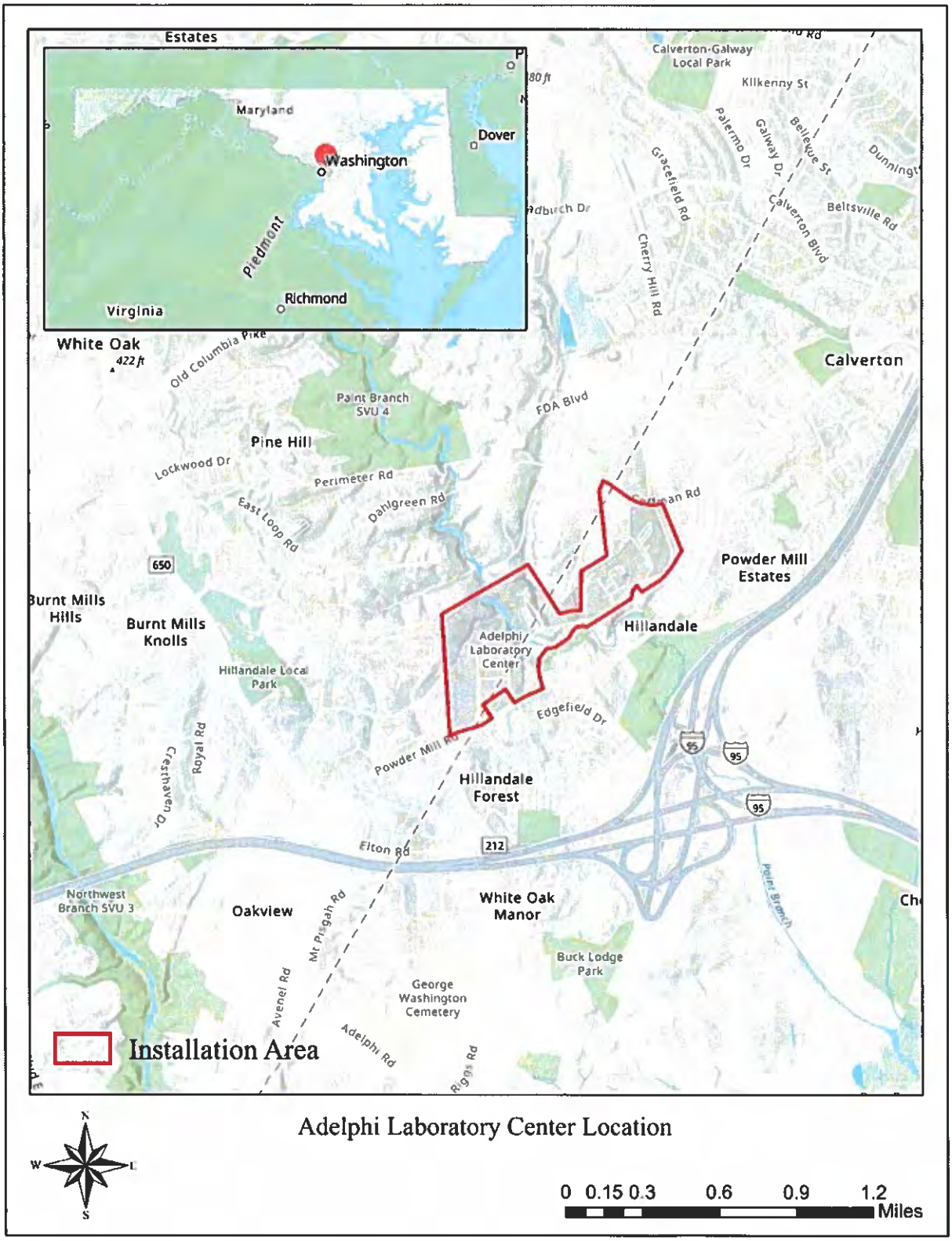
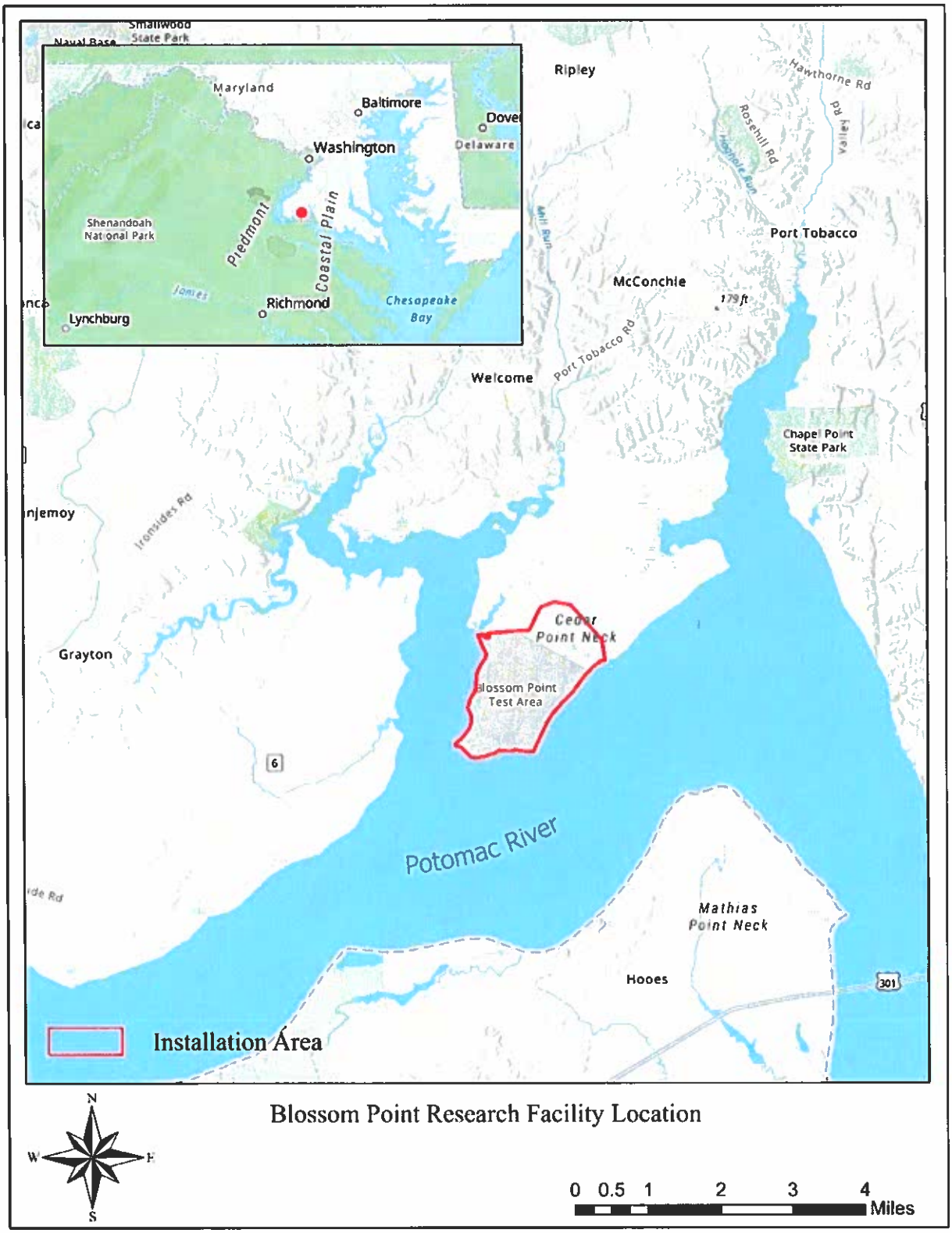


Adelphi Laboratory Center Location

Enclosure 2: BPRF Site Location Map



DEPARTMENT OF THE ARMY
U.S. ARMY INSTALLATION MANAGEMENT COMMAND
U.S. ARMY GARRISON ABERDEEN PROVING GROUND
BUILDING 4510, 6429 BOOTHBY HILL AVENUE
ABERDEEN PROVING GROUND MARYLAND 21005-5001

Ms. Blair Fink
Historic Preservation Representative
Delaware Tribe of Indians
Temple University
115 W. Polett Walk
Philadelphia, PA 19122

DEC 10 2021

Dear Ms. Fink:

The U.S. Army Garrison Aberdeen Proving Ground would like to initiate coordination with the Delaware Tribe of Indians related to the five-year update of an existing Integrated Natural Resources Management Plan (INRMP). The INRMP addresses natural resources management at two of Aberdeen Proving Ground's site's which include the Adelphi Laboratory Center located in Prince George's and Montgomery Counties, Maryland, and the Blossom Point Research Facility located in Charles County, Maryland (Enclosures 1 and 2).

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Sincerely,

Vance G. Hobbs
Chief, Environmental Division
Directorate of Public Works

Enclosures

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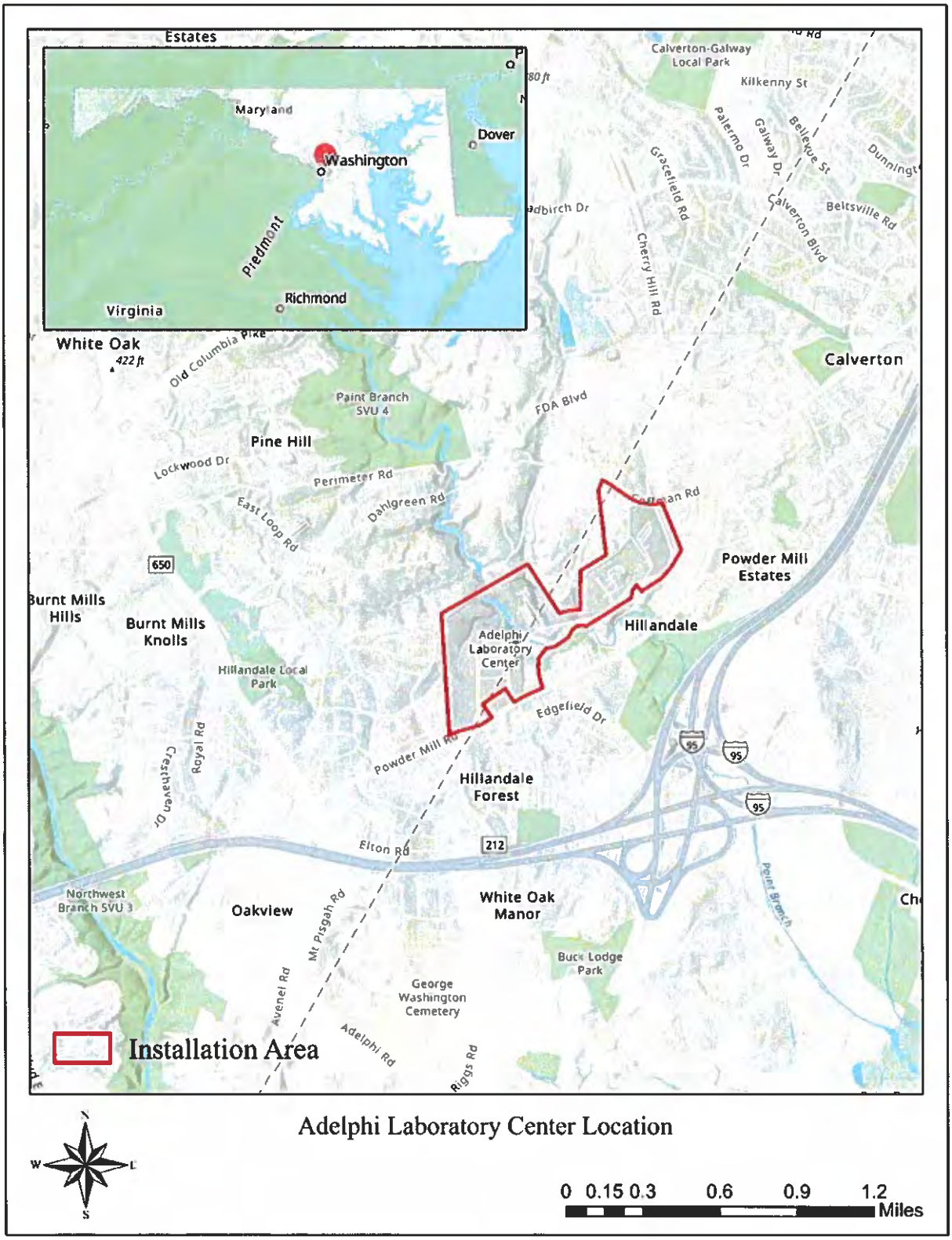
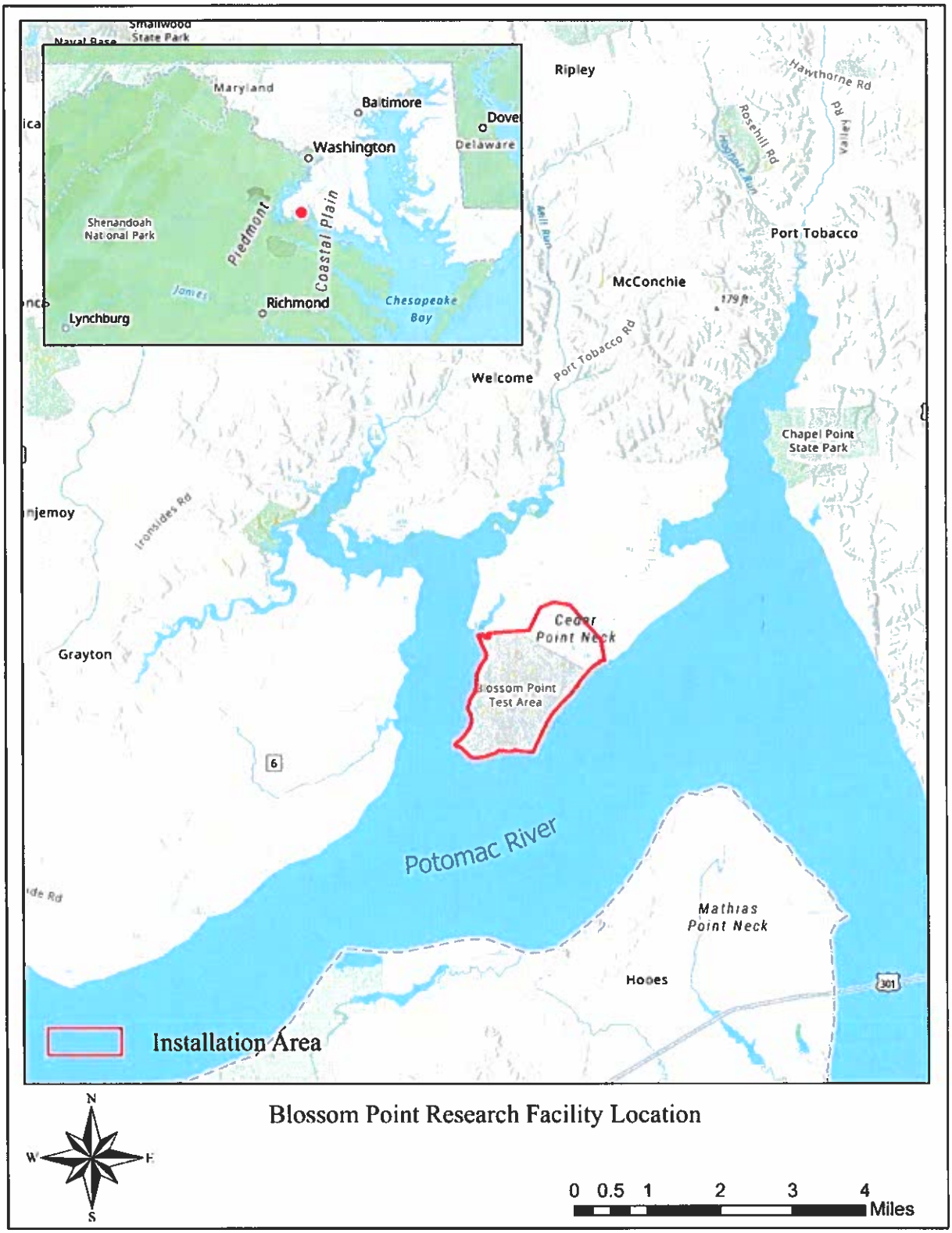


Enclosure 2: BPRF Site Location Map



Blossom Point Research Facility Location

DEPARTMENT OF THE ARMY
U.S. ARMY INSTALLATION MANAGEMENT COMMAND
U.S. ARMY GARRISON ABERDEEN PROVING GROUND
BUILDING 4510, 6429 BOOTHBY HILL AVENUE
ABERDEEN PROVING GROUND MARYLAND 21005-5001

Ms. Deborah Dotson
President
Delaware Nation, Oklahoma
P.O. Box 825
Anadarko, OK 73005

OCT 1 0 2021

Dear Ms. Dotson:

The U.S. Army Garrison Aberdeen Proving Ground would like to initiate coordination with the Delaware Nation, Oklahoma related to the five-year update of an existing Integrated Natural Resources Management Plan (INRMP). The INRMP addresses natural resources management at two of Aberdeen Proving Ground's site's which include the Adelphi Laboratory Center located in Prince George's and Montgomery Counties, Maryland, and the Blossom Point Research Facility located in Charles County, Maryland (Enclosures 1 and 2).

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Sincerely,

Vance G. Hobbs
Chief, Environmental Division
Directorate of Public Works

Enclosures

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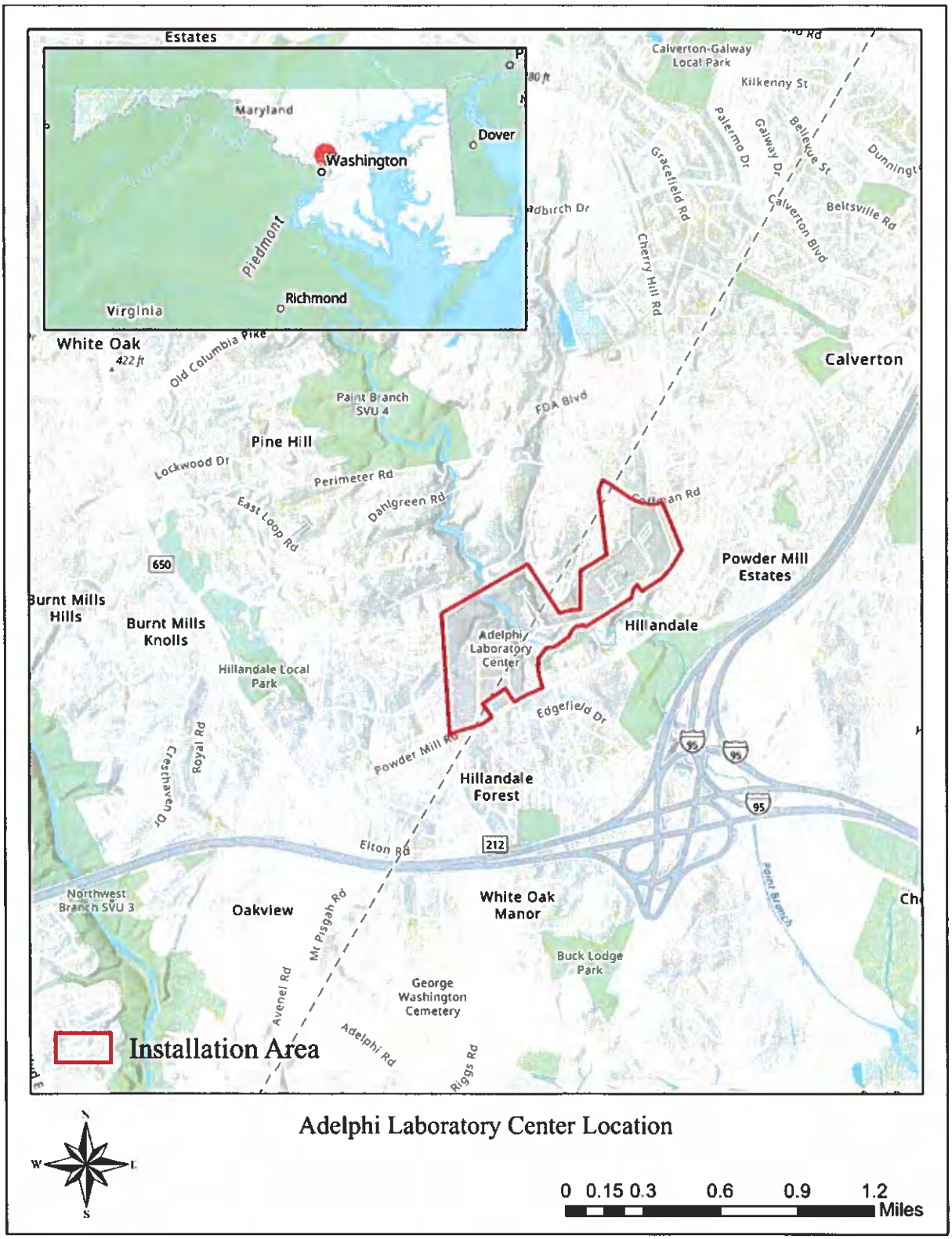
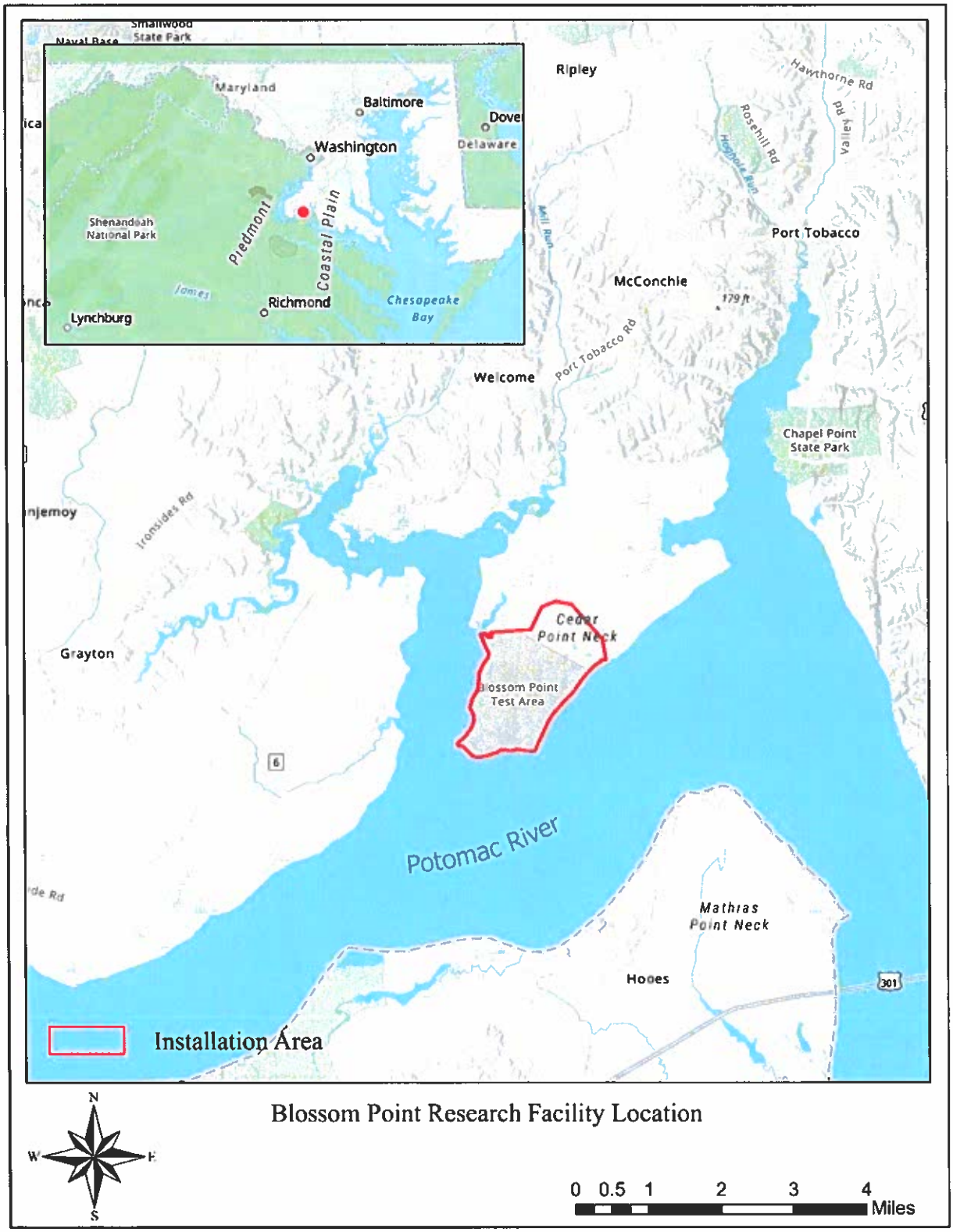


Enclosure 2: BPRF Site Location Map



DEPARTMENT OF THE ARMY
U.S. ARMY INSTALLATION MANAGEMENT COMMAND
U.S. ARMY GARRISON ABERDEEN PROVING GROUND
BUILDING 4510, 6429 BOOTHBY HILL AVENUE
ABERDEEN PROVING GROUND MARYLAND 21005-5001

Nekole Alligood
Director of Cultural Resources & Section 106
Delaware Nation, Oklahoma
P.O. Box 825
Anadarko, OK 73005

DEC 10 2021

Dear Nekole:

The U.S. Army Garrison Aberdeen Proving Ground would like to initiate coordination with the Delaware Nation, Oklahoma related to the five-year update of an existing Integrated Natural Resources Management Plan (INRMP). The INRMP addresses natural resources management at two of Aberdeen Proving Ground's site's which include the Adelphi Laboratory Center located in Prince George's and Montgomery Counties, Maryland, and the Blossom Point Research Facility located in Charles County, Maryland (Enclosures 1 and 2).

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Vance G. Hobbs
Chief, Environmental Division
Directorate of Public Works

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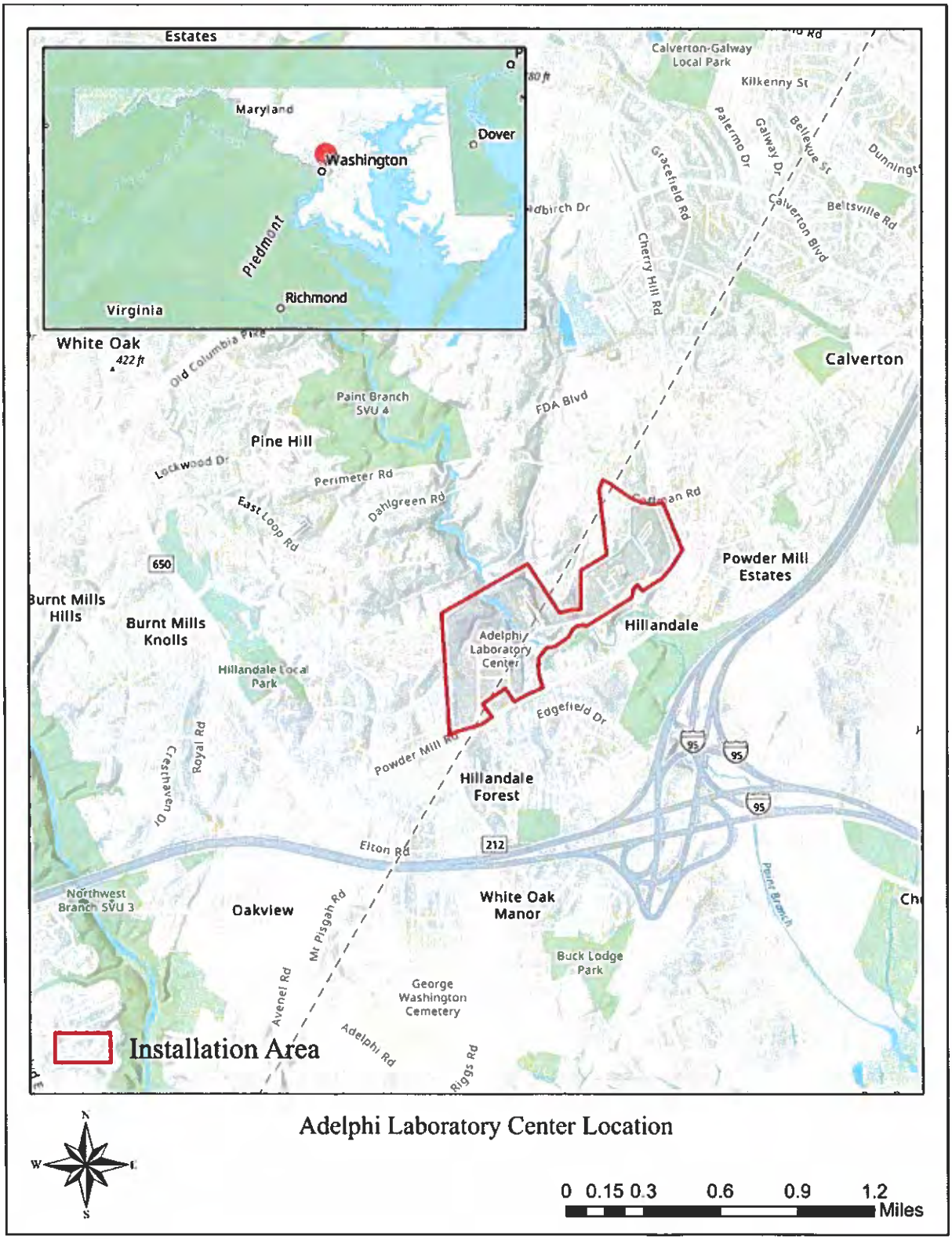
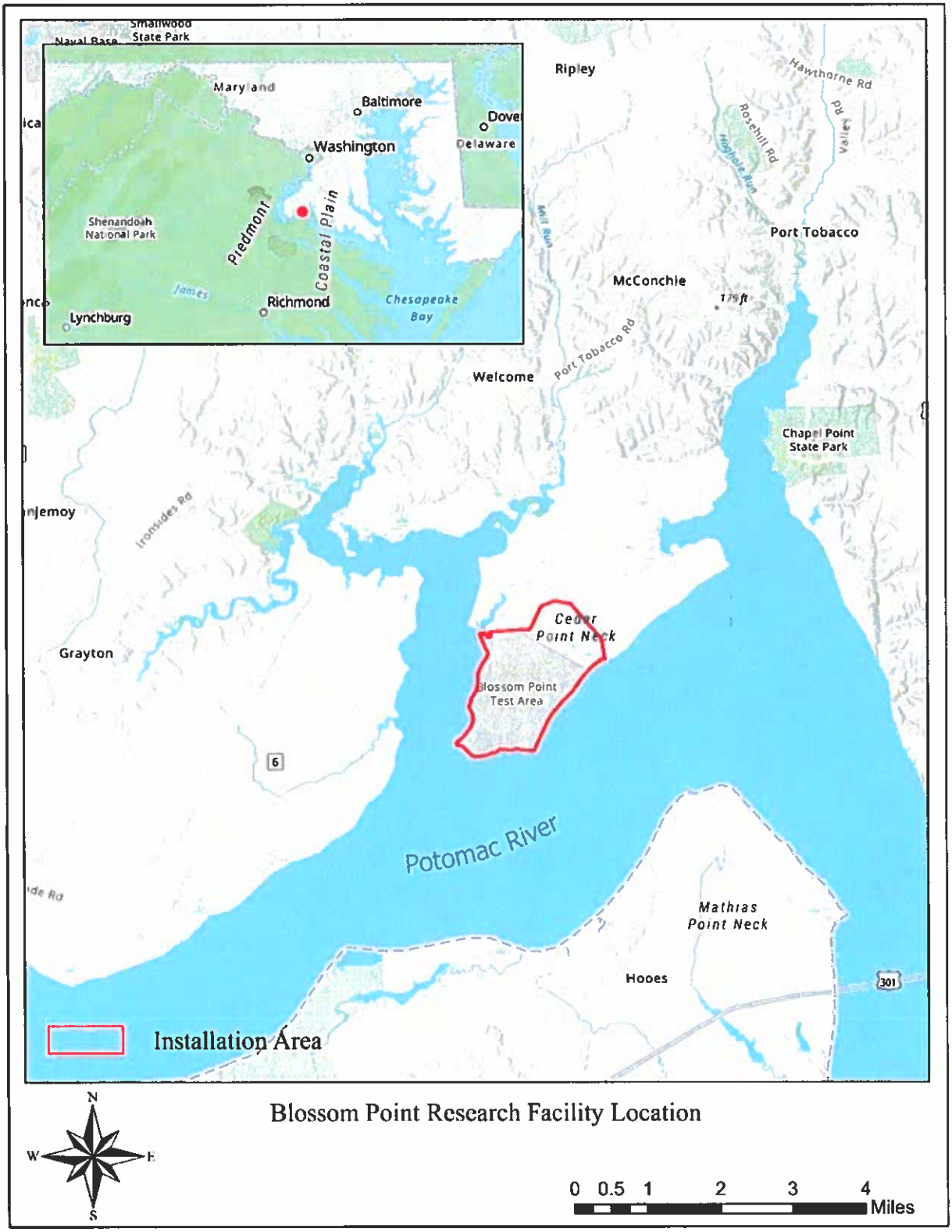


Enclosure 2: BPRF Site Location Map



DEPARTMENT OF THE ARMY
U.S. ARMY INSTALLATION MANAGEMENT COMMAND
U.S. ARMY GARRISON ABERDEEN PROVING GROUND
BUILDING 4510, 6429 BOOTHBY HILL AVENUE
ABERDEEN PROVING GROUND MARYLAND 21005-5001

Mr. Darrin Ahshapanek
EPA Director
Delaware Nation
30164 State Hwy. 281
Anadarko, OK 73005

[redacted] 10 2021

Dear Mr. Ahshapanek:

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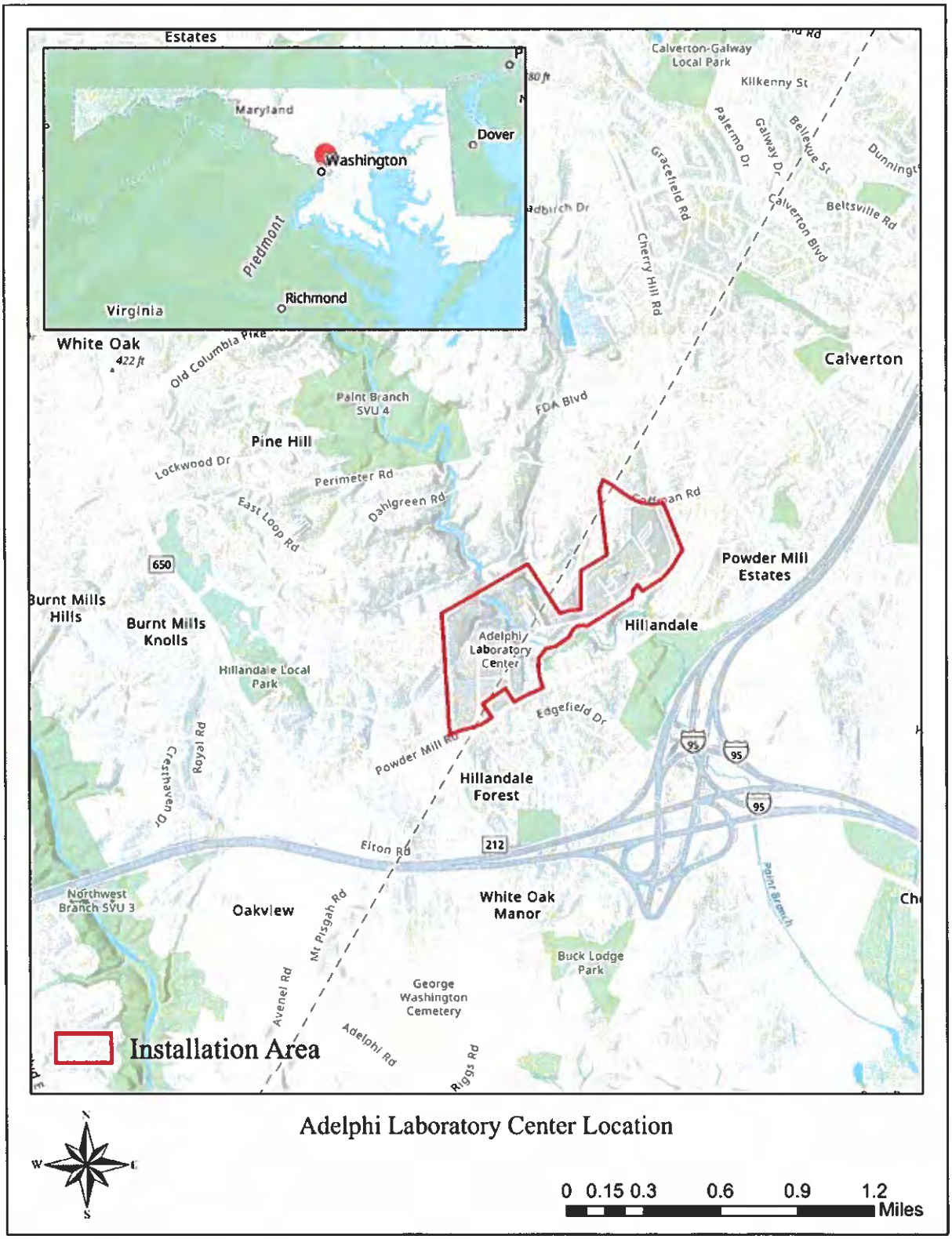

Adelphi Laboratory Center Location

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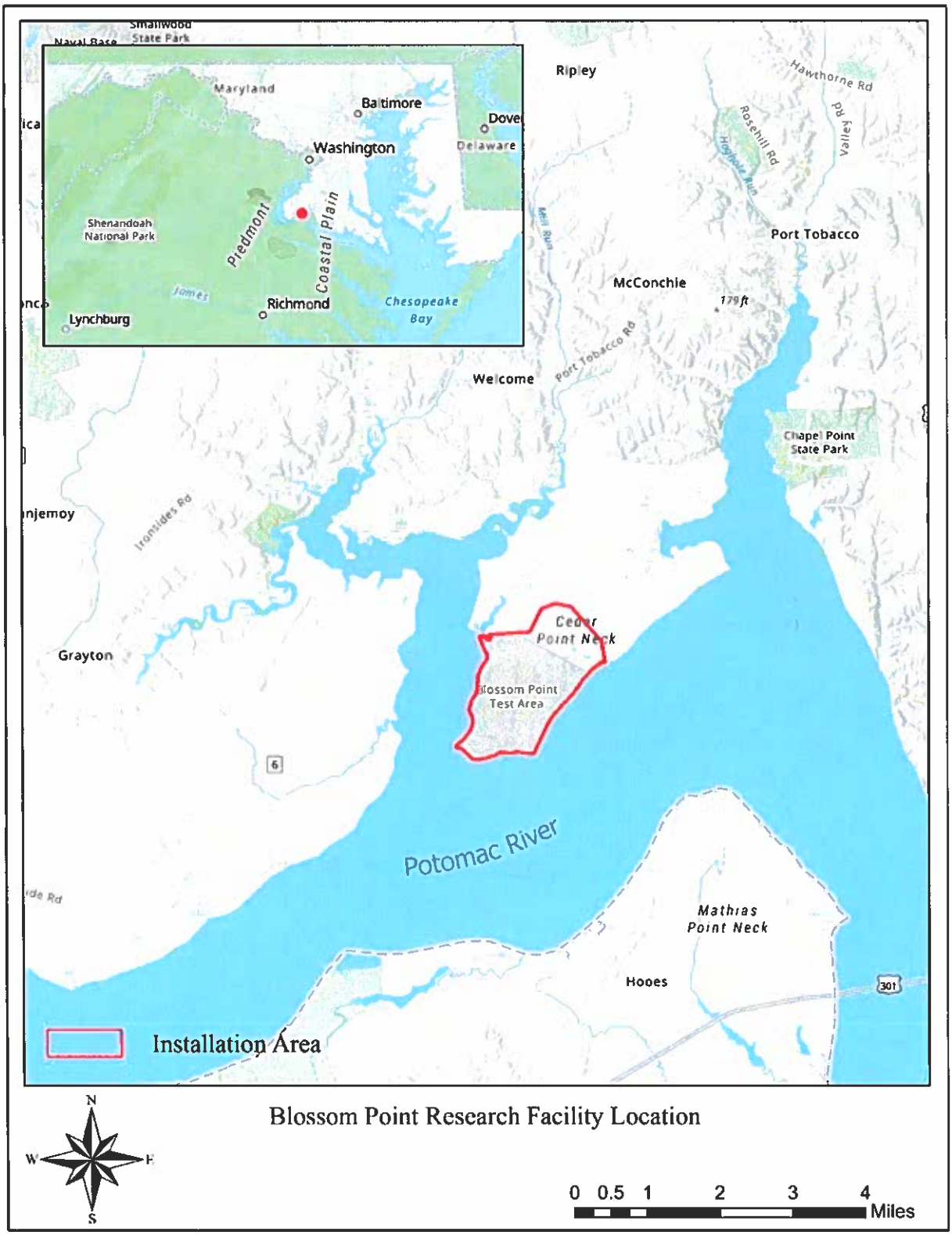

Blossom Point Research Facility Location

DEPARTMENT OF THE ARMY
U.S. ARMY INSTALLATION MANAGEMENT COMMAND
U.S. ARMY GARRISON ABERDEEN PROVING GROUND
BUILDING 4510, 6429 BOOTHBY HILL AVENUE
ABERDEEN PROVING GROUND MARYLAND 21005-5001

Mr. Kerry Holton
Tribal President
Delaware Nation
PO Box 825
Anadarko, OK 73005

[redacted] 10 2021

Dear Mr. Holton:

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Chief, Environmental Division
Directorate of Public Works

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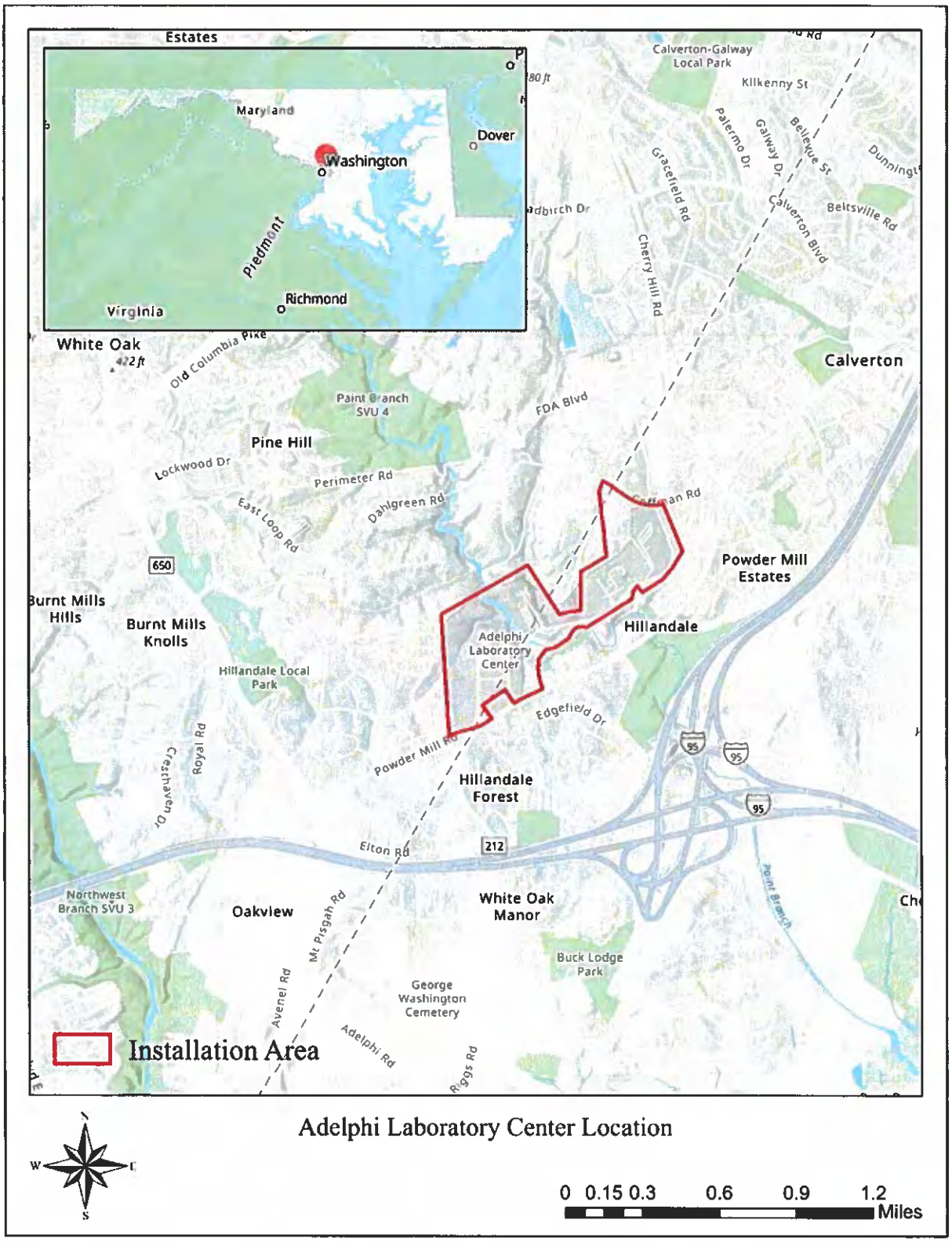

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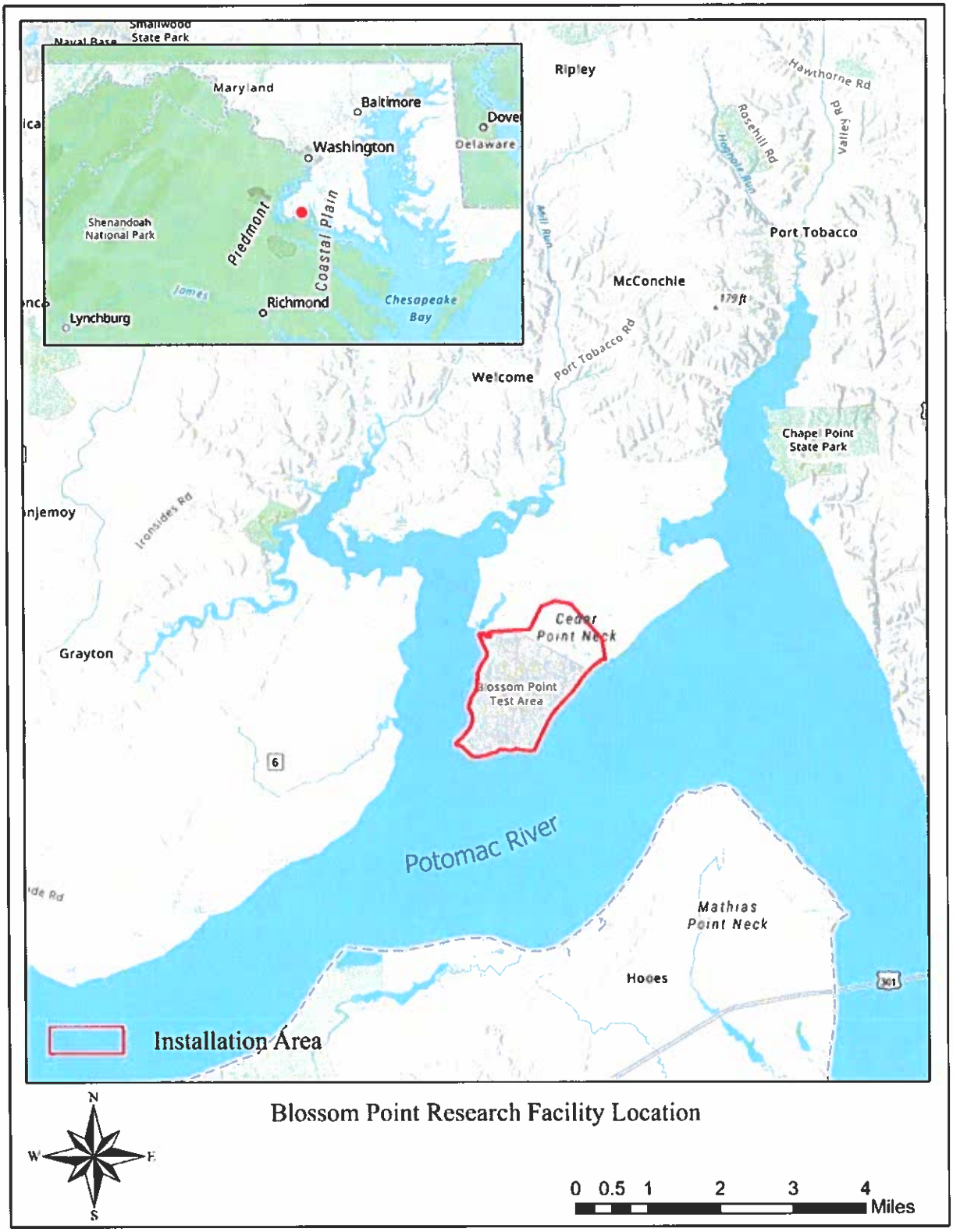

DEPARTMENT OF THE ARMY
U.S. ARMY INSTALLATION MANAGEMENT COMMAND
U.S. ARMY GARRISON ABERDEEN PROVING GROUND
BUILDING 4510, 6429 BOOTHBY HILL AVENUE
ABERDEEN PROVING GROUND MARYLAND 21005-5001

[redacted] 10 2021

Mr. Jason Ross
Delaware Nation
31064 State Hwy. 281
Anadarko, OK 73005

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Chief, Environmental Division
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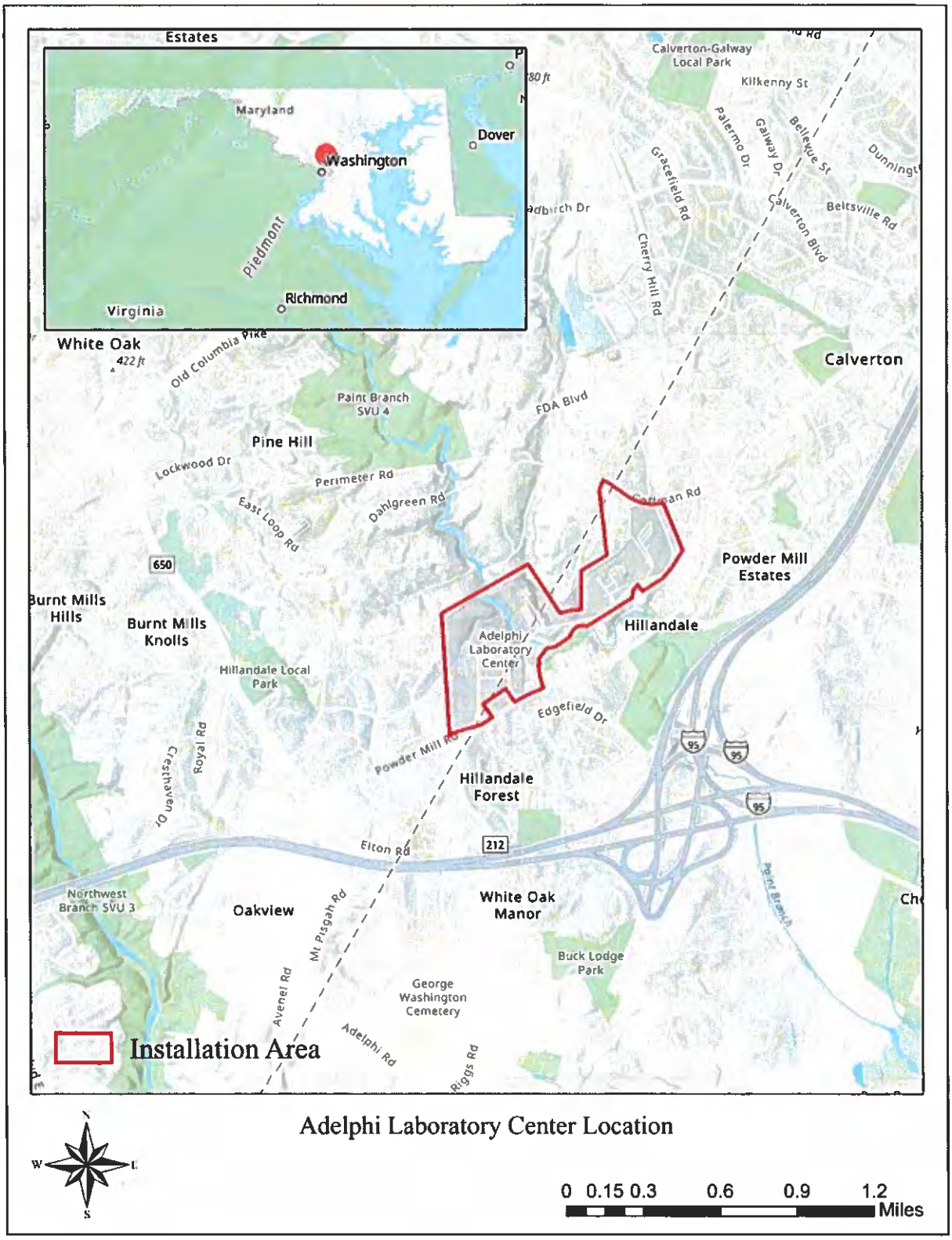

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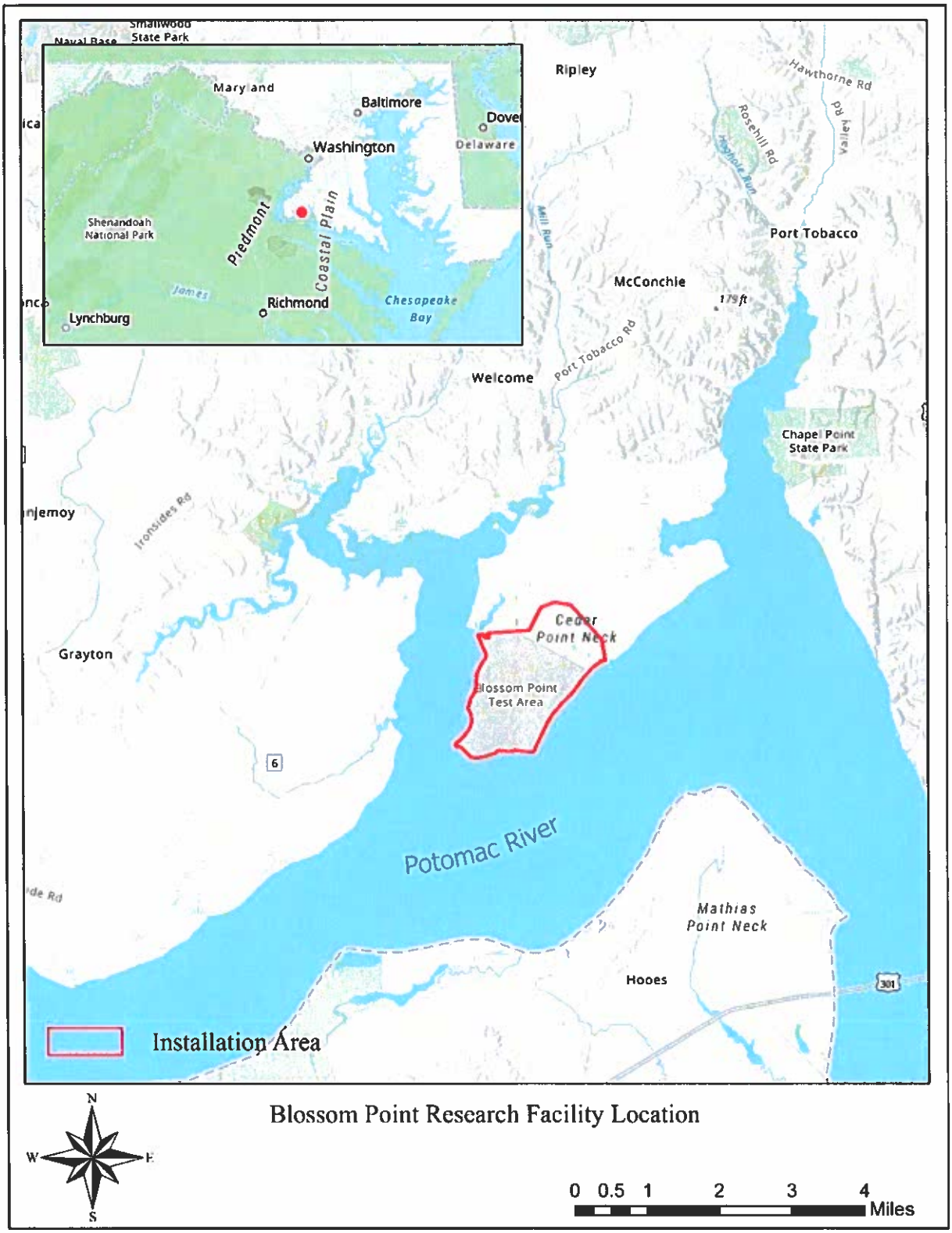

Blossom Point Research Facility Location

EASTERN SHAWNEE
CULTURAL PRESERVATION DEPARTMENT
70500 East 128 Road, Wyandotte, OK 74370

December 14, 2021

Department of The Army Garrison Aberdeen Proving Ground
Buildong 4510, 6429 Boothby Hill Ave.
Aberdeen Proving Ground, Maryland 21005-5001

RE: ***INRMP, Adelphi Laboratory, Prince George and Montgomery Counties, Blossom Point Research, Charles County, Maryland, Multiple Counties County, Maryland***

Dear Ms. Butcher,

The Eastern Shawnee Tribe has received your letter regarding the above referenced project(s) within Multiple Counties County, Maryland. The Eastern Shawnee Tribe is committed to protecting sites important to Tribal Heritage, Culture and Religion. Furthermore, the Tribe is particularly concerned with historical sites that may contain but not limited to the burial(s) of human remains and associated funerary objects.

As described in your correspondence, and upon research of our database(s) and files, we find our people occupied these areas historically and/or prehistorically. However, the project proposes **NO Adverse Effect** or endangerment to known sites of interest to the Eastern Shawnee Tribe. Please continue project as planned. However, should this project inadvertently discover an archeological site or object(s) we request that you immediately contact the Eastern Shawnee Tribe, as well as the appropriate state agencies (within 24 hours). We also ask that all ground disturbing activity stop until the Tribe and State agencies are consulted. Please note that any future changes to this project will require additional consultation.

In accordance with the NHPA of 1966 (16 U.S.C. § 470-470w-6), federally funded, licensed, or permitted undertakings that are subject to the Section 106 review process must determine effects to significant historic properties. As clarified in Section 101(d)(6)(A-B), historic properties may have religious and/or cultural significance to Indian Tribes. Section 106 of NHPA requires Federal agencies to consider the effects of their actions on all significant historic properties (36 CFR Part 800) as does the National Environmental Policy Act of 1969 (43 U.S.C. § 4321-4347 and 40 CFR § 1501.7(a). This letter evidences NHPA and NEPA historic properties compliance pertaining to consultation with this Tribe regarding the referenced proposed projects.

Thank you, for contacting the Eastern Shawnee Tribe, we appreciate your cooperation. Should you have any further questions or comments please contact our Office.

Sincerely,

Paul Barton, Tribal Historic Preservation Officer (THPO)
Eastern Shawnee Tribe of Oklahoma
(918) 666-5151 Ext:1833

DEPARTMENT OF THE ARMY
U.S. ARMY INSTALLATION MANAGEMENT COMMAND
ADELPHI LABORATORY CENTER
2800 MILL POWDER ROAD
ADELPHI MARYLAND 20783-1197

1/25/22

Ms. Genevieve LaRouche
U.S. Fish and Wildlife Service
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, Maryland 21401-7307

Dear Ms. LaRouche:

The U.S. Army Garrison Aberdeen Proving Ground (APG) has updated an existing Integrated Natural Resources Management Plan (INRMP). APG is submitting the updated *Integrated Natural Resource Management Plan 2022-2026, U.S. Army Garrison Aberdeen Proving Ground, Adelphi Laboratory Center and Blossom Point Research Facility* for your review and signature. This INRMP addresses natural resources management at the Adelphi Laboratory Center (ALC) located in Prince George's and Montgomery Counties, Maryland and the Blossom Point Research Facility (BPRF) located in Charles County, Maryland.

APG reviewed and updated information about natural resources and natural resources programs on ALC and BPRF and proposed appropriate courses of action to improve and protect these resources in collaboration with and under the direction of the Directorate of Public Works, Environmental Division. The INRMP was prepared in accordance with appropriate current Department of Defense and Army guidance and focuses on management opportunities in a manner consistent with the mission of the facilities. The following is a summary of new reports or updates that were made since the last INRMP 5-year revision:

- Language regarding the realignment of ALC and BPRF under APG's Command.
- Climate Change Section updated to include the Army's Climate Assessment Tool.
- Updates to the Threatened and Endangered Species List.
- Natural Resources Management Goals, Objectives and Projects for the next 5 years.
- Appendix F – Planning Level Surveys were updated in 2021.
- Appendix G – Rare, Threatened and Endangered Surveys (2016 and 2019 Bat Surveys and 2015 Species Survey).
- Appendix H – 2019 Amphibian and Reptile Species Survey.
- Appendix I – 2019 Stream Assessment for Paint Branch and Associated Tributaries on ALC.
- Appendix J – 2017 Shoreline Survey and Management Plan.

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To assist the review of the INRMP update, a link to download an electronic copy of the INRMP will be emailed to you from DoD SAFE. Please review and return the signed INRMP Tripartite Agreement within 60 days to Ms. Bridget Kelly Butcher, U.S. Army Garrison Adelphi Laboratory Center, 2800 Powder Mill Road, AMIM-ALP-E, Adelphi, Maryland 20783-1197, bridget.c.kellybutcher.civ@army.mil, 301-394-1062.

Sincerely,

HOBBS.VANCE.G.1229303801 Digitally signed by HOBBS.VANCE.G.1229303801 Date: 2022.01.25 15:34:49 -05'00'

Vance G. Hobbs
Chief, Environmental Division
Directorate of Public Works
Aberdeen Proving Ground

Enclosure

DEPARTMENT OF THE ARMY
U.S. ARMY INSTALLATION MANAGEMENT COMMAND
ADELPHI LABORATORY CENTER
2800 MILL POWDER ROAD
ADELPHI MARYLAND 20783-1197

1/25/22

Ms. Lynn Davidson
Wildlife and Heritage Service
Department of Natural Resources
580 Taylor Avenue
Tawes Office Building E-1
Annapolis, Maryland 21401-2352

Dear Ms. Davidson:

The U.S. Army Garrison Aberdeen Proving Ground (APG) has updated an existing Integrated Natural Resources Management Plan (INRMP). APG is submitting the updated *Integrated Natural Resource Management Plan 2022-2026, U.S. Army Garrison Aberdeen Proving Ground, Adelphi Laboratory Center and Blossom Point Research Facility* for your review and Mr. Peditto's signature. This INRMP addresses natural resources management at the Adelphi Laboratory Center (ALC) located in Prince George's and Montgomery Counties, Maryland and the Blossom Point Research Facility (BPRF) located in Charles County, Maryland.

APG reviewed and updated information about natural resources and natural resources programs on ALC and BPRF and proposed appropriate courses of action to improve and protect these resources in collaboration with and under the direction of the Directorate of Public Works, Environmental Division. The INRMP was prepared in accordance with appropriate current Department of Defense and Army guidance and focuses on management opportunities in a manner consistent with the mission of the facilities. The following is a summary of new reports or updates that were made since the last INRMP 5-year revision:

- Language regarding the realignment of ALC and BPRF under APG's Command.
- Climate Change Section updated to include the Army's Climate Assessment Tool.
- Updates to the Threatened and Endangered Species List.
- Natural Resources Management Goals, Objectives and Projects for the next 5 years.
- Appendix F – Planning Level Surveys were updated in 2021.
- Appendix G – Rare, Threatened and Endangered Surveys (2016 and 2019 Bat Surveys and 2015 Species Survey)
- Appendix H – 2019 Amphibian and Reptile Species Survey.
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Sincerely,

HOBBS.VANCE.G.1229303801 Digitally signed by HOBBS.VANCE.G.1229303801 Date: 2022.01.25 15:36:39 -05'00'

Vance G. Hobbs
Chief, Environmental Division
Directorate of Public Works
Aberdeen Proving Ground

Enclosure

DEPARTMENT OF THE ARMY
U.S. ARMY INSTALLATION MANAGEMENT COMMAND
ADELPHI LABORATORY CENTER
2800 MILL POWDER ROAD
ADELPHI MARYLAND 20783-1197

1/25/22

Mr. Brian D. Hopper
Protected Resources Division, NOAA Fisheries
Greater Atlantic Regional Fisheries Office
200 Harry S Truman Parkway, Suite 460
Annapolis, MD 21401

Dear Mr. Hopper:

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Sincerely,

HOBBS.VANCE.G.1229303801 Digitally signed by HOBBS.VANCE.G.1229303801 Date: 2022.01.25 15:35:46 -05'00'

Vance G. Hobbs
Chief, Environmental Division
Directorate of Public Works
Aberdeen Proving Ground

APPENDIX D:
Federal Regulations and Other Regulatory Instruments

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Below is a list of the most significant federal laws and regulations, state laws and other regulatory instruments that may govern implementation of this Integrated Natural Resources Management Plan.

Federal Laws

American Indian Religious Freedom Act (42 United States Code (USC) 1996-1996a)
Archaeological and Historic Preservation Act of 1974 (PL 93-291; 16 USC 469 *et seq*.)
Archaeological Resources Protection Act of 1979 (PL 96-95:16 USC 470aa-11)
Army National Environmental Policy Act Regulation (32 CFR 651)
Bald and Golden Eagle Protection Act (PL 86-70, as amended)
Clean Air Act (as amended through 1990) (42 USC 7401-7642)
Clean Water Act of 1972 (33 USC 1251-1387)
Comprehensive Environmental Response, Compensation, and Liability Act
Conservation and Rehabilitation Program on Military and Public Lands (PL 93-452)
Conservation Programs on Military Reservations (PL 90-465)
Endangered Species Act of 1973 (PL 95-632, as amended)
Energy Independence and Security Act, 2007 (PL 110-140)
Erosion Protection Act (33 USC 426e-426h)
Federal Facilities Compliance Act of 1992 (PL 102-386; amending 42 USC 6961)
Federal Insecticide, Fungicide and Rodenticide Act (7 USC 136 *et seq*.)
Federal Water Pollution Control Act Amendments of 1972 (PL 92-522)
Fish and Wildlife Conservation Act of 1980 (PL 96-366; 16 USC 2901)
Fish and Wildlife Coordination Act (PL 85-624)
Fish and Wildlife Conservation and Natural Resource Management Programs on Military Reservation (Amends Public Law 86-797 (Sikes Act) (PL 96-561)
Migratory Bird Conservation Act (Chapter 257; 45 Stat 1222; 16 USC 715 *et seq*.)
Migratory Bird Treaty Act (PL 65-186; 16 USC 703 *et seq*.)
Native American Graves Protection and Repatriation Act (25 USC, Section 3001 *et seq*.)
National Environmental Policy Act of 1969 (as amended, PL 91-190; 42 USC 4321 *et seq*.)
Noxious Plant Control Act (PL 90-583)
Plant Protection Act of 2000 (replaces Federal Noxious Weed Act of 1973 (PL 93-629))
Resource Conservation and Recovery Act (42 U.S.C. §6901)
Sikes Act Improvement Amendments of 1997 (PL 105-85, as amended; USC Title 16)
Watershed Protection and Flood Prevention Act (PL 92419; 68 Stat 666, as amended and 86 Stat 667; 16 USC 1001)

Executive Orders and Presidential Memoranda

Executive Order 11593, Protection and Enhancement of the Cultural Environment
Executive Order 11988, Floodplain Management
Executive Order 11991, Protection and Enhancement of Environmental Quality
Executive Order 12608, Protection of Wetlands: Amends Executive Order 11990
Executive Order 12898, Environmental Justice
Executive Order 13007, Indian Sacred Sites
Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks
Executive Order 13175, Consultation and Coordination with Indian Tribal Governments
Executive Order 13112, Invasive Species, 1999

Executive Order 13148, Greening the Government through Leadership in Environmental Management
Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds
Executive Order 13508, Strategy for Restoring and Protecting the Chesapeake Bay Watershed
Presidential Memorandum – Incorporating Ecosystem Services into Federal Decision Making (October 2015)
Presidential Memorandum – Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators (June 2014)

Department of Defense (DoD) Instructions, Manuals and Policies
DoD Instruction 4715.03, Natural Resource Conservation Program
DoD Manual 4715.03, INRMP Implementation Manual
DoD Instruction 4150.07, DoD Pest Management Program
DoD Instruction 4715.16, Cultural Resources Management
DoD Instruction 4710.02, DoD Interactions with Federally-Recognized Tribes
DoD Policy to Use Pollinator-Friendly Management Prescriptions, September 2014

Army Regulations (AR) and Implementing Guidance
AR 200-1, Environmental Protection and Enhancement (2007)
Memorandum – Army Policy Guidance for Fish and Wildlife Conservation Fund, 21X5095 (January 2002)

Maryland State Laws and Enforceable Policies
Maryland Enforceable Coastal Policies, April 2011
Maryland Stormwater Management and Erosion and Sediment Control Guidelines for State and Federal Projects, February 2015
Erosion and Sediment Control, Code of Maryland Regulations 26.17.01
Endangered Species of Fish Conservation Act, Annotated Code of Maryland, Natural Resources Article, Title 4-2A
Nongame and Endangered Species Conservation Act, Annotated Code of Maryland, Natural Resources Article, Title 10-2A
Nontidal Wetlands Protection Act, Annotated Code of Maryland, Environment Article, Title 5-901(h)(1)
Tidal Wetlands Protection Act, Annotated Code of Maryland, Environment Article, Title 16-101(n)
Stormwater Management Regulations, Code of Maryland Regulations 26.17.02

Other Guidance
Climate Adaptation for DoD Natural Resource Managers
Army Climate Assessment Tool
Sikes Tripartite MOU
Mutual DoD and USFWS Guidelines for Streamlined Review of INRMP Updates
Addressing Migratory Bird Management in INRMPs

APPENDIX E:
Critical Habitat Issues

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Critical Habitat is defined in the Endangered Species Act (ESA) as "specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection." An area can only be established as "Critical Habitat" after the USFWS has published it in the Federal Register. The ESA also states that "the secretary shall not designate as critical habitat any lands or other geographic areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an INRMP prepared under section 101 of the Sikes Act, if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation."

ALC has no area that is considered critical habitat. For BPRF, the Potomac River was designated as critical habitat for the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) in 2017. ALC manage its lands with an ecosystem approach in accordance with the Maryland Coastal Zone Management Act, Bald and Golden Eagle Protection Act and all appropriate regulations, laws and policies. New listings of endangered species will be reviewed regularly and included in the updates of this INRMP.

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APPENDIX F:
Planning Level Surveys

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Natural Resources Management Planning Level Survey

Adelphi Laboratory Center
Adelphi, Maryland

Submitted to:

Environmental Management Office
Adelphi Laboratory Center
Adelphi, Maryland 20783

Submitted by:

U.S. Army Corps of Engineers, Baltimore District
2 Hopkins Plaza
Baltimore, Maryland 21201

March 2021

Natural Resources Management Planning Level Survey

Adelphi Laboratory Center
Adelphi, Maryland

EXECUTIVE SUMMARY

Adelphi Laboratory Center (ALC) is located in Adelphi, Maryland (Latitude 39 -1'-45"N, Longitude 76 -58'-19"W), approximately 10 miles north of Washington, D.C. and approximately 26 miles southwest of Baltimore, Maryland. The facility straddles the border between two Maryland jurisdictions, Prince George's and Montgomery Counties, with the majority of the facility residing in Montgomery County. ALC is approximately 207 acres in size. ALC lies in the Anacostia River drainage basin which is a tributary of the Potomac River. It is bordered by residential areas on the east and south and by the General Service Administration's Federal Center on the north and west.

ALC is home to the Headquarters for the Army Research Laboratory (ARL). The mission of ARL is to provide the underpinning science, technology, and analysis that enable full-spectrum operations. The mission of ALC is to support innovative science and technology by providing service and infrastructure while optimizing resources, sustaining the environment, and enhancing the wellbeing of the Army's workforce and community.

This Natural Resources Management Planning Level Survey (PLS) is intended to identify the biological resources of the installation and to address the potential impacts that installation activities may have on federal and/or state endangered and threatened species or any significant biological resource that may exist on the installation property. As part of the assessment procedure, the PLS included an investigation of not only the presence of threatened and endangered species, but also the evaluation of habitat to support these species.

The assessment methodology included contact with the U.S. Fish and Wildlife Service (USFWS), Maryland Department of Natural Resources (MDNR) and Maryland Natural Heritage Program (NHP) to request information regarding threatened and endangered plants and animal species that may be present on the Installation or adjacent properties.

Background information collection was primarily collected from a previous PLS (2011). Existing Geographic Information System data was used to begin the desktop reconnaissance of ALC. Maps of the area were developed from several sources including: U.S. Geological Survey (USGS) Quadrangle, U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NCRS) Soil Data Mart, USFWS National Wetland Inventory Map and MDNR Wetlands map. Data from the Maryland Invasive Plant Council (MISC) was obtained to assist in the identification of invasive plant species that may exist on the installation property.

A field survey of ALC was conducted from June 22-24, 2020. All areas of the installation were subjected to pedestrian reconnaissance, except restricted areas, and information was recorded to document dominant vegetation species, wetlands and stream areas, and wildlife habitat to facilitate preparation of the natural resource maps. All wildlife seen or heard was noted, as were wildlife

signs such as nests, burrows, tracks and scat.

While the facility does not contain any federally- or state-listed threatened or endangered species, there is forested habitat that is considered Forest Interior Dwelling Bird habitat and should be protected. Paint Branch is classified as Class III – Natural Trout Waters by the State of Maryland and must be protected through a stream protective buffer. A stream protective buffer should be applied to Paint Branch and its tributaries on ALC, at a minimum of 200 feet in width. There are also wetlands scattered throughout ALC that must be avoided from impacts. These natural resources must be considered when planning for future construction activities, training and maintenance on the facility to avoid and minimize impacts.

Invasive species and pest management continue to enhance the natural ecosystems and should be continued according to the Invasive Species Management Plan (2017) and Integrated Pest Management Plan (2020).

Natural Resources Management Planning Level Survey

Adelphi Laboratory Center
Adelphi, Maryland

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TABLES

FIGURES

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Natural Resources Management Planning Level Survey

Adelphi Laboratory Center
Adelphi, Maryland

1.0 INTRODUCTION

Adelphi Laboratory Center (ALC) is located in Adelphi, Maryland (Latitude 39 -1'-45"N, Longitude 76 -58'-19"W), approximately 10 miles north of Washington, D.C. and approximately 26 miles southwest of Baltimore, Maryland (Figure 1). The facility straddles the border between two Maryland jurisdictions, Prince George's and Montgomery Counties, with the majority of the facility residing in Montgomery County. ALC is approximately 207 acres in size. ALC lies in the Anacostia River drainage basin, a tributary of the Potomac River.

ALC was acquired by the U.S. Army in 1969 from the U.S. Naval Surface Warfare Center (NSWC), Adelphi, Maryland. ALC is home to the Headquarters for the Army Research Laboratory (ARL). The mission of ARL is to provide the underpinning science, technology, and analysis that enable full-spectrum operations. The mission of ALC is to support innovative science and technology by providing service and infrastructure while optimizing resources, sustaining the environment, and enhancing the wellbeing of the Army's workforce and community.

This Natural Resources Management Planning Level Survey (PLS) is intended to identify the biological resources of the installation and to address the potential impacts that installation activities may have on federal and/or state endangered and threatened species or any significant biological resource that may exist on the installation property. As part of the assessment procedure, the PLS included an investigation of not only the presence of threatened and endangered species, but also the evaluation of habitat to support these species.

2.0 METHODS

2.1 Background Information Search

Background information was collected from a variety of sources to prepare this PLS. Contact was initiated with the U.S. Fish and Wildlife Service (USFWS) and Maryland Department of Natural Resources (MDNR) to request information regarding threatened and endangered plant and animal species that may be present on the Installation or adjacent properties. Existing reports, existing Geographic Information System (GIS) data from ALC and the 2011 PLS were reviewed. Data was collected from several sources including: U.S. Geological Survey (USGS), Topographic Quadrangle, U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NCRS) Soil Data Mart, USFWS National Wetland Inventory (NWI) Map and MDNR wetlands mapping. Data from the Maryland Invasive Species Council (MISC) was obtained to assist in the identification of invasive plant species that may exist on the installation property.

US Army Corps of Engineers
Baltimore District

Figure 1. Adelphi Laboratory Center Location
Montgomery and Prince George's Counties, MD

2.2 Field Surveys

A field survey of ALC was conducted on June 22-24, 2020. All areas of the installation were subjected to pedestrian reconnaissance, except restricted areas, and information was recorded to document dominant vegetation species, wetlands and stream areas, and wildlife habitat to facilitate preparation of the natural resource maps. All wildlife seen or heard was noted, as were wildlife signs such as nests, burrows, tracks and scat.

3.0 RESULTS AND DISCUSSION

3.1 Site Description

ALC generally consists of the land use categories: industrial, installation support, and open space. Within those general categories specific land use designations include research, development and testing, open space/buffers, maintenance and storage, administration, utilities, and explosive storage. The installation maintains a 200-foot forested buffer zone along Paint Branch at the request of the Maryland-National Capital Park and Planning Commission (M-NCPPC) and a 200-foot buffer exists along a short span of Floral Drive east of the bridge from the time the property initially transferred to the Army and continues to this day. The open space consists of tracts of contiguous forest and maintained landscape. Paint Branch runs through ALC, as does Hillandale Run, a tributary of Paint Branch. ALC lies in the Anacostia River drainage basin which is a tributary of the Potomac River. It is bordered by residential areas on the east and south and by the USDA on the north and west.

3.2 Vegetative Cover Types

There are two plant communities generally present on the installation: forested and maintained area. The remaining acreage has been developed and includes buildings, paved or graveled parking areas and sidewalks. A habitat map is presented as Figure 2. Table 1 identifies the plant species associated with each of the designated plant communities.

Forested Area

Vegetation at ALC is a mix of oak-hickory-pine forest and Appalachian oak forest. The majority of the installation is forested with urban, developed land and mowed, maintained lawns. Species found on the installation include the following:

- Oak – Hickory – Pine Forest:
    - Dominant Species – hickories (*Carya* sp.), loblolly pine (*Pinus taeda*), and white and post oaks (*Quercus* sp.)
    - Subdominant Species – blackgum (*Nyssa sylvatica*), tulip poplar (*Liriodnedron tulipifera*), sweetgum (*Liquidambar styracifula*), persimmon (*Diospyros virginiana*), flowering dogwood (*Cornus florida*), sourwood (*Oxydendrum arboretum*), Virginia pine (*Pinus Virginiana*) and a variety of oak species

US Army Corps of Engineers
Baltimore District

Figure 2. Adelphi Laboratory Center
Habitat Areas
Montgomery and Prince George's Counties, MD
Sources: Aerial Photo, Bing Maps, 2010. Boundary, ALC, 2010. Habitats, USACE, 2011.

1 inch = 1,000 feet

0 375 750 1,500 2,250 3,000 Feet

N

- Appalachian Oak Forest:
    - Dominant Species – white and northern red oaks (*Quercus* sp.)
    - Subdominant Species – red and sugar maple (*Acer* sp.), yellow birch (*Betula alleghaniensis*), hickories, tulip poplar, sweetgum, American beech (*Fagus grandifolia*) and several oak species

Common tree species observed on ALC include: northern red oak, white oak (*Quercus alba*), blackgum, tulip poplar, mockernut hickory (*Carya alba*), American beech, Virginia pine, red maple, black locust (*Robinia pseaudoacacia*) and American sycamore (*Platanus occidentalis*). Common shrub species observed on ALC include: Japanese barberry (*Beberis thunbergii*), mountain laurel (*Kalmia latifolia*) and multiflora rose (*Rosa multiflora*). See Table 1 for a complete list of observed species.

The forested areas on ALC are considered Forest Interior Dwelling Bird habitat by MDNR and should be protected if possible.

ALC does not contain forest land that can be managed for timber harvest and sale and therefore does not require the development of a Forest Management Plan. Gypsy moth (*Lymantria dispar dispar*) infestations are a continuing threat to the hardwoods and could produce significant damage to ALC's forest resources. The moth is found throughout the State of Maryland in its preferred oak forest habitat. Annual aerial surveys for gypsy moth defoliation are conducted by the USDA's Forest Service. The emerald ash borer (*Agrilus planipennis*) and spotted lanternfly (*Lycorma delicatula*) also pose a threat to trees at ALC; removal of wood from ALC is prohibited to prevent the spread of these pests.

Maintained Area

The maintained, landscaped areas are located generally around developed areas, such as buildings, roads, and parking lots. These areas generally consist of common grasses and ornamental plants. Common herbaceous species observed on ALC include: Japanese stiltgrass (*Microstegium vimineum*), barnyardgrass (*Echinochloa crus-galli*), common ladyfern (*Athyrium filix-femina*), green bristlegrass (*Setaria viridis*), purpletop tridens (*Tridens flavus*), sericea lespedeza (*Lespedeza cuneata*), wingstem (*Verbesina alternifolia*), roundleaf greenbrier (*Smilax rotundifolia*) and summer grape (*Vitis aestivalis*). See Table 1 for a complete list of observed species.

Table 1. Plant Species Observed on ALC

Common Name	*Scientific Name*
Trees	
American Beech	*Fagus grandifolia*
American Elm	*Ulmus Americana*
American Holly	*Ilex opaca*
American Hornbeam	*Carpinus caroliniana*
American Sycamore	*Platanus occidentalis*
Basswood	*Tilia Americana*

Common Name	*Scientific Name*
Trees	
Black Cherry	*Prunus serotina*
Black Gum	*Nyssa sylvatica*
Black Locust	*Robinia pseudoacacia*
Black Oak	*Quercus velutina*
Blackhaw	*Viburnum prunifolium*
Boxelder	*Acer negundo*
Chestnut Oak	*Quercus prinus*
Common Serviceberry	*Amelanchier arborea*
Crabapple	*Malus angustifolia*
Eastern Red Cedar	*Juniperus virginiana*
Eastern White Pine	*Pinus strobus*
Flowering Dogwood	*Cornus florida*
Green Ash	*Fraxinus pennsylvanica*
Hawthorn**	*Crataegus monogyna*
Hop–Hornbeam**	*Ostrya virginiana*
Ironwood	*Carpinus caroliniana*
Mockernut Hickory	*Carya alba*
Mountain Laurel	*Kalmia latifolia*
Northern Red Oak	*Quercus rubra*
Osage Orange	*Maclura pomifera*
Tree-of Heaven*	*Ailanthus altissima*
Persimmon	*Diospyrus virginiana*
Pin Oak	*Quercus palustris*
Pitch Pine	*Pinus rigida*
Post Oak	*Quercus stellata*
Princess Tree*	*Paulownia tomentosa*
Red Cedar	*Juniperus virginiana*
Red Maple	*Acer rubrum*
River Birch	*Betula nigra*
Sassafras	*Sassafras albidum*
Scarlet Oak	*Quercus coccinea*
Southern Red Oak**	*Quercus falcata*
Spanish Oak	*Quercus falcate*
Sweetbay	*Magnolia virginiana*
Sweetgum	*Liquidambar stiraciflua*
Tulip Poplar	*Liriodendron tulipifera*
Turkey Foot Oak**	*Quercus laevis*
Virginia Pine**	*Pinus virginiana*
White Ash	*Fraxinus americanus*
White Mulberry**	*Morus alba*
White Oak	*Quercus alba*

Common Name	*Scientific Name*
Trees	
White Pine	*Pinus strobus*
Willow Oak	*Quercus phellos*
Witch Hazel	*Hamamelis virginiana*
Shrubs	
Allegheny Blackberry	*Rubus allegheniensis*
Chinese Privet*	*Ligustrum sinense*
Japanese Barberry*	*Beberis thunbergii*
Lowbush Blueberry	*Vaccinium angustifolium*
Mountain Laurel	*Kalmia latifolia*
Multiflora Rose*	*Rosa multiflora*
Spicebush	*Lindera benzoin*
Wineberry*	*Rubus phoenicolasius*
Herbaceous	
Bamboo*	Bambusa spp.
Barnyard Grass	*Echinochloa crus-galli*
Bermuda Grass	*Cynodon dactylon*
Broadleaf Cattail	*Typha latifolia*
Broomsedge Bluestem	*Andropogon virginicus*
Carolina Horsenettle	*Solanum carolinense*
Christmas Fern	*Polystichum acrostichoides*
Common Ladyfern	*Athyrium filix-femina*
Common Mullein	*Verbascum thapsus*
Common Reed*	*Phragmites australis*
Foxtail **	*Setaria spp.*
Gill-Over-the-Ground	*Glechoma hederacea*
Green Bristlegrass	*Setaria viridis*
Horse Thistle**	*Onopordum acaulon*
Jack-in-the-Pulpit	*Arisaema triphyllum*
Japanese Stiltgrass*	*Microstegium vimenium*
Musk Thistle*	*Carduss nutans*
Narrow Leaf Cattail	*Typha angustifolia*
Partridgeberry	*Mitchella repens*
Poison Ivy	*Toxicodendron radicans*
Purpletop Tridens	*Tridens flavus*
Queen Anne's Lace	*Daucus carota*
Sedge	*Carex spp.*
Sericea Lespedeza*	*Lespedeza cuneata*
Skunk Cabbage	*Symplocarpus foetidus*
Small Green Wood Orchid**	*Platanthera clavellata*
White Snakeroot**	*Ageratina altissima*
Wingstem	*Verbesina alternifolia*

Common Name	*Scientific Name*
Vines	
Japanese Honeysuckle*	*Lonicera japonica*
Late-Flowering Thoroughwort	*Eupatorium serotinum*
Mile-A-Minute*	*Polygonum perfoliatum*
Oriental Bittersweet*	*Celastrus orbiculatus*
Pennsylvania Smartweed	*Polygonum pensylvanicum*
Roundleaf Greenbrier	*Smilax rotundifolia*
Summer Grape	*Vitis aestivalis*
Virginia Creeper	*Parthenocissus quinquefolia*

* Invasive species
**New species observed only in 2020

3.3 Surface Waters and Wetlands

Paint Branch and Hillandale Run, a tributary of Paint Branch, are perennial streams on ALC (Figure 3). Paint Branch originates approximately six miles north of the installation, cuts in a southeasterly direction through the interior of ALC, and then flows another four miles south to its confluence with the Northeast Branch of the Anacostia River. Ultimately, the Anacostia River empties into the Potomac River, which discharges into the Chesapeake Bay.

Hillandale Run flows west to east across ALC and empties into Paint Branch in the north central portion of the installation. Both streams have predominantly cobbled substrates, moderately rapid currents, and well-shaded, undeveloped stream banks.

A second tributary of Paint Branch is unnamed and located primarily outside of the eastern boundary of the installation, more or less parallel to Kuester Road. This stream receives drainage from the 400 Area. There are no stream gauges on Paint Branch and ALC has not conducted flow monitoring.

A stream protective buffer must be maintained adjacent to Paint Branch and its tributaries. The State of Maryland designates these waterways as Class III – Natural Trout Waters. Montgomery County, Maryland guidelines for environmental management of development recommend a minimum buffer width of 200 feet from the stream bank when slope ranges are 25 percent or greater. This 200-foot buffer is applicable to Paint Branch. A 150-foot buffer is to be maintained on the Paint Branch tributaries within the boundaries of ALC.

There are 10 wetlands located on ALC, amounting to approximately 10.41 acres (see Figure 3 and Table 2 below). The majority of the wetlands are located within the floodplains of Paint Branch and Hillandale Run. There is also a large wetland area in the center of the site that is associated with an unnamed tributary to Paint Branch that runs along the border of ALC and through ALC under Floral Road near the center of the facility. There are scattered smaller wetlands in the forested areas on the eastern portion of the facility that drain to drainage ditches that eventually flow to Paint Branch.

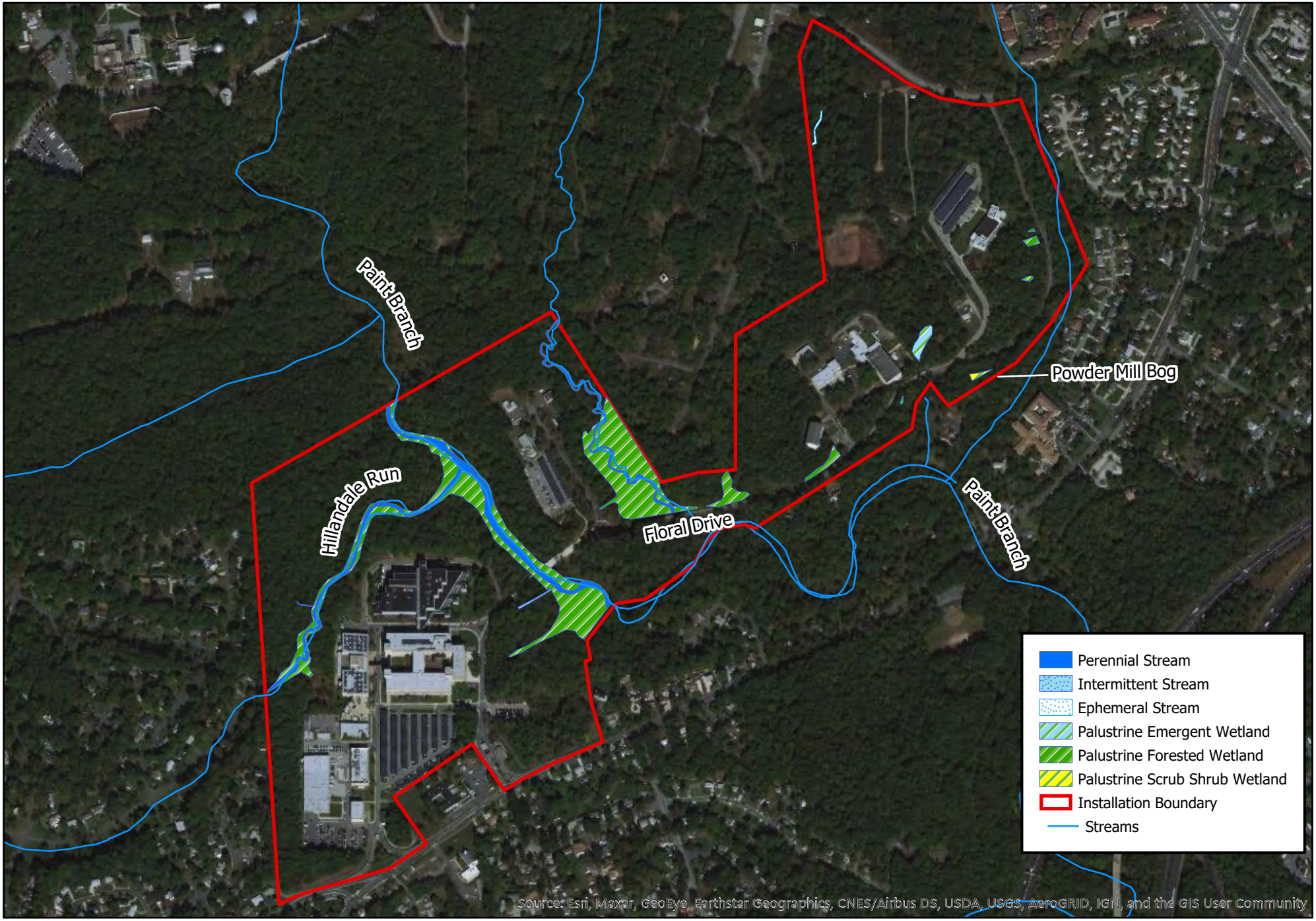

Figure 3. Adelphi Laboratory Center
Wetlands and Streams
Montgomery and Prince George's Counties, MD

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The Powder Mill Bog (PMB) on ALC is located on the southeastern portion of ALC. This bog is a remnant magnolia bog that drains to Paint Branch that has been known to support habitat for two State-listed endangered species: Long's rush (*Juncus longii*) and Capitate Beakrush (*Rhynchospora cephalantha*). Neither of these species were observed at the time of the 2020 PLS. A few small patches of the uncommon and unique (though not state-rare) small green wood orchid (*Platanthera clavellata*) was observed at the bog during the 2020 PLS. The PMB was observed to have decreased in size, most likely due to several dry summers and the maturation of the surrounding forest. The soils within the bog were completely saturated and coated in organic matter.

Table 2. Wetlands on ALC

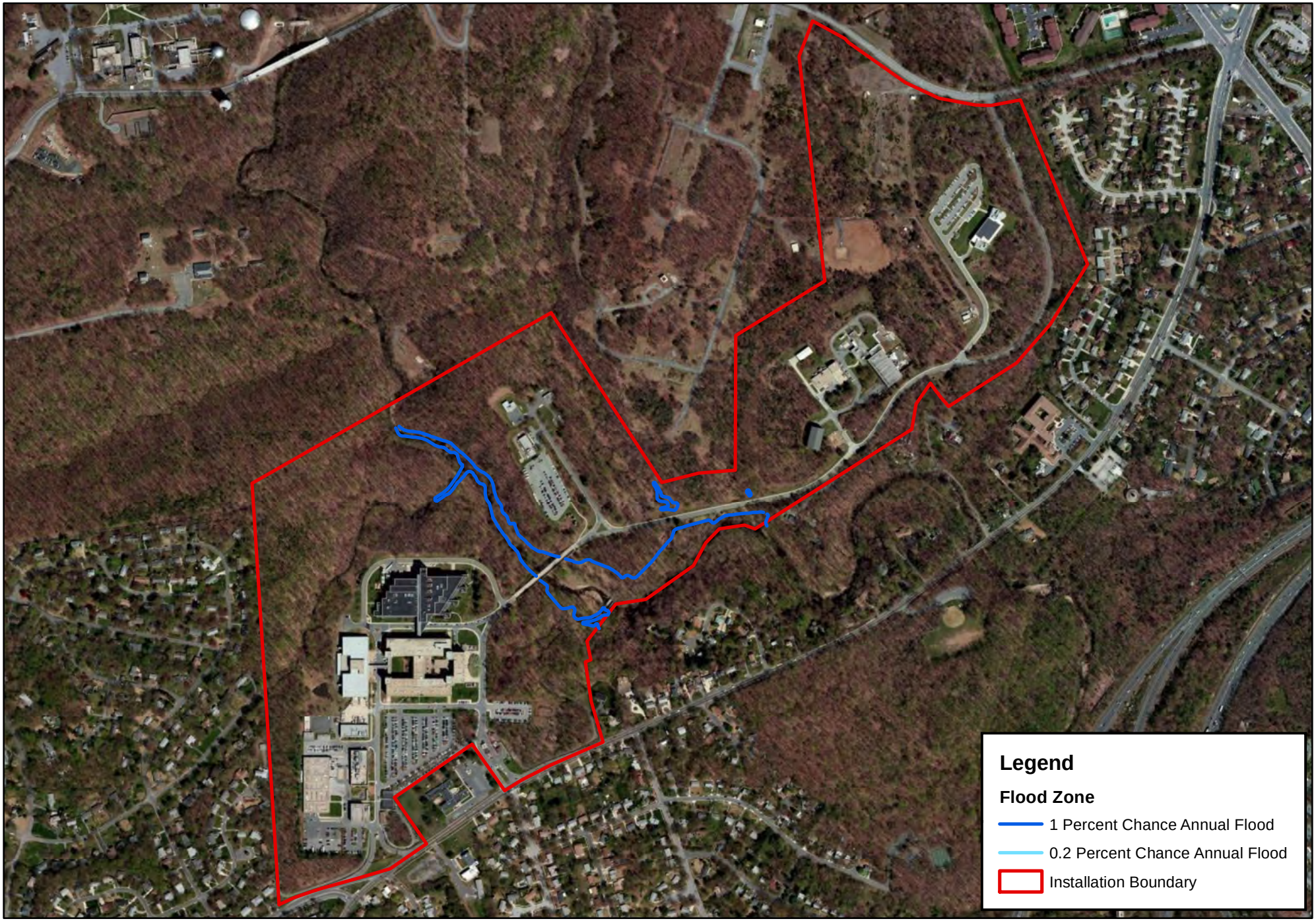
Wetland Name	Wetland Type	Description	Acreage
1	PFO	Drains to ditch, which flows to unnamed tributary to Paint Branch	0.01
2	PFO	Drains to ditch, which flows to unnamed tributary to Paint Branch	0.08
3	PFO	Drains to ditch, which flows to unnamed tributary to Paint Branch	0.03
4 (PMB)	PSS	Remnant Magnolia Bog, drains to Paint Branch	0.06
5	PEM	Drains to pipe, which outfalls to unnamed tributary to Paint Branch	0.26
6	PFO	Isolated	0.01
7	PFO	Floodplain wetland drains to unnamed tributary to Paint Branch	3.87
8	PFO	Drains to unnamed tributary to Paint Branch	0.19
9	PFO	Drains to unnamed tributary to Paint Branch	0.40
10	PFO	Floodplain wetland drains to Hillandale Run and Paint Branch	5.50
		TOTAL WETLAND ACREAGE	**10.41**

3.4 Floodplain

Throughout much of the installation steep side slopes restrict the 100-year floodplain for both the tributaries and Paint Branch to their narrow stream valleys (Figure 4). Below their confluence, the floodplain broadens and reaches its widest point, approximately 250 feet, between Floral Drive and the installation's southeastern border.

3.5 Wildlife

The wildlife species observed on the installation and adjacent area are representative and typical for forested and maintained lawn areas in residential areas. The presence of the chain-link fence around the perimeter of the property tends to restrict entry by larger animals. The 2020 PLS



US Army Corps of Engineers
Baltimore District

Figure 4. Adelphi Laboratory Center
Floodplains
Montgomery and Prince George's Counties, MD

Sources: Aerial Photo, Bing Maps, 2010. Boundary, ALC, 2010. Floodplains, ALC, 2010.

1 inch = 750 feet

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revealed a nesting Cooper's hawk (*Accipiter cooperii*) with two young fledglings near Wetland 3. A complete list of observed species is included on Table 3.

Amphibians and Reptiles

A bullfrog (*Rana catesbeiana*), eastern American toad (*Anaxyrus americanus americanus*), and eastern box turtle (*Terrapene carolina*) were observed during the 2020 PLS at Paint Branch and Hillandale Run. The wetlands on ALC provide habitat for amphibians and reptiles that may not have been observed during the 2020 PLS. Herpetofaunal surveys were conducted at ALC from March to October 2018. The findings of these surveys are included in Table 3.

Birds

The bird species that were observed during the 2020 PLS include American robin (*Turdus migratorius*), mourning dove (*Zenaida macroura*), Great Blue Heron (*Ardea herodias*), turkey vulture (*Cathartes aura*), Cooper's hawk, and red-winged blackbird (*Agelaius phoeniceus*). All of the species observed are typical for this area. The forested areas, wetlands and streams provide habitat for Forest Interior Dwelling Birds and other common bird species that may not have been observed at the time of the 2020 PLS. Avian surveys were conducted at ALC in June and September of 2018. Three observed species are Maryland-state listed as rare: sharp-shinned hawk (*Accipiter striatus*), brown creeper (*Certhia americana*), and dark-eyed junco (*Junco hyemalis*).

Mammals

The only mammal observed during the 2020 PLS was a white-tailed deer (*Odocoileus virginianus*). The entire perimeter of the installation is fenced, which has affected the number and diversity of mammals observed, though it is likely that common small mammals could be found on ALC.

Fish and Aquatic Species

MDNR notes that Paint Branch supports brown trout (*Salmo trutta*).

Table 3. Fauna Observed on ALC

Common Name	*Scientific Name*
Amphibians and Reptiles	
Bullfrog	*Rana catesbeiana*
Eastern American Toad	*Anaxyrus americanus americanus*
Eastern Box Turtle	*Terrapene carolina*
Eastern Worm Snake**	*Carphophis amoenus amoenus*
Five-lined Skink**	*Plestiodon fasciatus*
Gray Treefrog**	*Hyla versicolor*
Northern Green Frog**	*Lithobates clamitans melanota*
Northern Two-lined Salamander**	*Eurycea bislineata*

Common Name	*Scientific Name*
Amphibians and Reptiles	
Northern Water Snake**	*Nerodia sipedon sipedon*
Red-backed Salamander**	*Plethodon cinereus*
Spring Peeper**	*Pseudacris crucifer*
Birds	
Acadian Flycatcher	*Empidonax virescens*
American Robin	*Turdus migratorius*
Baltimore Oriole	*Icterus galbula*
Bluejay	*Corvus brachyrhynchos*
Blue-gray Gnatcatcher	*Polioptila caerulea*
Brown Creeper**	*Certhia americana*
Brown Thrasher	*Toxostoma rufum*
Carolina Chickadee**	*Poecil carolinensis*
Carolina Wren**	*Thryothorus ludovicianus*
Common Grackle**	*Quiscalus quiscula*
Cooper's Hawk	*Accipiter cooperii*
Eastern Phoebe**	*Sayornis phoebe*
Eastern Wood Peewee**	*Contopus virens*
European Starling*	*Sturnus vulgaris*
Gray Catbird**	*Dumetella carolinensis*
Great Blue Heron	*Ardea Herodias*
Great-crested Flycatcher**	*Maiarchus crinitus*
House Wren**	*Troglodytes aedon*
Louisiana Waterthrush **	*Seiurus motacilla*
Mourning Dove	*Zenaida macroura*
Northern Cardinal	*Cardinalis cardinalis*
Northern Mockingbird	*Mimus polyglotis*
Northern Parula**	*Parula Americana*
Purple Martin**	*Progne subis*
Red-eyed Vireo**	*Vireo olivaceus*
Red-winged Blackbird	*Agelaius phoeniceus*
Scarlet Tanager**	*Piranga olivacea*
Sharped-shinned Hawk	*Accipiter striatus*
Tufted Titmouse	*Baeolophus bicolor*
White-breasted Nuthatch**	*Sitta carolinensis*
White-eyed Vireo**	*Vireo flavifrons*
White-throated Sparrow	*Zonotrichia albicollis*
Wood Thrush**	*Hylocichla mustelina*
Mammals	
White-tailed Deer	*Odocoileus virginianus*

*Observed during 2011 Planning Level Survey

****** Observed only in 2018 Avian and Herpetological Surveys

3.6 Threatened and Endangered Species

USFWS and MDNR were contacted for information regarding threatened and endangered species and significant habitats on or in the vicinity of the installation. The response correspondence received from these agencies is presented in Appendix J of this INRMP.

Federally-Listed Species

The response letter from the USFWS stated that there are no Federally-listed species on ALC. Please see Appendix J of this INRMP for the response letter.

The northern long-eared bat (NLEB) (*Myotis septentrionalis*) was listed as threatened by the USFWS in May 2015. An acoustic bat survey with focus on the NLEB was conducted at ALC during the summers of 2016 and 2019. The NLEB was recorded at one sample site on ALC during the 2016 surveys; however no NLEB were detected during the 2019 surveys.

State-Listed Species

No State-listed threatened, endangered, or special status species were observed on ALC during the 2020 PLS.

Three bird species observed during the 2018 avian surveys are Maryland-state listed as rare: sharp-shinned hawk, brown creeper, and dark-eyed junco. None of these species were observed during the 2020 PLS, though it is possible they still reside on-site.

In 2002, biologists located the PMB, a small Fall-Line Terrace Gravel Bog on ALC. This site is a remnant of a once more widely distributed plant community that has been largely destroyed by drainage or filling for commercial and residential development along the Fall Line in the Maryland and Virginia suburbs of Washington, D.C. Not a true bog, PMB is a groundwater-fed, saturated wetlands. Its nutrient poor, gravelly soils support a distinctive plant community that is considered Highly Globally Rare. Fewer than ten Fall Line Terrace Gravel Bogs are known to exist worldwide, and most (including this one) are highly degraded (NatureServe, 2009).

Five rare and uncommon plant species were documented at the PMB in 2002 and 2007. Table 4 lists plant species documented by MDNR in 2007 to potentially occur within the PMB. None of these species were observed during the PLS conducted in 2020, though it is possible that these species persist on site.

Table 4. State-Listed Rare, Threatened and Endangered Species and Habitats on ALC

Scientific Name	Common Name	Status	Location
Plant Species			
Eriocaulon decangulare	Ten-angled Pipewort	G5, S2, State Rare	Prince George's County
Juncus longii	Long's Rush	G3Q, S1, State Endangered	Montgomery County

Scientific Name	Common Name	Status	Location
Plant Species			
Pogonia ophioglossoides	Snakemouth Orchid (Rose pogonia)	State Watch List	N/A
Rhynchospora cephalantha	Capitate Beakrush	G5, S1, State Endangered	Prince George's County
Solidago uliginosa	Bog Goldenrod	State Watch List	N/A
Habitats			
Bog and Fen Wetland Complex	Fall-Line Terrace Gravel Bog	State Highly Rare	N/A

(Source: MDNR, 2007)

3.7 Invasive Species

Invasive plants that were observed on ALC during the 2020 PLS are noted on Table 1 and include, but are not limited to: Japanese barberry, multiflora rose, musk thistle, Japanese stiltgrass, Japanese honeysuckle, mile-a-minute, common reed and Oriental bittersweet. These species are listed on the Maryland Invasive Species of Concern.

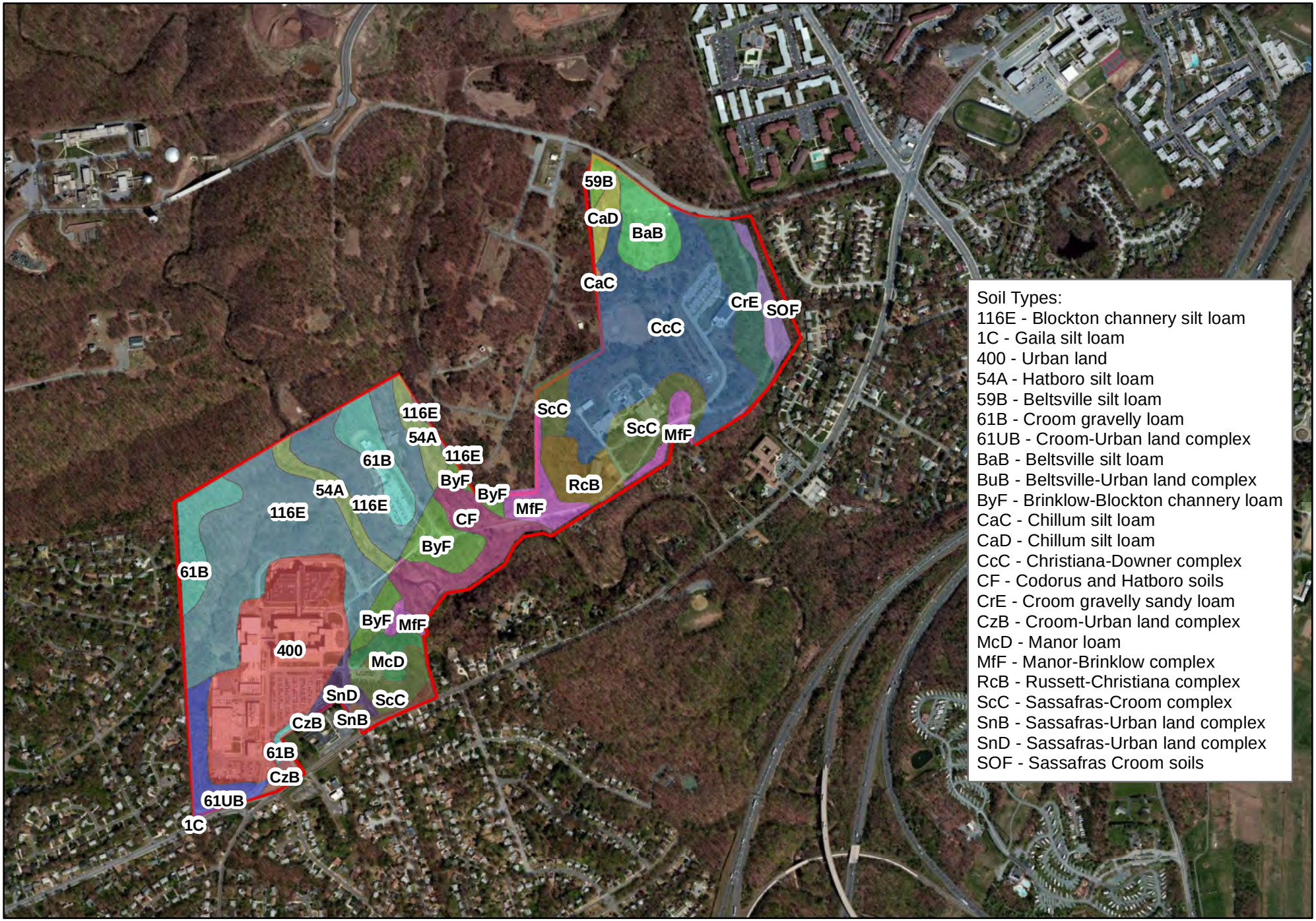
3.8 Soils and Topography

Soils

Twenty-three soil types are present at ALC and are presented in Table 5 and Figure 5. The Blocktown channery silt loam, Christiana-Downer complex, and Sassafras-Croom complex cover a majority of the facility. The Blocktown channery silt loam is found on the slopes along Paint Branch and a tributary, Hillandale Run, on the western portion of the facility and is a well-drained soil. The Christiana-Downer complex is found on the upland, flatter areas on the eastern portion of the site and is a moderately to well-drained soil. The Sassafras-Croom complex is found along 5-10% slopes in a few areas on ALC and are well-drained. Urban land also makes up a good portion of the soils on ALC. Generally, upland areas have deep, very permeable soils, which are moderately to somewhat excessively well-drained, and are subject to severe erosion. Soils on the intermediate elevations and slopes are generally shallower, overlying a dense fragipan, resulting in impeded internal drainage. Soils in the low areas along stream valleys are poorly drained, silty loams.

Table 5. Soil Types on ALC

Soil Key	Soil Type	County	Hydric
116E	Blocktown channery silt loam, 25-40% slopes, very rocky	Montgomery	Yes (5% of map unit)
1C	Gaila silt loam, 8-15% slopes	Montgomery	Yes (5% of map unit)
400	Urban land	Montgomery	



US Army Corps of Engineers
Baltimore District

Figure 5. Adelphi Laboratory Center
Soils
Montgomery and Prince George's Counties, MD

Sources: Aerial Photo, Bing Maps, 2010. Boundary, ALC, 2010. Soils, NRCS Soil Datamart, 2007 & 2009.

1 inch = 1,000 feet

0 375 750 1,500 2,250 3,000 Feet

N

Soil Key	Soil Type	County	Hydric
54A	Hatboro silt loam, 0-3% slopes, frequently flooded	Montgomery	Yes
59B	Beltsville silt loam, 3- 8% slopes	Montgomery	
61B	Croom gravelly loam, 3-8% slopes	Montgomery	
61UB	Croom-Urban land complex, 0-8% slopes	Montgomery	
BaB	Beltsville silt loam, 2- 5% slopes	Prince George's	Yes (5% of map unit)
BuB	Beltsville-Urban land complex, 0-5% slopes	Prince George's	Yes (5% of map unit)
ByF	Brinklow-Blockton channery loams, 25-65% slopes	Prince George's	
CaC	Chillum silt loam, 5-10% slopes	Prince George's	
CaD	Chillum silt loam, 10-15% slopes	Prince George's	
CcC	Christiana-Downer complex, 5-10% slopes	Prince George's	Yes (5% of map unit)
CF	Codorus and Hatboro soils, frequently flooded	Prince George's	Yes (40% of map unit)
CrE	Croom gravelly sandy loam, 15-25% slopes	Prince George's	
CzB	Croom-Urban land complex, 0-5% slopes	Prince George's	
McD	Manor loam, 15-25% slopes	Prince George's	
MfF	Manor-Brinklow complex, 25-65% slopes, very rocky	Prince George's	
RcB	Russett-Christiana complex, 2-5% slopes	Prince George's	Yes (5% of map unit)
ScC	Sassafras-Croom complex, 5-10% slopes	Prince George's	
SnB	Sassafras-Urban land complex, 0-5% slopes	Prince George's	
SnD	Sassafras-Urban land complex, 5-15% slopes	Prince George's	
SOF	Sassafras and Croom soils, 25-40% slopes	Prince George's	Yes (5% of map unit)

Source: USDA Soil Datamart, 2007 and 2009

Topography

The terrain at ALC is hilly, with numerous rock outcroppings, sloping generally towards the Paint Branch valley. Elevations range from 138 to 282 feet above mean sea level (MSL). The highest elevations on ALC are found in the 600 Area, reaching 282 feet above MSL and in the northwest and southwest corners of the Installation ranging from 274 to 278 feet above MSL. The lowest point on ALC is 138 feet above MSL, at Paint Branch where it flows off the installation at the southern boundary. Slopes found within ALC range from 2 to 40 percent and are steepest along the stream valleys. Figure 6 shows the USGS topographic quadrangle and Figure 7 shows the two-foot elevation contours at ALC.

3.9 Management Considerations

While the facility does not contain any federally- or state-listed threatened species, there is forested habitat that is considered Forest Interior Dwelling Bird habitat and should be protected. Paint Branch is classified as Class III – Natural Trout Waters by the State of Maryland and must be protected through a stream protective buffer. A stream protective buffer should be applied to Paint Branch and its tributaries on ALC, at a minimum of 200-feet in width. There are also wetlands scattered throughout ALC. These natural resources must be considered when planning for future construction activities, training and maintenance on the facility to avoid and minimize impacts.

Invasive species and pest management continue to enhance the natural ecosystems and should be continued according to the Invasive Species Management Plan (2017) and the Integrated Pest Management Plan (2020). Invasive species management is recommended within the maintained areas, to include regular mowing and manual removal to limit and prevent the spread of invasive species.

US Army Corps of Engineers
Baltimore District

Figure 6. Adelphi Laboratory Center
USGS Topographic Quadrangle
Montgomery and Prince George's Counties, MD
Sources: USA Topo Maps, 2011. Boundary, ALC, 2010.

1 inch = 1,000 feet

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US Army Corps of Engineers
Baltimore District

Figure 7. Adelphi Laboratory Center
Two-Foot Contour Map
Montgomery and Prince George's Counties, MD
Sources: Contours, MDNR, 2005. Boundary, ALC, 2010.

1 inch = 750 feet

0 375 750 1,500 2,250 3,000 Feet

N

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PHOTOS

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Photo 1: Southwest stormwater pond

Photo 2: Northern portion of Paint Branch

Photo 3: Cooper's hawk nest with two young fledglings

Photo 4: Juvenile American toad

Natural Resources Management Planning Level Survey

Blossom Point Research Facility
La Plata, Maryland

Submitted to:

Environmental Management Office
Adelphi Laboratory Center
Adelphi, Maryland 20783

Submitted by:

U.S. Army Corps of Engineers, Baltimore District
2 Hopkins Plaza
Baltimore, Maryland 21201

March 2021

Natural Resources Management Planning Level Survey

Blossom Point Research Facility
La Plata, Maryland

EXECUTIVE SUMMARY

Blossom Point Research Facility (BPRF) (Latitude 38 -24 -50"N, Longitude 77 5 -50"W) occupies 1,600 acres on Cedar Point Neck in southern Charles County, Maryland. BPRF is approximately 35 miles south of Washington, D.C. The closest town is La Plata, Maryland, which is approximately nine miles northeast of the facility. The Potomac River and Nanjemoy Creek border BPRF on three sides.

BPRF is a satellite installation of Adelphi Laboratory Center (ALC), which is now under the control of the U.S. Army Garrison Aberdeen Proving Ground (APG). Currently, BPRF serves as a test facility for fuses, explosive and pyrotechnic devices, and telemetry systems. These activities include optical (laser) testing and unmanned aerial vehicle (UAV; commonly referred to as drones) testing. In addition, the U.S. Naval Research Laboratory holds a lease permit for 291 acres for the Project Vanguard.

This Natural Resources Management Planning Level Survey (PLS) is intended to identify the biological resources of the installation and to address the potential impacts that installation activities may have on federal and/or state endangered and threatened species or any significant biological resource that may exist on the installation property. As part of the assessment procedure, the PLS included an investigation of not only the presence of threatened and endangered species, but also the evaluation of habitat to support these species.

The assessment methodology included contact with the U.S. Fish and Wildlife Service (USFWS), Maryland Department of Natural Resources (MDNR) and Maryland Natural Heritage Program (NHP) to request information regarding threatened and endangered plants and animal species that may be present on the Installation or adjacent properties.

Background information collection was primarily collected from a previous PLS (2011). Existing Geographic Information System data was used to begin the desktop reconnaissance of BPRF. Maps of the area were developed from several sources including: U.S. Geological Survey (USGS) Quadrangle, U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NCRS) Soil Data Mart, USFWS National Wetland Inventory Map and MDNR Wetlands map. Data from the Maryland Invasive Plant Council (MISC) was obtained to assist in the identification of invasive plant species that may exist on the installation property.

A field survey of BPRF was conducted from July 7-10 and August 5-7, 2020. All areas of the installation were subjected to pedestrian reconnaissance, with the exception of the testing range, and information was recorded to document dominant vegetation species, wetlands and stream areas, and wildlife habitat to facilitate preparation of the natural resource maps. All wildlife seen or heard was noted, as were wildlife signs such as nests, burrows, tracks and scat.

BPRF contains sensitive habitat to include wetlands, streams, shorelines, and forested areas and also consists of Maryland Critical Area. Management personnel of BPRF must consider these features and all natural resources when planning mission activities and any new development. Currently, testing activities are limited to the open field areas and do not impact these resources. Conservation of the Critical Area, wetlands and forested area provides for wildlife habitat, water quality protection, flora habitat, migratory bird habitat and Forest Interior Dwelling (FID) Bird habitat.

Invasive species and pest management continue to enhance the natural ecosystems and should be continued according to the Invasive Species Management Plan (2013) and Integrated Pest Management Plan (2020).

Natural Resources Management Planning Level Survey

Blossom Point Research Facility
La Plata, Maryland

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FIGURES

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Natural Resources Management Planning Level Survey

Blossom Point Research Facility
La Plata, Maryland

1.0 INTRODUCTION

Blossom Point Research Facility (BPRF) (Latitude 38 -24 -50"N, Longitude 77 5 -50"W) occupies 1,600 acres on Cedar Point Neck in southern Charles County, Maryland (Figure 1). BPRF is approximately 35 miles south of Washington, D.C. The closest town is La Plata, Maryland, which is approximately nine miles northeast of the facility. The Potomac River and Nanjemoy Creek border BPRF on three sides.

BPRF is a satellite installation of Adelphi Laboratory Center (ALC), which is now under the control of the U.S. Army Garrison Aberdeen Proving Ground (APG). Currently, BPRF serves as a test facility for fuses, explosive and pyrotechnic devices, and telemetry systems. These activities include optical (laser) testing and unmanned aerial vehicle (UAV; commonly referred to as drones) testing. In addition, the U.S. Naval Research Laboratory (NRL) holds a lease permit for 291 acres for the Project Vanguard.

Prior to being acquired by the Army, the site was owned by the Corporation of Roman Catholic Clergymen of Maryland. In November 1942, the National Bureau of Standards (NBS) leased the southern portion of Cedar Point Neck from the Catholic Church for fuse and ordnance testing. This activity was transferred from the NBS to the Department of the Army (DA) in 1953. In June 1980, the DA bought the land from the Catholic Church.

This Natural Resource Management Planning Level Survey (PLS) is intended to identify the biological resources of the installation and to address the potential impacts that installation activities may have on federal and/or state endangered and threatened species or any significant biological resource that may exist on the installation property. As part of the assessment procedure, the PLS included an investigation of not only the presence of threatened and endangered species, but also the evaluation of habitat to support these species.

2.0 METHODS

2.1 Background Information Search

Background information was collected from a variety of sources to prepare this PLS. Contact was initiated with the U.S. Fish and Wildlife Service (USFWS) and Maryland Department of Natural Resources (MDNR) to request information regarding threatened and endangered plant and animal species that may be present on the Installation or adjacent properties. Existing reports, existing Geographic Information System (GIS) data from BPRF and the 2011 PLS were reviewed. Data was collected from several sources including: U.S. Geological Survey (USGS), Topographic Quadrangle, U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NCRS) Soil Data Mart, USFWS National Wetland Inventory (NWI) Map and MDNR wetlands mapping. Data from the Maryland Invasive Species Council (MISC) was obtained to assist in the identification of invasive plant species that may exist on the installation property.

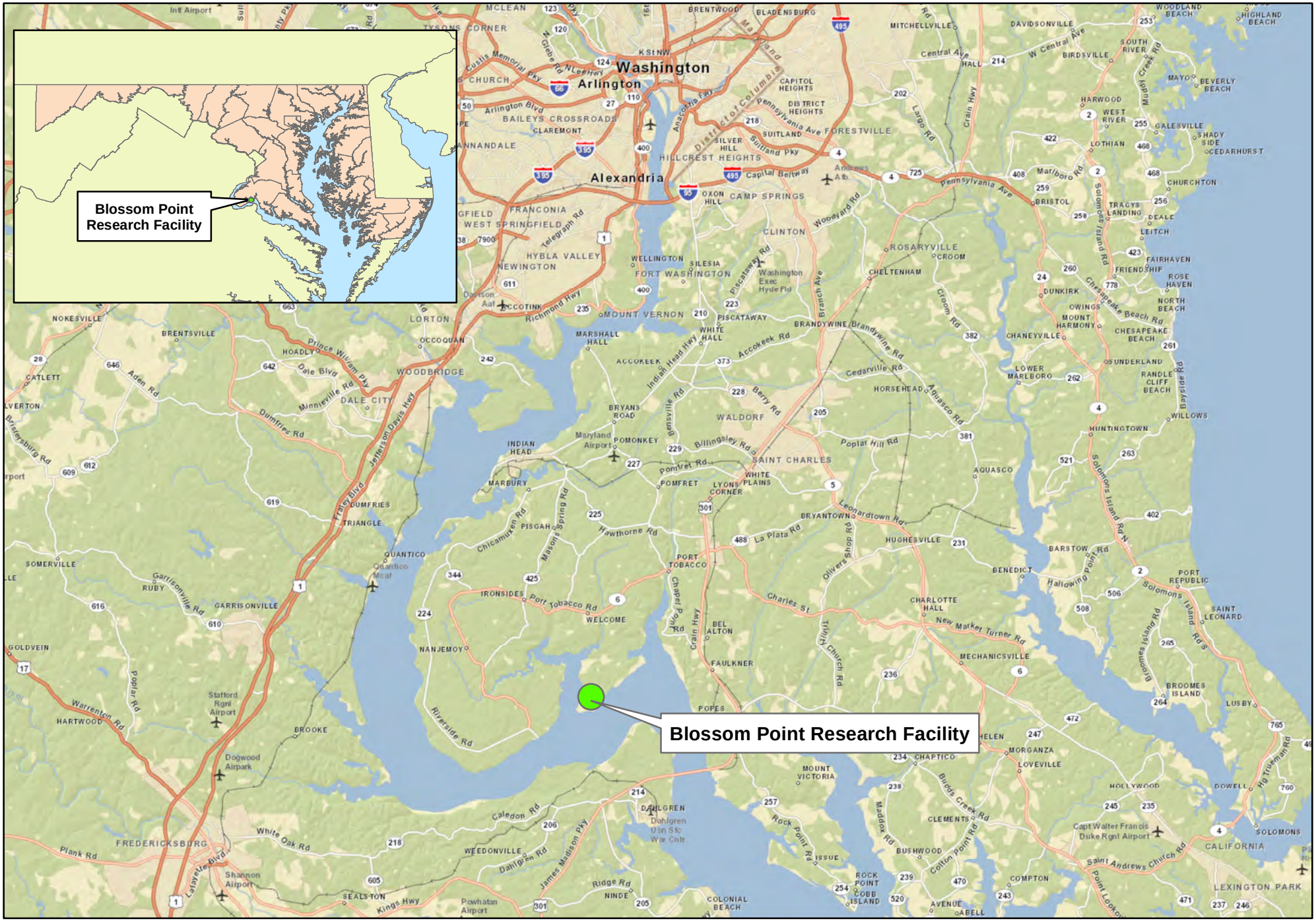


Figure 1. Blossom Point Research Facility Location
Charles County, MD

US Army Corps of Engineers
Baltimore District

2.2 Field Surveys

A field survey of BPRF was conducted from July 7-10 and August 5-7, 2020. All areas of the installation were subjected to pedestrian reconnaissance, with the exception of the testing range, and information was recorded to document dominant vegetation species, wetlands and stream areas, and wildlife habitat to facilitate preparation of the natural resource maps. All wildlife seen or heard was noted, as were wildlife signs such as nests, burrows, tracks and scat.

3.0 RESULTS AND DISCUSSION

3.1 Site Description

BPRF largely consists of wetland and forested areas. Overall, the installation contains 14.7 acres of improved lands, 680.9 acres of semi-improved grounds, and 903.4 acres of unimproved lands. The installation includes 22,172 square feet of building area over the 1,600 acre site. The primary land use category at BPRF is industrial. This classification results from its status as a test facility. Secondary land use categories include administration, explosives storage, NRL forested buffer area, NRL facilities, maintenance, and research, development, and testing areas. BPRF includes a Coastal Zone Management Area and is surrounded by the Potomac River and Nanjemoy Creek on three sides.

3.2 Vegetative Cover Types

There are two main plant communities present on the installation: forested/forest wetland and maintained area. The remaining acreage is emergent wetland or has been developed and includes buildings, paved or graveled parking areas and sidewalks. A habitat map is presented as Figure 2. Table 1 identifies the plants species observed across BPRF during both the 2011 and 2020 PLSs.

Forested/Forested Wetland Area

Much of BPRF is forested, containing both upland forests and wetland forests. The vegetation within the forested areas consist of hardwood, hardwood-pine, and planted pines. Dominant trees in the upland forests include Virginia pine (*Pinus virginiana*), white oak (*Quercus alba*), northern red oak (*Quercus rubra*), black oak (*Quercus velutina*), willow oak (*Quercus phellos*), persimmon (*Diospyros virginiana*), and hickory (*Carya spp*.). Species dominating the shrub layer include saplings such as American holly (*Ilex opaca*), eastern red cedar (*Juniperus virginiana*), mountain laurel (*Kalmia latifolia*), and wax myrtle (*Myrica cerifera*).

BPRF recently implemented forest management techniques to improve the understory of several forests stands. American holly, Virginia Pine, and sweetgum (*Liquidambar styraciflua*) with a diameter breast height (dbh) of five inches or less were removed from parts of stands. Dead and/or leaning trees were also removed from stands. In addition, several key invasive species including Japanese stiltgrass (*Microstegium vimineum*) and tree of heaven (*Ailanthus altissima*) were targeted. The understory of these stands appears to be significantly improved and with maintenance, should give way to higher regeneration rates of native saplings and trees.

Figure 2. Blossom Point Research Facility
Habitat Areas
Charles County, MD

Sources: World Imagery. Boundary, ALC, 2010. Critical Area, ALC, 2010. Wetlands, USACE, 2020.

1:24,000

0 500 1,000 2,000 3,000 4,000 Feet

N

Forested wetlands on BPRF are dominated by red maple (*Acer rubrum*), black gum (*Nyssa sylvatica*), and sweetgum. The shrub layer contains American holly and highbush blueberry (*Vaccinium corymbosum*). Herbaceous species include common cattail (*Typha latifolia*), sedges (*Carex* sp.), soft rush (*Juncus effusus*), and marsh pepper (*Polygonum* sp.). Within wetlands along the Potomac River, common reed and saltmeadow cordgrass (*Spartina patens*) are common. See Table 1 for a complete list of observed species.

Maintained Area

The maintained, landscaped areas are located generally around developed areas, such as buildings, roads and parking lots, and test areas. These areas generally consist of common grasses and ornamental plants. Common herbaceous species observed on BPRF include: Japanese stiltgrass (*Microstegium vimineum*), barnyardgrass (*Echinochloa crus-galli*), common ladyfern (*Athyrium filix-femina*), bluestem broomsedge (*Andropogon virginicus*), Bermuda grass (*Cynodon dactylon*), redtop grass (*Agrostis gigantea*), wingstem (*Verbesina alternifolia*), roundleaf greenbrier (*Smilax rotundifolia*) and summer grape (*Vitis aestivalis*). See Table 1 for a complete list of observed species.

Table 1. Plant Species Observed on BPRF

Common Name	*Scientific Name*
Trees	
American Beech	*Fagus grandifolia*
American Elm	*Ulmus americana*
American Holly	*Ilex opaca*
Black Cherry	*Prunus serotina*
Black Gum	*Nyssa sylvatica*
Black Locust	*Robinia pseudoacacia*
Black Oak	*Quercus velutina*
Black Walnut	*Juglans niagra*
Chestnut Oak	*Quercus prinus*
Devils Walking Stick*	*Aralia spinosa*
Hackberry	*Celtis occidentalis*
Loblolly Pine	*Pinus taeda*
Mockernut Hickory	*Carya tomentosa*
Mountain Laurel	*Kalmia latifolia*
Musclewood	*Carpinus caroliniana*
Northern Red Oak	*Quercus rubra*
Osage Orange	*Naclura pomifera*
Paradise Tree**	*Simarouba glauca*
Persimmon	*Diospyros virginiana*
Pin Oak	*Quercus palustris*
Possumhaw	*Viburnum nudum*
Post Oak	*Quercus stellata*
Princess Tree*	*Paulownia tamentosa*
Red Cedar	*Juniperus virginiana*

Common Name	*Scientific Name*
Trees	
Red Maple	*Acer rubrum*
Southern Red Oak	*Quercus falcata*
Sassafras	*Sassafras albidum*
Shagbark Hickory	*Carya laciniosa*
Sweetgum	*Liquidambar styraciflua*
Sycamore	*Platanus occidentalis*
Tree-of-Heaven**	*Ailanthus altissima*
Tulip Poplar	*Liriodendron tulipifera*
Virginia Pine	*Pinus virginiana*
Wax Myrtle	*Morella cerifera*
White Oak	*Quercus alba*
Willow Oak	*Quercus phellos*
Shrubs	
Allegheny Blackberry	*Rubus allegheniensis*
Autumn Olive*	*Elaeagnus umbellata*
Flowering Dogwood	*Cornus florida*
Highbush Blueberry	*Vaccinium corymbosum*
Japanese Barberry*	*Berberis thunbergii*
Lowbush Blueberry	*Vaccinium angustifolium*
Multiflora Rose*	*Rosa multiflora*
Strawberry Bush	*Euonymus americana*
Wineberry*/**	*Rubus phoenicolasius*
Herbaceous	
Allegheny Monkeyflower	*Mimulus ringens*
American Water Horehound	*Lycopus americanus*
American Water Plaintain	*Alisma subcordatum*
Arrow Arum	*Peltandra virginica*
Barnyard Grass	*Echinochloa crus-galli*
Bedstraw	*Galium mollugo*
Bermuda Grass	*Cynodon dactylon*
Blunt Spike Rush	*Eleocharis ovata obtusa*
Broadleaf Cattail	*Typha latifolia*
Broom Sedge	*Carex scoparia*
Broomsedge	*Andropogon virginicus*
Bush Clover	*Lespedeza virginica*
Bushy Bluestem	*Andropogon glomeratus*
Canada Goldenrod	*Solidago canadensis*
Canada Thistle*	*Cirsium arvense*
Christmas Fern	*Polystichum acrostichoides*
Cinnamon Fern	*Osmunda cinnamomea*
Common Reed*	*Phragmites australis*
Deer-tongue Grass	*Dichanthelium clandestinum*
Duckweed	*Lemna minor*

Common Name	*Scientific Name*
Herbaceous	
Eastern Gamagrass	*Tripsacum dactyloides*
False Nettle	*Boehmeria cylindrica*
Fox Sedge	*Carex crus-corvi*
Frank's Sedge	*Carex frankii*
Grass Rush	*Juncus marginatus*
Ground Pine	*Diphasiastrum digitatum*
Gypsum Weed	*Datura stramonium*
Hog Peanut	*Amphicarpaea bracteata*
Hop Sedge	*Carex lupulina*
Horsenettle	*Solanum carolinense*
Humped Bladderwort	*Utricularia gibba*
Japanese Honeysuckle*	*Lonicera japonica*
Japanese Stiltgrass*	*Microstegium vimineum*
Lady Fern	*Anthyrium filix-femina*
Lizard's Tail	*Saururus cernuus*
Marsh St. John's	*Hypericum virginicum*
Maryland Meadowbeauty	*Rhexia mariana*
Mint species	*Mentha* sp.
Narrow Leaf Cattail	*Typha angustifolia*
Partridgeberry	*Mitchella repens*
Poison Ivy	*Toxicodendron radicans*
Queen Anne's Lace	*Daucus carota*
Redtop Grass	*Agrostis gigantea*
Rice Cutgrass	*Leersia oryzoides*
Rough Barnyardgrass	*Echinochloa muricata*
Royal Fern	*Osmunda regalis*
Saltmeadow Cordgrass	*Spartina patens*
Sensitive Fern	*Onoclea sensibilis*
Shining Panic Grass	*Dichanthelium dichotomum*
Slender Crown Grass	*Paspalum setaceum*
Slender Lady Tresses	*Spiranthes lacera*
Slender Woodoats	*Chasmanthium laxum*
Soft Rush	*Juncus effusus*
Spikerush	*Eleocharis palustris*
Strawcolored Flatsedge	*Cyperus strigosus*
Swamp Rose Mallow	*Hibiscus moscheutos*
Threeway Sedge	*Dulichium arundinaceum*
Tickseed Sunflower	*Bidens polylepis*
Violet species	*Viola* sp.
Virginia Chain Fern	*Woodwardia virginica*
Water Hemlock	*Cicuta douglasii*
Water Lily	*Nymphaea odorata*
Wingstem	*Verbesina alternifolia*

Common Name	*Scientific Name*
Herbaceous	
Wool Grass	*Scirpus cyperinus*
Vines	
Roundleaf Greenbrier	*Smilax rotundifolia*
Summer Grape	*Vitis aestivalis*
Trumpet Creeper	*Campsis radicans*
Virginia Creeper	*Parthenocissus quinquefolia*

*Invasive species
**New species observed only in 2020

3.3 Surface Waters and Wetlands

BPRF is located on the north bank of the Potomac River and the east side of the mouth of Nanjemoy Creek. The Potomac River bounds the south and eastern sides of BPRF while Nanjemoy Creek borders its western side. Kings Creek and Port Tobacco River are located northwest and northeast of the installation, respectively.

The interior of BPRF is dissected by several short streams and drainage-ways, most of which are subject to tidal influences, that drain the upstream farmlands and BPRF. Associated with the streams are small pockets of open water. The largest of these covers several acres near the eastern shore of the facility, Wetland BPRF-1. The pools tend to be shallow and slightly brackish.

There are 25 wetlands located on BPRF, amounting to approximately 263 acres (Figure 3). Most of these wetlands are estuarine emergent wetlands, palustrine forested, estuarine scrub-shrub and palustrine scrub-shrub wetlands. Dominant wetland vegetation includes common cattail, sedges (*Carex* spp. and *Cyperus* spp.), and common reed in marshes, while highbush blueberry, red maple, American holly and sweetgum are dominant in forested wetlands.

3.4 Floodplain

The 100-year flood elevation for BPRF is nine feet above mean sea level (MSL). Substantial portions of the undeveloped areas on the installation lie below the 100-year elevation (Figure 4). Overall, the 100-year floodplain encompasses approximately 388 acres of BPRF. The high tide elevation is one foot MSL.

3.5 Critical Area

Maryland has established the Critical Area Act where a Critical Area is defined as “all land within 1,000 feet of the mean high water line of tidal waters, or the landward edge of tidal wetlands and all waters of and lands under the Chesapeake Bay and Atlantic Coastal Bays and tributaries.” The Critical Area Act establishes the Chesapeake Bay Critical Area and Atlantic Coastal Bays Critical Area Protection Programs and the Critical Area Commission to enable the State and local governments to jointly address the impacts of land development on habitat and aquatic resources.

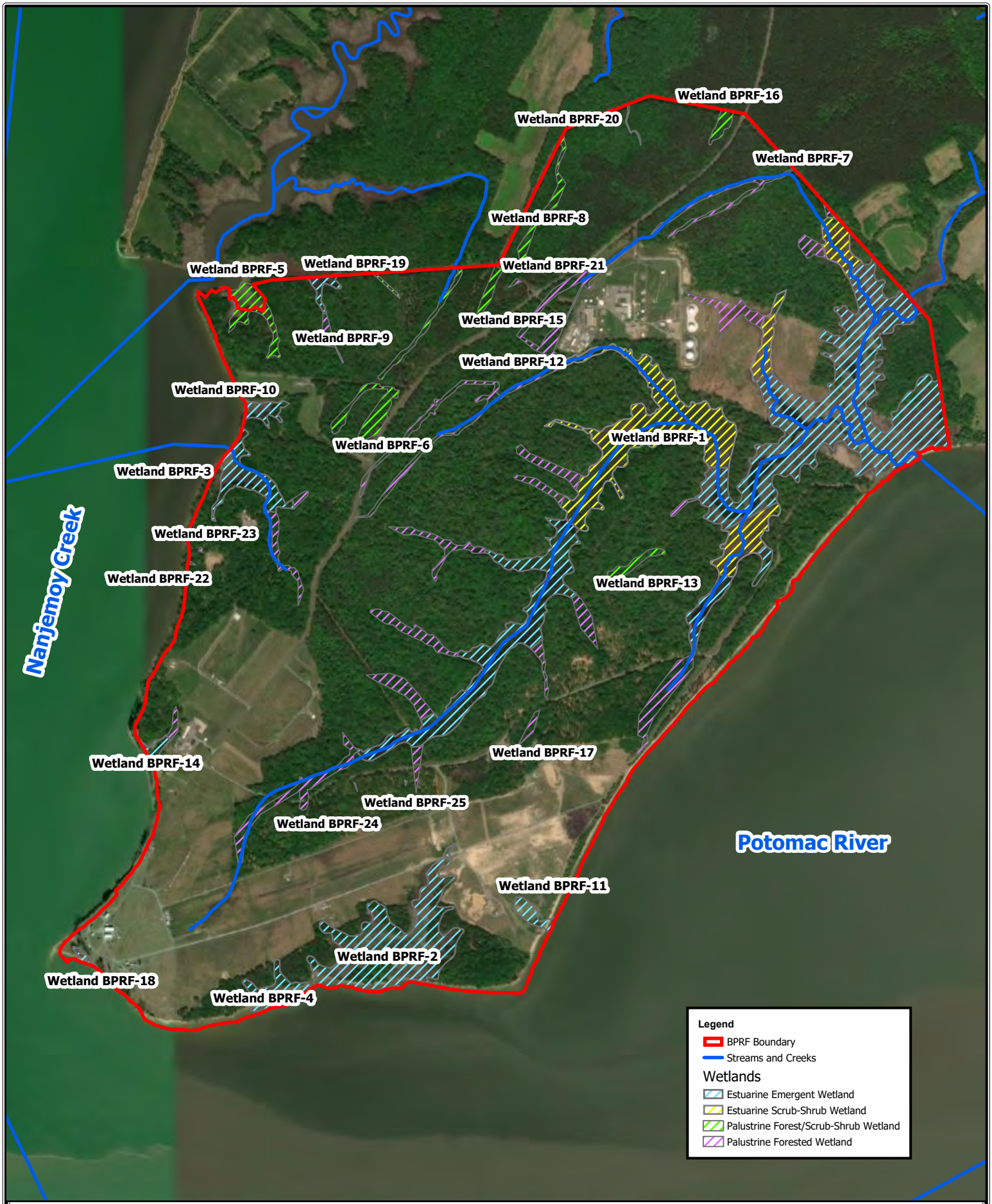


Figure 3. Blossom Point Research Facility
Wetlands and Streams
Charles County, MD

1:18,000

0 375 750 1,500 2,250 3,000 Feet

Sources: World Imagery. Boundary, ALC, 2010. Critical Area, ALC, 2010. Wetlands, USACE, 2020.

Figure 4. Blossom Point Research Facility
Floodplains
Charles County, MD

1:18,000
0 375 750 1,500 2,250 3,000 Feet

Sources: World Imagery. Boundary, ALC, 2010. Critical Area, ALC, 2010. Wetlands, USACE, 2020.

The goals of the Critical Area Protection Programs are to:

- Minimize adverse impacts on water quality that result from pollutants that are discharged from structures or conveyances or that have run off from surrounding lands;
- Conserve fish, wildlife, and plant habitat in the Critical Area; and
- Establish land use policies for development in the Critical Area that accommodate growth and also address the fact that, even if pollution is controlled, the number, movement, and activities of persons in the Critical Area can create adverse environmental impacts.

The Critical Area Commission devised a set of criteria to minimize the adverse effects of human activities on water quality and natural habitats and foster consistent, uniform and more sensitive development activity within the Critical Area. Much of BPRF is within the Critical Area. Several wetlands and streams, forest habitat and shorelines are within the Critical Area (Figure 5). The western most critical area is highly eroded along the shoreline.

Table 2. Wetlands on BPRF

Wetland Name	Previous Wetland Name	Wetland Class	Acres
Wetland BPRF-1	Adel 23	Estuarine Emergent Wetland	188.065
Wetland BPRF-2	Adel 3	Estuarine Emergent Wetland	30.424
Wetland BPRF-3	Adel 18	Estuarine Emergent Wetland	9.291
Wetland BPRF-4	Adel 4	Estuarine Emergent Wetland	4.838
Wetland BPRF-5	Adel 1	Palustrine Forest/Scrub-Shrub Wetland	4.729
Wetland BPRF-6	Adel 16	Palustrine Forest/Scrub-Shrub Wetland	4.433
Wetland BPRF-7	Adel 10	Palustrine Forest/Scrub-Shrub Wetland	2.693
Wetland BPRF-8	Wet 45	Palustrine Forest/Scrub-Shrub Wetland	2.573
Wetland BPRF-9	Adel 20	Estuarine Emergent Wetland	2.385
Wetland BPRF-10	Adel 19	Estuarine Emergent Wetland	2.104
Wetland BPRF-11	Adel 2	Estuarine Emergent Wetland	1.965
Wetland BPRF-12	Adel 15	Palustrine Forest/Scrub-Shrub Wetland	1.813
Wetland BPRF-13	Adel 8	Palustrine Forest/Scrub-Shrub Wetland	1.687
Wetland BPRF-14	Adel 5	Estuarine Emergent Wetland	1.661
Wetland BPRF-15	Adel 12	Palustrine Forest/Scrub-Shrub Wetland	1.405
Wetland BPRF-16	Adel 9	Palustrine Forest/Scrub-Shrub Wetland	1.298
Wetland BPRF-17	Wet 12	Palustrine Forested Wetland	0.677
Wetland BPRF-18	Adel 21	Estuarine Emergent Wetland	0.581
Wetland BPRF-19	Wet 48	Palustrine Forest/Scrub-Shrub Wetland	0.292
Wetland BPRF-20	Wet 44	Palustrine Forest/Scrub-Shrub Wetland	0.200
Wetland BPRF-21	Wet 47	Palustrine Forested Wetland	0.129
Wetland BPRF-22	Wet 63	Palustrine Forested Wetland	0.056
Wetland BPRF-23	Wet 62	Palustrine Forested Wetland	0.041

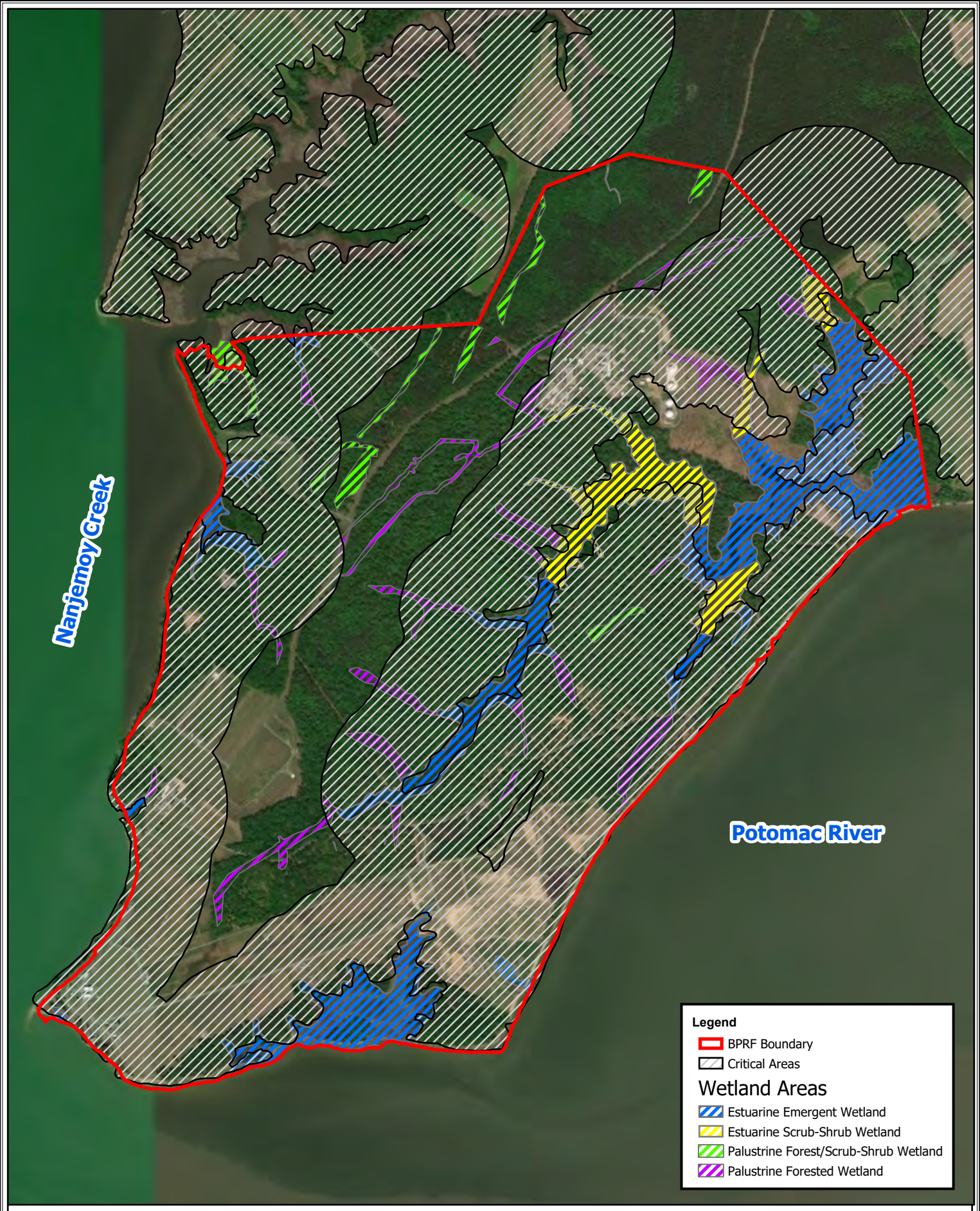


Figure 5. Blossom Point Research Facility
Critical Area
Charles County, MD

Sources: World Imagery. Boundary, ALC, 2010. Critical Area, ALC, 2010. Wetlands, USACE, 2020.

Wetland Name	Previous Wetland Name	Wetland Class	Acres
Wetland BPRF-24	Wet 10	Palustrine Forested Wetland	0.026
Wetland BPRF-25	Wet 11	Palustrine Forested Wetland	0.025
		TOTAL WETLAND ACREAGE	**263.390**

3.6 Wildlife

The wildlife species observed on the installation and adjacent area are representative and typical for forested, wetland and aquatic, and maintained lawn areas. The presence of the chain-link fence around the perimeter of the property and the water surrounding the facility on three sides tends to restrict entry by larger animals. The following sections of the report present the common species and assess the potential for federally- and state-listed plant and animal species. Table 3 identifies the wildlife species observed across BPRF during the 2011 and 2020 PLSs along with the 2018 avian and herpetological surveys.

Amphibians and Reptiles

A box turtle (*Terrapene ornate*), green frog (*Lithobates clamitans*), common eastern toad (*Bufo americanus*), Fowler's toad (*Bufo [Anaxyrus] fowleriand*), and worm snake (*Carphophis amoenus*) were observed during the 2020 PLS. Box turtles are common on the facility. A spotted turtle (*Clemmys guttata*) was observed on BPRF during the 2011 and 2020 PLSs (Table 3). The many wetlands, streams and surrounding water bodies on BPRF provide adequate habitat for these amphibian and reptile species. Beaches on-site may provide terrapin and horseshoe crab spawning habitat, according to MDNR.

Twenty-five species of amphibians and reptiles were observed on BPRF during the 2018 survey, including three species of salamander, one species of newt, eight species of frogs and toads, four turtle species, six snake species and three species of lizard (Table 3).

Birds

The bird species that were observed during the 2020 PLS included bald eagle (*Haliaeetus leucocephalus*), downy woodpecker (*Picoides pubescens*), great blue heron (*Ardea herodias*), osprey (*Pandion haliaetus*), and black vultures (*Coragyps atratus*). All of the species observed are typical for this area. The forested areas, wetlands and streams provide habitat for FID Birds and other common bird species that may not have been observed at the time of the 2020 PLS. The waterfront adjacent to BPRF is a waterfowl concentration and staging area, according to MDNR.

A total of 94 species were observed at BPRF during the 2018 Avian Survey (Table 3).

Mammals

The only mammal observed during the 2020 PLS was a red fox (*Vulpes vulpes*). It is likely that common small mammals could be found on BPRF, though access may be restricted due to the fenceline and the site is mostly surrounded by water.

Fish and Aquatic Species

MDNR noted that the Potomac River in this area is pristine habitat for largemouth bass (*Micropterus salmoides*) as well as spawning habitat for striped bass (*Morone saxatilis*) and anadromous fish species. The Atlantic sturgeon (*Acipenser oxyrinchus*), a potentially federally-protected species, may also use this area for spawning. Natural oyster bars are also found near BPRF.

Table 3. Fauna Observed on BPRF

Common Name	*Scientific Name*
Amphibians and Reptiles	
Black Racer	*Coluber constrictor*
Blackrat Snake	*Pantherophis obsoletus*
Bluetail Skink	*Cryptoblepharus egeriae*
Box Turtle	*Terrapene ornata*
Broad-headed Skink**	*Plestiodon laticeps*
Bull Frog**	*Lithobates catesbeiana*
Common Eastern Toad	*Bufo americanus*
Eastern American Toad**	*Anaxyrus americanus*
Eastern Black Rat Snake	*Pantherophis alleghaniensis*
Eastern Box Turtle	*Hemidactylium scutatum*
Eastern Garter Snake**	*Thamnophis sirtalis*
Eastern Hog-nosed Snake	*Heterodon platirhinos*
Eastern Mud Turtle**	*Kinosternon subrubrum*
Five-lined Skink**	*Plestiodon fasciatus*
Fowlers Toad	*Bufo [Anaxyrus] fowleriand*
Gray Treefrog**	*Hyla versicolor*
Green Frog	*Lithobates clamitans*
Little Brown Skink**	*Scincella lateralis*
Marbled Salamander**	*Ambystoma opacum*
Northern Cricket Frog**	*Acris crepitans*
Northern Water Snake**	*Nerodia sipedon*
Painted Turtle**	*Chrysemys picta*
Red-spotted Newt (Red Eft)**	*Notophthalmus viridescen*
Southern Leopard Frog**	*Lithobates sphenocephalus*
Spotted Salamander**	*Ambystoma maculatum*
Spotted Turtle	*Clemmys guttata*
Spring Peeper**	*Pseudacris crucifer*
Worm Snake	*Carphophis amoenus*
Birds	
American Goldfinch**	*Spinus tristis*
American Redstar	*Setophaga ruticilla*
Bald Eagle	*Haliaeetus leucocephalus*
Baltimore Oriole**	*Icterus galbula*

Common Name	*Scientific Name*
Birds	
Black-and-white Warbler	*Mniotilta varia*
Blackpoll Warbler**	*Setophaga striata*
Black-throated green Warbler**	*Setophaga virens*
Brown Thrasher	*Toxostoma rufum*
Brown-headed Cowbird	*Molothrus ater*
Bufflehead**	*Bucephala albeola*
Canada Goose**	*Branta canadensis*
Cedar Waxwing	*Bombycilla cedrorum*
Chipping Sparrow	*Spizella passerina*
Common Grackle	*Quiscalus quiscula*
Common Yellowthroat**	*Geothlypis trichas*
Dark-eyed Junco	*Junco hyemalis*
Double-crested Cormorant**	*Phalacrocorax auritus*
Eastern Meadowlark**	*Sturnella magna*
Eastern Towhee	*Pipilo erythrophthalmus*
European Starling	*Sturnus vulgaris*
Golden-crowned Kinglet**	*Regulus satrapa*
Golden-winged Warbler**	*Vermivora chrysoptera*
Grasshopper Sparrow**	*Ammodramus savannarum*
Gray Catbird	*Dumetella carolinensis*
Great Blue Heron**	*Ardea herodias*
Indigo Bunting**	*Passerina cyanea*
Lesser Scaup**	*Aythya affinis*
Long-tailed Duck**	*Clangula hyemalis*
Mallard**	*Aix sponsa*
Northern Cardinal	*Cardinalis cardinalis*
Northern Mockingbird	*Mimus polyglotis*
Northern Parula**	*Parula Americana*
Orchard Oriole**	*Icterus spurius*
Ovenbird**	*Seiurus aurocapillus*
Pine Warbler**	*Setophaga pinus*
Prothonotary Warbler**	*Protonotaria citrea*
Red-breasted Nuthatch	*Sitta canadensis*
Red-winged Blackbird	*Agelaius phoenicius*
Ruby-crowned Kinglet**	*Regulus calendula*
Ruddy Duck**	*Oxyura jamaicensis*
Scarlet Tanager	*Piranga olivacea*
Song Sparrow	*Melospiza melodia*
Summer Tanager	*Piranga rubra*
Swainson’s Thrush	*Catharus ustulatus*
White-throated Sparrow**	*Zonotrichia albicollis*
Wood Duck	*Aix sponsa*
Yellow Warbler**	*Setophaga petechia*

Common Name	*Scientific Name*
Birds	
Yellow-rumped Warbler**	*Setophaga coronata*
Yellow-throated Warbler**	*Setophaga dominica*
Mammals	
Red Fox	*Vulpes vulpes*
White-tailed Deer*	*Odocoileus virgianus*

*Observed during 2011 Planning Level Survey
**Observed only in 2018 Avian and Herpetological Surveys

3.7 Threatened and Endangered Species

USFWS and MDNR were contacted for information regarding threatened and endangered species and significant habitats on or in the vicinity of the installation. The response correspondence received from these agencies is presented in Appendix J of this INRMP.

Federally-Listed Species

The response letter from the USFWS stated that there are no Federally-listed species on BPRF. Please see Appendix C of this INRMP for the response letter.

The USFWS did note that there is habitat for the Bald Eagle at BPRF, which is protected under the Bald and Golden Eagle Protection Act, Lacey Act and the Migratory Bird Treaty Act. As a result, starting on August 8, 2007, if your project may cause "disturbance" to the bald eagle, please consult the "National Bald Eagle Management Guidelines" dated May 2007. The locations of Bald Eagle nest areas are depicted on Figure 6.

A herptofaunal survey in 2011 targeted the State-endangered rainbow snake. The rainbow snake is a highly aquatic species, preferring swamps, marshes, and slow-moving streams and can tolerate brackish water. The rainbow snake can also be found on dry land, burrowing in moist soil, muck or a sandy substrate. While habitat exists on BPRF for this species, none were observed during the field survey.

An acoustic bat survey with focus on the NLEB was conducted at BPRF during the summers of 2016 and 2019. The NLEB was recorded at one sample site on BPRF during the 2016 surveys; however no NLEB were detected during the 2019 surveys.

This area of the Potomac River may provide habitat for spawning for the Atlantic sturgeon, a potentially federally protected species. Activities on BPRF are to avoid impact to the in-river habitat; any disturbance to in-river habitat should be both seasonal and minimized. Generally, no instream work likely to result in suspended sediments within the water column is allowed in this area of the Potomac River between 15 February and 15 June, inclusive, of any year.

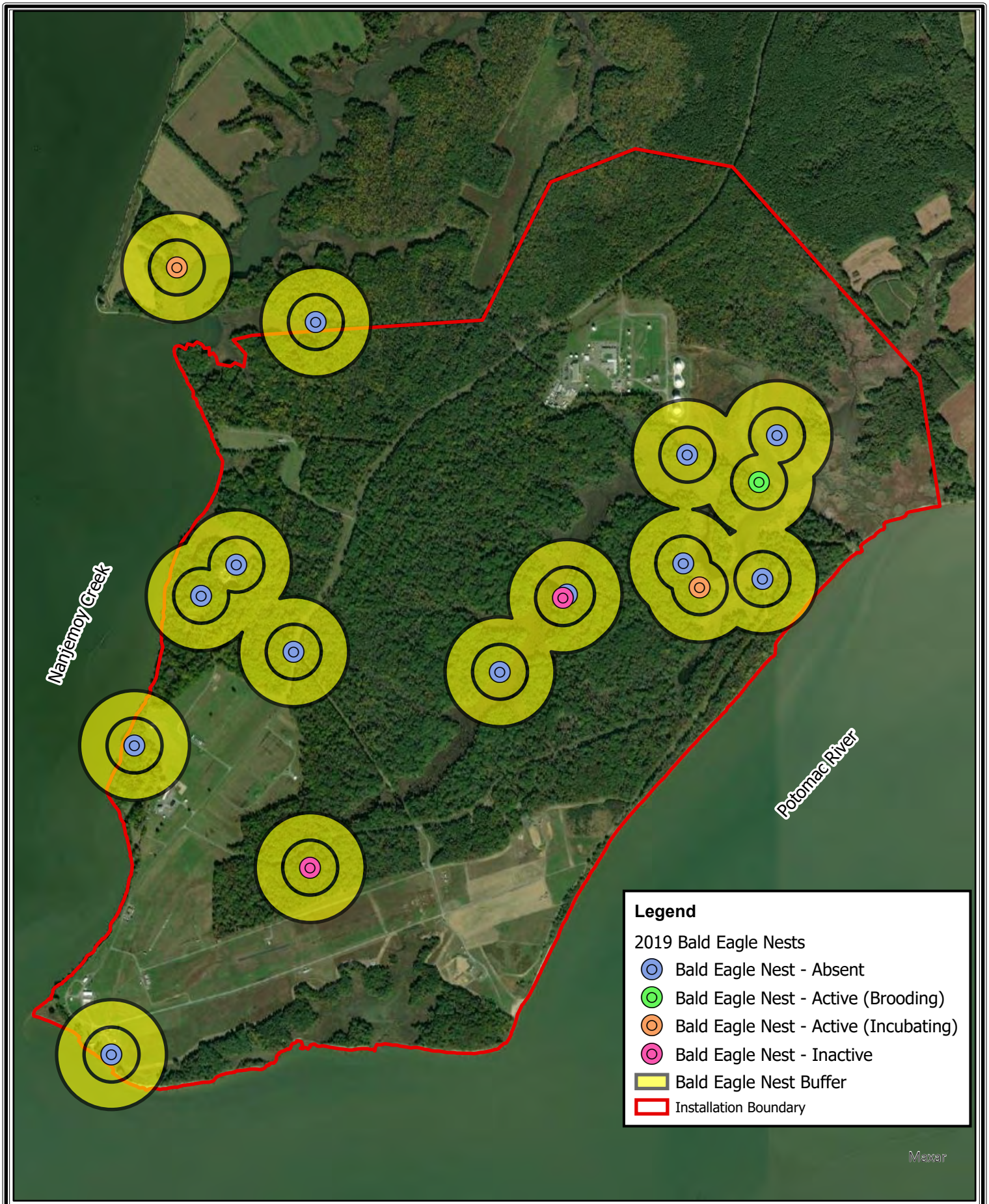


Figure 6. Bald Eagle Nests on Blossom Point Research Facility Charles County, MD

Sources: Aerial Photo, ESRI World Energy, 2020. Boundary, ALC, 2010. Nests, ALC, 2013.

Habitat for the small whorled pogonia (*Isotria medeloides*) exists on BPRF, though this plant is believed to be extirpated from the State of Maryland. The small whorled pogonia habitat is deciduous or deciduous-coniferous forest with light to moderate leaf litter, an open herb layer (occasionally dense ferns), moderate to light shrub layer, and relatively open canopy. This plant has not been observed on BPRF.

State-Listed Species

MDNR listed no federally- or state- listed species on BPRF in their response letter dated September 15, 2020 (Appendix J). Several habitats of concern were noted, however, to include waterfowl habitat and FID Bird habitat. Habitat for the rainbow snake is present on BPRF. Surveys for the presence of the rainbow snake took place during a herptofaunal survey in 2011; however, no rainbow snakes were observed.

Eight species of birds were recorded at BPRF during the 2018 avian surveys, which are state-listed as rare (S2), state watchlist (S3), or state watchlist for breeding (S3B) and/or historically breeding in the state (SHB). This included the bald eagle (*Haliaeetus leucocephalus*) (S3), least flycatcher (*Empidonax minimus*) (S3), brown creeper (S3), red-breasted nuthatch (*Sitta canadensis*) (S3B), golden-crowned kinglet (*Regulus satrapa*) (S3B), Swainson's thrush (*Catharus ustulatus*) (SHB), golden-winged warbler (*Vermivora chrysoptera*) (S2), and dark-eyed junco (S3B).

3.8 Invasive Species

Invasive plants that were observed on the installation during the 2020 PLS include, but are not limited to, multiflora rose (*Rosa multiflora*), Japanese honeysuckle (*Lonicera japonica*), autumn olive (*Elaeagnus umbellata*), Japanese barberry (*Berberis thunbergii*), Canada thistle (*Cirsium arvense*), Japanese stiltgrass, and common reed (*Phragmites australis*).

3.9 Soils and Topography

Soils

Fifteen soil series are present at BPRF (Figure 7, Table 4). The soils are generally poorly to moderately well drained and range in texture from fine sand to silty loams and clay to coarse sands and gravels. The majority of the soils found on BPRF are Annemessex silt loam (0-2% slopes), Lenni and Quindocqua soils (0-2% slopes), Liverpool-Piccowaxen complex (5-15% slopes), and Nanticoke and Mannington soils. All of these more dominant soil types are considered hydric soils except for the Liverpool-Piccowaxen complex, which is moderately well drained.

Table 4. Soil Types on BPRF

Soil Key	Soil Type	Hydric
AsA	Annemessex silt loam, 0-2% slopes	Yes (15% of map unit)
AsB	Annemessex silt loam, 2-5% slopes	Yes (10% of map unit)

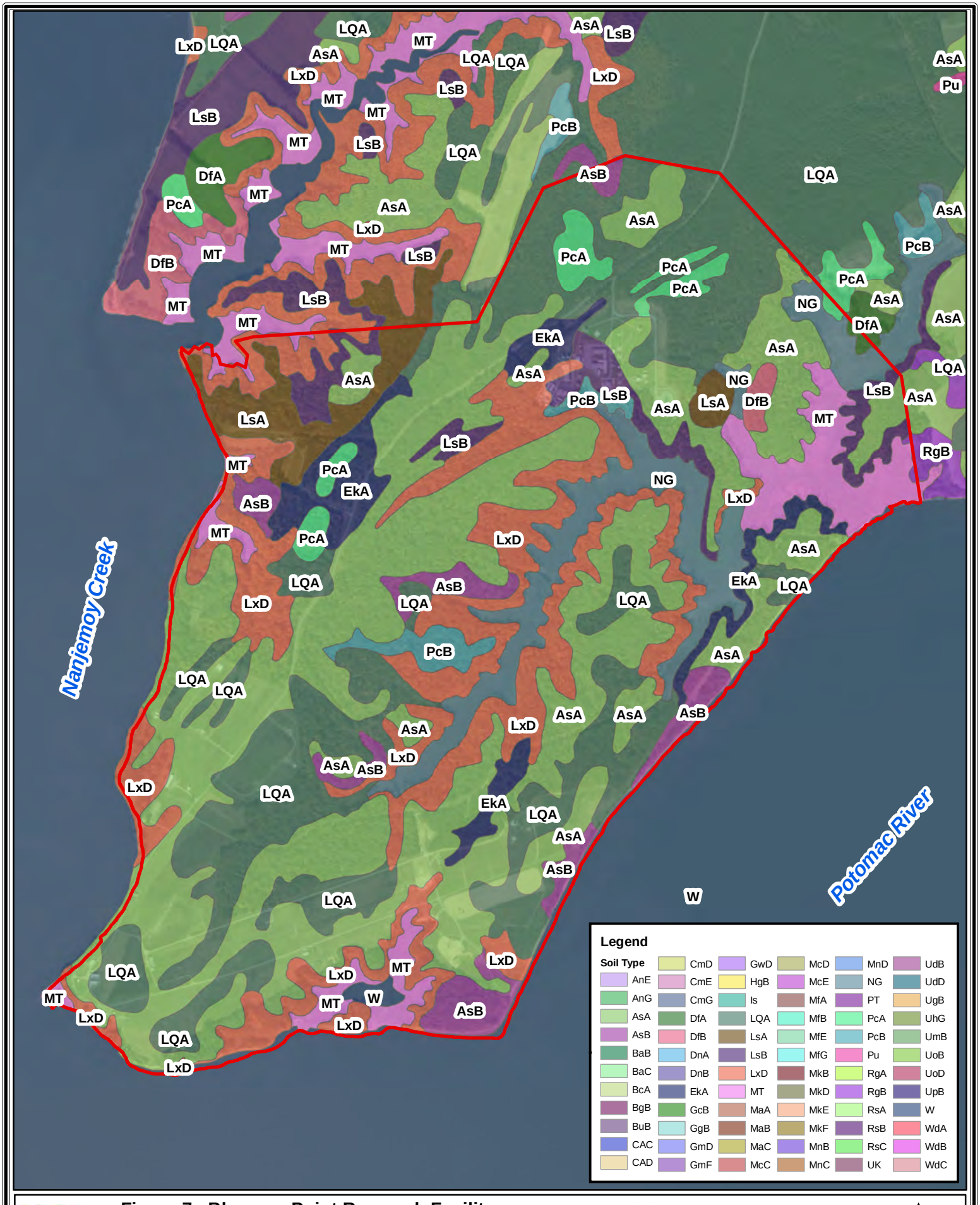


Figure 7. Blossom Point Research Facility
Soils
Charles County, MD

US Army Corps of Engineers
Baltimore District

1 inch = 1,500 feet

0 375 750 1,500 2,250 3,000 Feet

Sources: Aerial Photo, Bing Maps, 2010. Boundary, ALC, 2010. Soils, NRCS Soil Datamart, 2009.

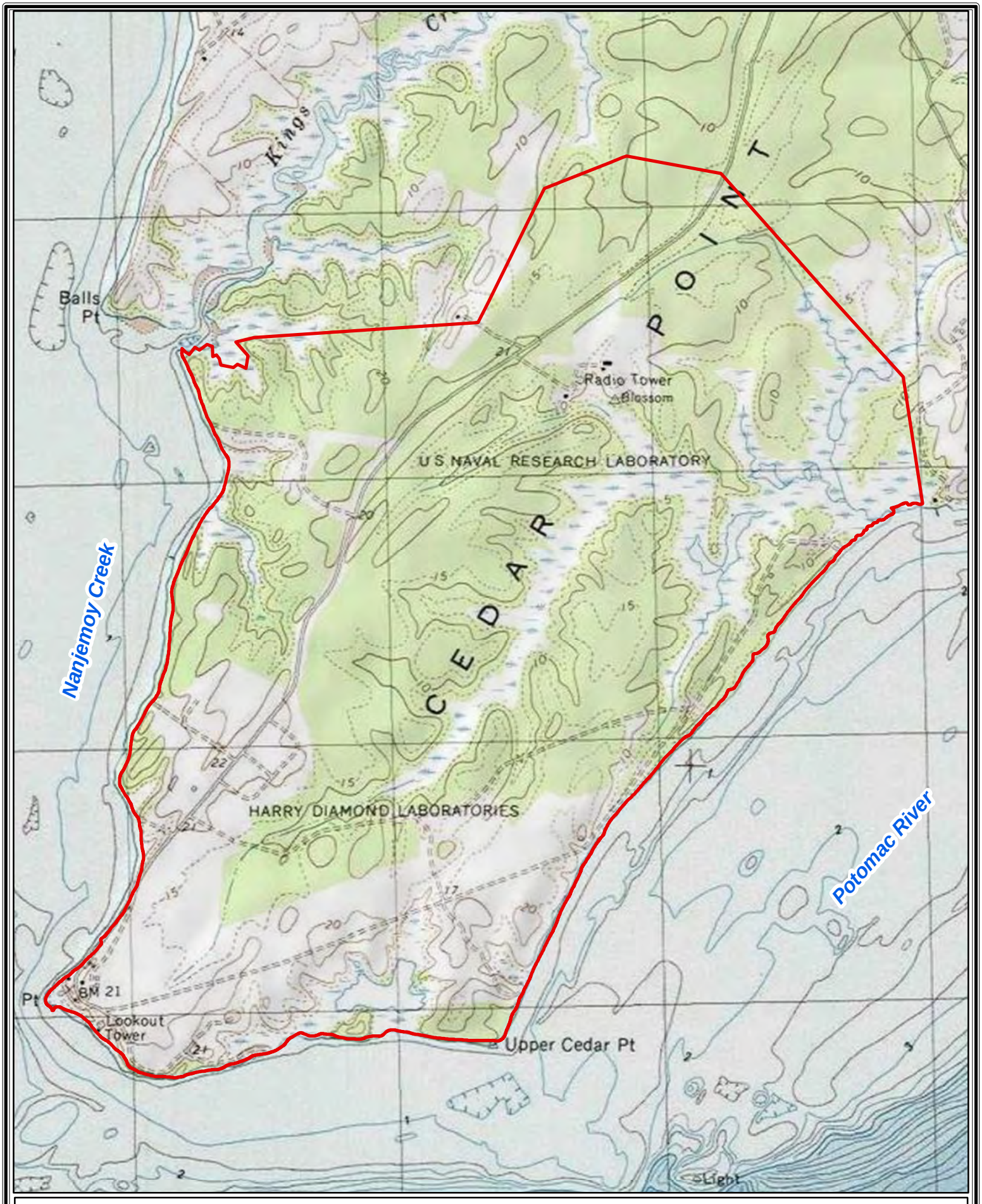
Soil Key	Soil Type	Hydric
DfA	Dodon fine sandy loam, 0-2% slopes	
DfB	Dodon fine sandy loam, 2-5% slopes	
EkA	Elkton silt loam, 0-2% slopes, frequently ponded	Yes
LQA	Lenni and Quindocqua soils, 0-2% slopes	Yes
LsA	Liverpool silt loam, 0-2% slopes	Yes (5% of map unit)
LsB	Liverpool silt loam, 2-5% slopes	Yes (5% of map unit)
LxD	Liverpool-Piccowaxen complex, 5-15% slopes	
MT	Mispillion and Transquaking soils, tidally flooded	Yes
NG	Nanticoke and Mannington soils, frequently flooded	Yes
PcA	Piccowaxen loam, 0-2% slopes	Yes (10% of map unit)
PcB	Piccowaxen loam, 2-5% slopes	Yes (10% of map unit)
RgB	Reybold loam, gravelly subsoil, 2-5% slopes	
W	Water	Yes

Topography

BPRF slopes gently towards the Potomac River and Nanjemoy Creek. The highest elevation is 25 feet above MSL in the north central part of the installation. Lowest elevations, approximately MSL, occur along the Potomac River and Nanjemoy Creek. In general, the installation is relatively flat with slopes of 2 to 5 percent. The shoreline, however, contains steep bluffs with an average elevation of 20 feet above MSL. The shoreline, in general, experiences erosive wave action from the Potomac River and is eroding at an average of 1 to 3 feet per year. The western reach of BPRF is eroding at a quicker pace than others due to wave action. Figure 8 shows the USGS topographic quadrangle and Figure 9 shows the five-foot elevation contours at BPRF.

3.10 Management Considerations

BPRF contains sensitive habitat to include wetlands, streams, shorelines, and forested areas and also consists of Maryland Critical Area. Management personnel of BPRF must consider these



US Army Corps of Engineers
Baltimore District

Figure 8. Blossom Point Research Facility
USGS Topographic Quadrangle
Charles County, MD

Sources: USA Topo Maps, 2011. Boundary, ALC, 2010.

1 inch = 1,500 feet

0 375 750 1,500 2,250 3,000 Feet

N

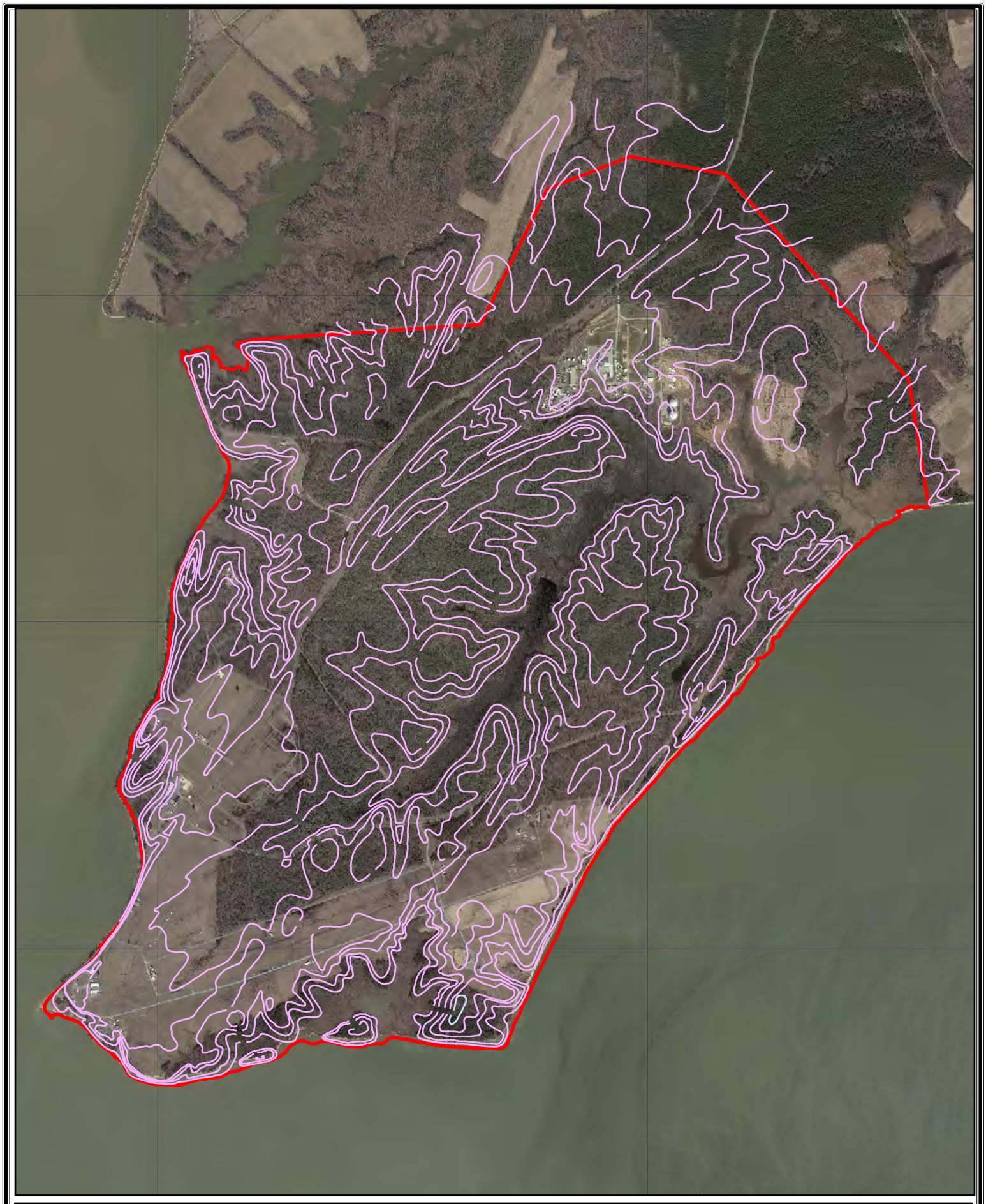


Figure 9. Blossom Point Research Facility
Five-Foot Elevation Contours
Charles County, MD

1:18,000

0 375 750 1,500 2,250 3,000 Feet

N

features and all natural resources when planning mission activities and any new development. Currently, testing activities are limited to the open field areas and do not impact these resources. Conservation of the Critical Area, wetlands and forested area provides for wildlife habitat, water quality protection, flora habitat, migratory bird habitat and FID Bird habitat.

Invasive species and pest management continue to enhance the natural ecosystems and should be continued according to the Invasive Species Management Plan (2013) and the Integrated Pest Management Plan (2020).

The shorelines of BPRF are eroding at a rate of approximately 1- to 3-feet per year, and faster in areas such as the western reach. The western reach of BPRF is eroding at a quicker pace than others due to wave action and is being addressed in an ongoing erosion surveys. BPRF has determined that if shoreline management strategies are not implemented, then the longevity of BPRF at its current location will be jeopardized, and land and critical infrastructure may be lost. The Shoreline Management Plan (2016) should be implemented by constructing stone shoreline protection structures such as sills, brills, spurs, and revetments, along with associated sand nourishment and marsh vegetation planting along approximately 3.5 miles of shoreline.

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PHOTOS

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Photo 1: Oak forest understory

Photo 2: Pine forest understory

Photo 3: Tidal marsh with water lilies

Photo 4: Box turtle

Photo 5: Green tree frog

APPENDIX G:
Rare, Threatened and Endangered Surveys
(Bat and RTE Species)

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Results of Bat Survey of Adelphi Laboratory Center, Maryland

Prepared for:

Adelphi Laboratory Center

Prepared by:

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March 2020

Introduction

Bat conservation and management has become a major concern on state, federal, and private lands throughout the United States. Bats represent an important component of many ecosystems and contribute significantly to an area's biodiversity. A greater proportion of bats are considered rare, sensitive, threatened or endangered than for any other group of mammals in North America within some regulatory or assessment frameworks. Reasons for these listings range from loss of roosting and/or foraging habitat, pesticides, persecution, and disturbance of hibernacula (Racey and Entwistle 2003).

Recently, wind energy development (Johnson et al. 2003, Fiedler 2004, Arnett et al. 2008) and White-nose Syndrome (WNS) have emerged as additional threats (USGS 2008). WNS is an emerging disease that is responsible for the death of over 6 million hibernating bats. These declines have resulted in the listing of the once common northern long-eared bat (*Myotis septentrionalis*) as federally threatened in 2015. Mortality rates observed at wind energy production facilities are variable, but at one facility in West Virginia, > 40 bats per turbine per year were killed, including the Lasurine or "tree" species not believed to be impacted by WNS (Arnett et al. 2008). As bat populations continue to experience stress from these sources, understanding bat distributions becomes more important.

Bats in the eastern United States use echolocation to orient to their surroundings and to locate prey. Ultrasonic detectors are now widely available and allows researchers to detect echolocation calls to assist in studies of bat ecology. Research has shown the presence of species-specific echolocation calls exists for many species (Krusic and Neefus 1996, Britzke et al. 2011). Ultrasonic detectors have many advantages over mist netting, including detection of more species at a site than mist nets (Murray et al. 1999, O'Farrell and Gannon 1999), sampling

multiple sites without a researcher present, and sampling habitats that lack a constricted flyway necessary for traditional capture techniques. Use of ultrasonic detectors has the potential to increase detectability of some species, thereby improving the efficiency of bat surveys. This has prompted the U.S. Fish and Wildlife Service to incorporate acoustic surveys into the survey guidance for federally listed bats species in the eastern United States.

In order to inform natural resource personnel at Adelphi Laboratory Center and Blossom Point about bat species presence on their installation, we initiated a bat survey using ultrasonic detectors in June 2019.

Methods

Data Collection

Adelphi Laboratory Center covers approximately 207 acres in Montgomery and Prince George County, Maryland. Blossom Point covers approximately 1,600 acres in Charles County, Maryland. Sampling was conducted for listed bat species following the USFWS 2019 Bat Survey guidance. Bat activity was recorded using the Anabat SD2 bat detector system (Titley Scientific; www.titley-scientific.com) and a directional microphone set at a 45° angle. Settings for the detector were as follows: sensitivity at 6.5, audio division at 16, data division at 8, and output file format to zero crossing files. Prior to initial deployment, units were calibrated using an ultrasonic pest repeller following Larson and Hayes (2000). Sampling was only conducted on nights when temperatures were high enough to maintain bat activity, there was no precipitation, and wind speed was minimal (Appendix A). Stationary units were placed at suitable locations within the forested habitats (Fig. 1, 2) by Dr. Eric Britzke approximately 1m above ground level. These locations include canopy openings, forest edge, linear corridors or flyways, and over water

(Appendix B). Detectors were housed in a weatherproof box on a tripod (Fig. 3) and were set to record from 30 minutes before sunset to 30 minutes after sunrise.

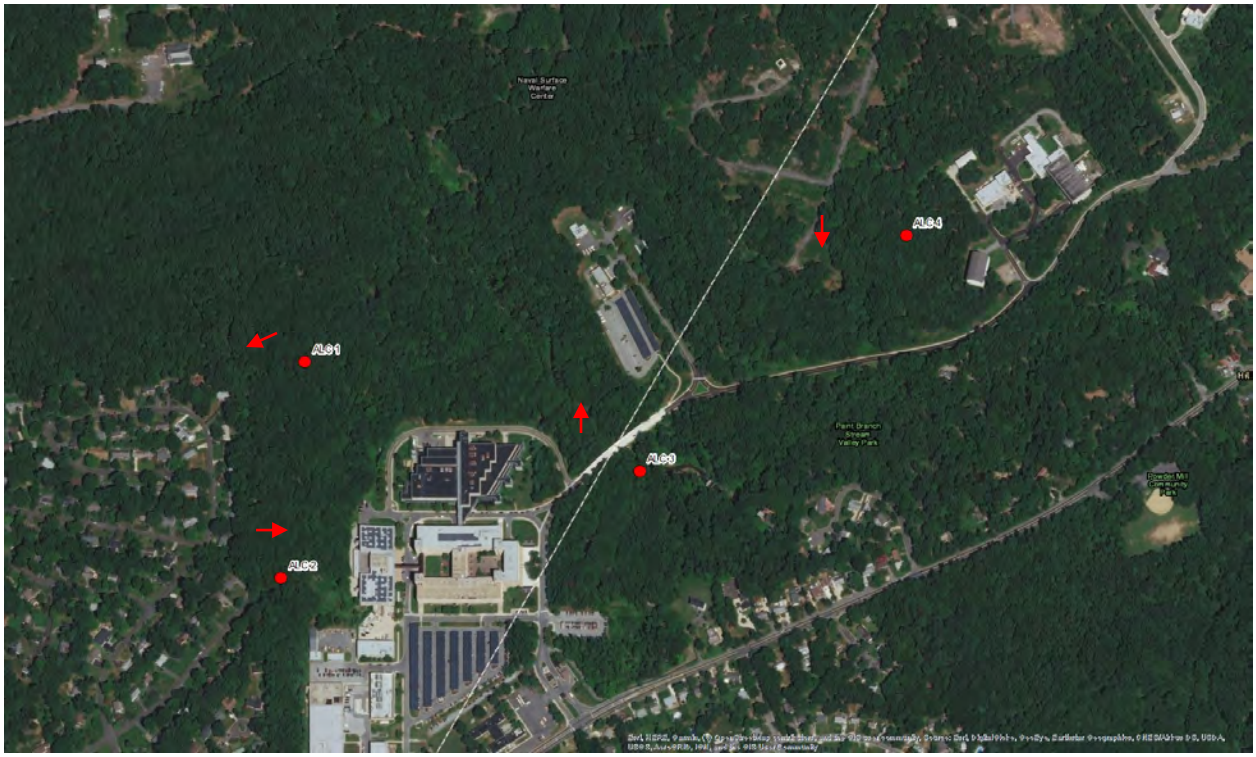

Figure 1. Map showing location of 4 sites sampled with Anabat SD2 detectors at Adelphi Laboratory Center, Maryland in June 2019.

Figure 2. Map showing location of 19 sites sampled with Anabat SD2 detectors at Blossom Point, Maryland in June 2019.

Figure 3. Example of Anabat bat detector setup for recording at Adelphi Laboratory Center and Blossom Point, Maryland during June 2019.

Data analysis

Upon completion of a least 4 nights with suitable weather conditions, equipment was picked up and the CF card was removed. The CFCRead program was used to download the data on a laptop computer for later analysis using settings found in Appendix C. Downloaded files were organized by date within site and analyzed using the Kaleidoscope Pro version 5.1.9g (Wildlife Acoustics, Inc., Maynard, MA). This program filters files, extracts parameters, and classifies files based on statistical comparison to a known call library. The Bats of North America 5.1.0 classifier, which is built into Kaleidoscope Pro, was selected and the following were specified as candidate species: hoary (*Aeorestes cinereus*), big brown (*Eptesicus fuscus*), eastern red (*Lasiurus borealis*), silver-haired (*Lasionycteris noctivagans*), southeastern myotis (*Myotis austroriparius*), little brown (*M. lucifugus*), northern long-eared (*M. septentrionalis*), Indiana (*M. sodalis*), evening (*Nycticeius humeralis*), and tricolored (*Perimyotis subflavus*). Results from Kaleidoscope Pro were manually verified by Dr. Eric Britzke based on expert knowledge of bat species call characteristics.

Results

A total of 23 points were sampled in June 2019 (Figure 1 & 2; Table 1). Recording resulted in sampling of 202,100 files (mean = 1,304; range 1-17,207 files / night). A total of 5 bat species were detected: hoary, big brown, eastern red, little brown, and tri-colored. Due to the similarity of calls between big brown bats and silver –haired bats, these species were combined and called big brown because they are more common residents of the area during the summer maternity period. Manual analysis revealed presence of eastern reds at 20 sites, big browns were

detected at 13 sites, hoarys were detected at 7 sites, little browns were detected at 20 sites, and tri-coloreds were detected at 9 sites (Table 2).

Table 1. Detector nights per area

Area	Sites/area	Nights/Site	Total detector nights
Adelphi Laboratory Center	4	6	24
Blossom Point	19	6	114

Table 2. Results of the Anabat bat survey conducted in Adelphi Laboratory Center and Blossom Point, Maryland in June 2019.

Location	Date	Total Number of Files	Bat Species Detected
ALC 1	6/4/2019	437	Big brown, Eastern red
	6/5/2019	614	Big brown, Eastern red
	6/6/2019	132	Big brown, Eastern red
	6/7/2019	342	Big brown, Eastern red
	6/8/2019	232	Big brown, Eastern red, Little brown
	6/9/2019	61	Big brown, Eastern red
ALC 2	6/4/2019	1242	Big brown, Eastern red, Tri-colored
	6/5/2019	819	Big brown, Eastern red, Little brown, Tri-colored
	6/6/2019	983	Big brown, Eastern red, Tri-colored
	6/7/2019	761	Big brown, Eastern red, Little brown, Tri-colored
	6/8/2019	904	Big brown, Eastern red, Tri-colored
	6/9/2019	109	Big brown, Eastern red
ALC 3	6/4/2019	22	Big brown
	6/5/2019	55	Big brown, Hoary, Tri-colored
	6/6/2019	22	Big brown, Hoary
	6/7/2019	20	Big brown
	6/8/2019	31	Big brown
	6/9/2019	0	
ALC 4	6/4/2019	141	Big brown, Eastern red, Little brown
	6/5/2019	214	Big brown, Eastern red, Little brown
	6/6/2019	32	Eastern red, Little brown
	6/7/2019	98	Big brown, Little brown
	6/8/2019	528	Big brown, Eastern red
	6/9/2019	27	Big brown, Little brown

Blossom 1	6/7/2019	7	Little brown
	6/8/2019	7	None
	6/9/2019	30	Little brown, Tri-colored
	6/10/2019	0	None
	6/11/2019	114	Eastern red, Little brown
	6/12/2019	0	None
Blossom 2	6/6/2019	1	None
	6/7/2019	2	None
	6/8/2019	0	None
	6/9/2019	0	None
	6/10/2019	1	None
	6/11/2019	0	None
	6/12/2019	0	None
Blossom 3	6/6/2019	150	Eastern red, Hoary, Little brown
	6/7/2019	307	Big brown, Eastern red
	6/8/2019	326	Eastern red, Little brown
	6/9/2019	298	Eastern red, Little brown
	6/10/2019	205	Big brown, Eastern red, Little brown
	6/11/2019	130	Eastern red, Little brown, Tri-colored
	6/12/2019	88	Eastern red, Little brown
Blossom 4	6/6/2019	28	Eastern red, Hoary, Little brown, Tri-colored
	6/7/2019	57	Little brown
	6/8/2019	116	Eastern red, Little brown, Tri-colored
	6/9/2019	60	Eastern red, Little brown
	6/10/2019	3	Tri-colored
	6/11/2019	124	Eastern red, Little brown, Tri-colored
	6/12/2019	44	Eastern red, Little brown
Blossom 5	6/6/2019	40	Eastern red, Little brown
	6/7/2019	57	Eastern red, Little brown
	6/8/2019	141	Eastern red, Little brown
	6/9/2019	112	Eastern red, Little brown
	6/10/2019	52	Hoary, Little brown
	6/11/2019	136	Eastern red, Hoary, Little brown
	6/12/2019	148	Eastern red, Little brown
Blossom 6	6/6/2019	38	Eastern red, Little brown
	6/7/2019	31	Eastern red, Little brown
	6/8/2019	53	Eastern red, Little brown
	6/9/2019	73	Eastern red, Little brown
	6/10/2019	28	Little brown
	6/11/2019	123	Eastern red, Little brown
	6/12/2019	79	Eastern red, Little brown
Blossom 7	6/6/2019	83	Little brown
	6/7/2019	225	Little brown

	6/8/2019	216	Eastern red, Little brown
	6/9/2019	280	Eastern red, Little brown
	6/10/2019	76	Eastern red, Little brown
	6/11/2019	321	Eastern red, Little brown
	6/12/2019	168	Eastern red, Little brown
Blossom 8	6/6/2019	328	Big brown, Eastern red, Little brown
	6/7/2019	554	Eastern red, Big brown
	6/8/2019	619	Big brown, Eastern red, Little brown
	6/9/2019	336	Eastern red, Little brown
	6/10/2019	511	Eastern red, Little brown
	6/11/2019	666	Eastern red, Little brown
	6/12/2019	360	Eastern red, Little brown
Blossom 9	6/6/2019	84	Big brown, Eastern red, Little brown
	6/7/2019	310	Big brown, Eastern red, Little brown
	6/8/2019	376	Big brown, Eastern red, Little brown
	6/9/2019	418	Eastern red, Little brown
	6/10/2019	136	Big brown, Eastern red, Little brown
	6/11/2019	346	Big brown, Eastern red, Little brown
	6/12/2019	244	Big brown, Eastern red, Little brown
Blossom 10	6/6/2019	29	Eastern red, Little brown, Tri-colored
	6/7/2019	23	Eastern red
	6/8/2019	41	Little brown
	6/9/2019	188	Eastern red, Hoary, Big brown, Tri-colored
	6/10/2019	75	Eastern red, Hoary, Little brown, Tri-colored
Blossom 11	6/6/2019	34	Little brown
	6/7/2019	58	Little brown
	6/8/2019	185	Big brown, Little brown
	6/9/2019	157	Eastern red, Little brown
	6/10/2019	118	Eastern red, Hoary, Little brown
	6/11/2019	229	Eastern red, Little brown
	6/12/2019	110	Little brown
Blossom 12	6/6/2019	46	Eastern red, Little brown
	6/7/2019	64	Little brown
	6/8/2019	230	Eastern red, Little brown
	6/9/2019	101	Eastern red, Little brown
	6/10/2019	636	Eastern red, Hoary, Little brown
	6/11/2019	130	Hoary, Little brown
	6/12/2019	74	Little brown
Blossom 13	6/6/2019	57	Big brown, Tri-colored
	6/7/2019	23	Little brown, Tri-colored
	6/8/2019	32	Eastern red, Tri-colored
	6/9/2019	45	Tri-colored
	6/10/2019	60	Eastern red, Tri-colored

	6/11/2019	144	Eastern red, Little brown, Tri-colored
	6/12/2019	33	Little brown, Tri-colored
Blossom 14	6/6/2019	174	Eastern red, Little brown
	6/7/2019	394	Eastern red, Little brown
	6/8/2019	535	Eastern red, Little brown
	6/9/2019	394	Eastern red, Little brown
	6/10/2019	245	Eastern red, Little brown
	6/11/2019	678	Eastern red, Little brown
	6/12/2019	297	Eastern red, Little brown
Blossom 15	6/6/2019	36	Tri-colored
	6/7/2019	21	Little brown
	6/8/2019	36	Eastern red, Tri-colored
	6/9/2019	50	Eastern red, Little brown, Tri-colored
	6/10/2019	20	Little brown, Tri-colored
	6/11/2019	129	Eastern red, Little brown, Tri-colored
	6/12/2019	29	Little brown, Tri-colored
Blossom 16	6/6/2019	400	Eastern red, Tri-colored
	6/7/2019	610	Big brown, Eastern red
	6/8/2019	389	Eastern red
	6/9/2019	444	Eastern red
	6/10/2019	373	Eastern red, Tri-colored
	6/11/2019	496	Eastern red, Big brown
	6/12/2019	416	Eastern red
Blossom 17	6/6/2019	13	Eastern red
	6/7/2019	8	Little brown
	6/8/2019	17	Eastern red, Little brown
	6/9/2019	15	Little brown
	6/10/2019	4	Eastern red, Little brown
	6/11/2019	27	Eastern red, Little brown
	6/12/2019	16	Eastern red, Little brown
Blossom 18	6/5/2019	0	None
	6/6/2019	0	None
	6/7/2019	1	Eastern red
	6/8/2019	227	Eastern red, Big brown, Little brown
	6/9/2019	382	Eastern red, Little brown
	6/10/2019	227	None
	6/11/2019	0	Eastern red, Little brown
	6/12/2019	168	Eastern red, Little brown
Blossom 19	6/6/2019	2	None
	6/7/2019	3	None
	6/8/2019	5	Little brown
	6/9/2019	4	None
	6/10/2019	10	Big brown

	6/11/2019	19	Eastern red
	6/12/2019	6	Little brown

Discussion

Activity levels varied substantially throughout the sites sampled during this project, but in general, activity was very high. As expected, eastern red bats and big brown bats were commonly detected during this sampling event. Some sites had very low bat activity levels and/or no species detected. When the log files and data were checked, the equipment was shown to be functioning during this time period. Thus, the low activity represented true bat activity at the sites. Some of the installation at Blossum Point has been thinned to open up the forested habitats. This has improved bat habitat at these sites. However, areas that have not been thinned have extremely dense forest vegetation and provide low quality bat habitat in these areas.

Manual analysis of the echolocation calls revealed fewer species than documented during the MLE analysis. This was due to extraneous noise which resulted in a large number of files being recorded for some sites. For example, eastern small-footed bats were identified using the automated software but were determined to be eastern red bat files during manual analysis of the echolocation calls. Despite these differences, the manual analysis and the software agreed that both northern long-eared and Indiana bats were absent from the project surveys.

Acknowledgements

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Appendix

Appendix A – Nighttime weather conditions during bat surveys at Adelphi Laboratory Center and Blossom Point in June 2019.

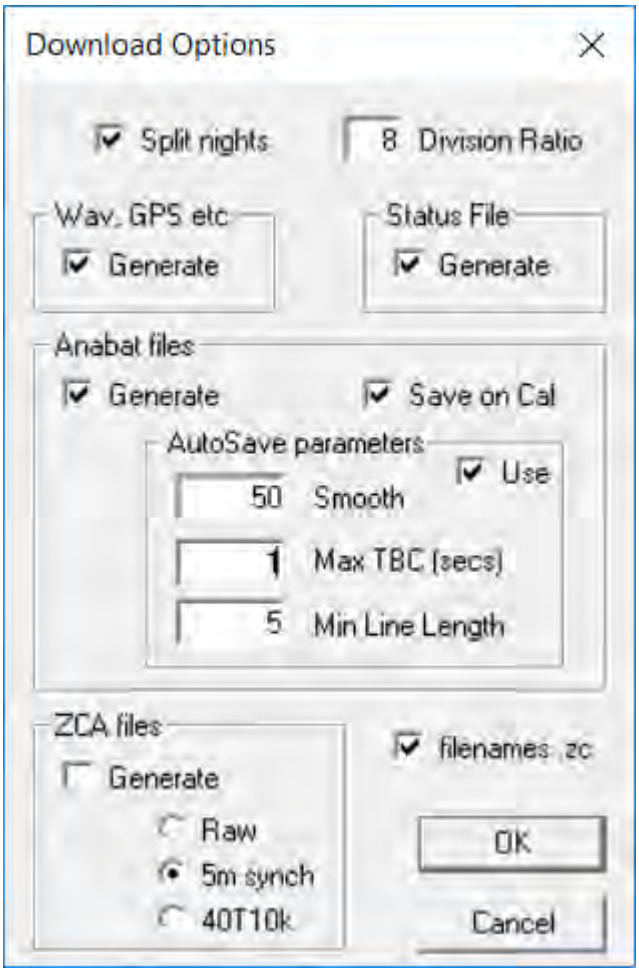
Date	Sunset	Sunrise	Min Temp	Max Temp	Average Temp	Humidity	Precipitation	Duration (Hours)	Wind Direction	Wind Speed	Moon Phase	Moon %
6/4/2019	20:29	5:43	62	65	63.44	75	0.00	-	S	8.44	Waxing Crescent	1.5
6/5/2019	20:30	5:43	70	74	71.84	98	0.02	-	SSW	9.05	Waxing Crescent	5.55
6/6/2019	20:30	5:43	70	77	72.44	92	0.00	-	NNE	3.33	Waxing Crescent	12.01
6/7/2019	20:31	5:42	65	72	68.33	90	0.00	-	NE	4.33	Waxing Crescent	20.55
6/8/2019	20:31	5:42	65	71	67.20	85	0.00	-	NE	7.50	Waxing Crescent	30.65
6/9/2019	20:32	5:42	63	64	63.38	100	0.04	1.33	NE	9.06	Waxing Crescent	41.73
6/10/2019	20:32	5:42	66	72	70.79	100	0.03	0.83	SSE	6.04	Waxing Crescent	53.17
6/11/2019	20:33	5:42	59	66	60.78	83	0.00	-	NNE	2.11	Waxing Crescent	64.36
6/12/2019	20:33	5:42	62	66	64.52	100	0.54	2.33	E	8.64	Waxing Crescent	74.71
6/13/2019	20:34	5:42	61	79	63.40	91	0.00	-	W	5.20	Waxing Crescent	83.73

Appendix B - GPS location of the 23 sites sampled for bats in Adelphi Laboratory Center and Blossom Point during June 2019.

Site	County	Latitude	Longitude	Habitat
ALC 1	Prince George	39.03232	-76.96714	Canopy Opening
ALC 2	Prince George	39.02961	-76.96752	Over Water
ALC 3	Prince George	39.03095	-76.96181	Over Water
ALC 4	Prince George	39.03391	-76.95757	Forest Edge
Blossom 1	Charles	38.42833	-77.09044	Canopy Opening
Blossom 2	Charles	38.42749	-77.09282	Canopy Opening
Blossom 3	Charles	38.42532	-77.0956	Forest Edge
Blossom 4	Charles	38.42219	-77.09578	Flyway
Blossom 5	Charles	38.42163	-77.09492	Over Water
Blossom 6	Charles	38.41701	-77.09582	Flyway
Blossom 7	Charles	38.42257	-77.10081	Flyway
Blossom 8	Charles	38.42508	-77.08555	Canopy Opening
Blossom 9	Charles	38.41965	-77.0864	Canopy Opening
Blossom 10	Charles	38.4342	-77.08283	Canopy Opening
Blossom 11	Charles	38.43201	-77.07886	Forest Edge
Blossom 12	Charles	38.43661	-77.08665	Canopy Opening
Blossom 13	Charles	38.43447	-77.08971	Canopy Opening
Blossom 14	Charles	38.43053	-77.09432	Flyway

Blossom 15	Charles	38.42906	-77.09809	Canopy Opening
Blossom 16	Charles	38.42618	-77.10152	Canopy Opening
Blossom 17	Charles	38.41372	-77.09619	Flyway
Blossom 18	Charles	38.41636	-77.08768	Flyway
Blossom 19	Charles	38.41333	-77.10155	Canopy Opening

Appendix C – Settings used in CFCRead to download data from Anabat SD2 detectors



Appendix D – Maximum likelihood estimator (MLE) results for each site and survey date at ALC and Blossom Point in 2019.

	Date	EPFU	LABO	LACI	LANO	MYLE	MYLU	MYSE	MYSO	NYHU	PESU
ALC 1	6/4/2019	0	0	1	1	1	0.746628	0.079627	1	0	0.811189
	6/5/2019	0	0	1	1	1	0.929272	1	1	0	1
	6/6/2019	0	0.030625	1	1	1	1	1	1	4.8E-06	0.226617
	6/7/2019	0	0.001227	1	1	1	1	1	1	0	1
	6/8/2019	0	0	1	1	1	0.02808	0.180586	1	0	1
	6/9/2019	0	0	1	1	1	1	1	1	0.305421	1
ALC 2	6/4/2019	0	0	1	1	1	1	1	1	0.961655	0
	6/5/2019	0	0	1	1	1	5E-07	1	1	0.049938	0
	6/6/2019	0	0	1	1	1	0.285937	1	1	0.596136	0
	6/7/2019	0	0	1	1	1	0.006194	1	1	0.000235	0
	6/8/2019	0	0	1	1	1	0.072131	1	1	1.69E-05	0
	6/9/2019	0	0.182488	1	0.412178	1	0.09198	1	1	0	0.96948
ALC 3	6/4/2019	0	0.063101	1	1	1	1	1	1	1	1
	6/5/2019	0	1	0.412837	0.000606	1	1	1	1	1	0.026369
	6/6/2019	0.000148	0.160546	0.045292	0.590451	1	0.359612	1	1	1	1
	6/7/2019	6.01E-05	0.063101	1	0.272451	1	1	1	1	1	1
	6/8/2019	0	0.063101	1	0.898752	1	1	0.023327	1	1	1
	6/9/2019	1	1	1	1	1	1	1	1	1	1
ALC 4	6/4/2019	0	0.008715	1	1	1	3E-07	1	1	1	1
	6/5/2019	0	3.8E-06	1	1	1	0.046729	1	1	1	1
	6/6/2019	0.072421	0.004148	1	0.5941	1	0.045555	1	1	1	1
	6/7/2019	0	0.447161	1	1	1	0.00271	0.004331	1	0.620896	1
	6/8/2019	0	0.005901	1	1	1	0	0.110545	1	1	1
	6/9/2019	0.001897	0.093494	1	1	1	0.000512	1	1	1	1
Blossom 1	6/7/2019	1	1	1	1	1	0.001105	1	1	1	1
	6/8/2019	0.467704	0.063281	0.265471	0.708247	1	1	1	1	1	1
	6/9/2019	1	1	1	1	1	0.014201	1	1	1	0.000853

	6/10/2019	1	1	1	1	1	1	1	1	1	1
	6/11/2019	1	1	1	1	0.026889	0	1	1	1	1
	6/12/2019	1	1	1	1	1	1	1	1	1	1
Blossom 2	6/6/2019	1	1	0.061924	1	1	1	1	1	1	1
	6/7/2019	1	1	1	1	1	0.103397	1	1	1	1
	6/8/2019	1	1	1	1	1	1	1	1	1	1
	6/9/2019	1	1	1	1	1	1	1	1	1	1
	6/10/2019	1	1	0.061924	1	1	1	1	1	1	1
	6/11/2019	1	1	1	1	1	1	1	1	1	1
	6/12/2019	1	1	1	1	1	1	1	1	1	1
Blossom 3	6/6/2019	0.531042	0	0.000751	1	1	0	1	1	1	0.114918
	6/7/2019	0	0	1	1	1	1	1	0.996087	1	1
	6/8/2019	0.073228	0	1	0.593578	1	0.197353	1	0.889685	1	1
	6/9/2019	1	0	1	1	1	0.002347	1	1	1	1
	6/10/2019	5.4E-06	0	0.618214	1	1	2E-07	1	1	1	1
	6/11/2019	0.395728	0	1	0.395635	1	0.00012	0.315005	1	1	0.997273
	6/12/2019	1	0	0.197044	0.62218	1	0	1	1	1	0.895343
Blossom 4	6/6/2019	1	0.001094	0.064361	1	1	0.003745	1	1	1	0.030659
	6/7/2019	1	0.158265	1	1	1	0	1	1	1	0.294989
	6/8/2019	1	0.000028	1	1	1	0	1	1	1	0.023668
	6/9/2019	1	0.001381	1	1	1	0	1	0.999723	1	0.508271
	6/10/2019	1	1	1	1	1	1	1	1	1	0.025272
	6/11/2019	1	0	1	1	1	0	1	1	1	0.046404
	6/12/2019	1	0.00014	1	1	0.02689	1.9E-06	1	1	1	1
Blossom 5	6/6/2019	0.649225	1.2E-06	0.376473	0.245702	1	0.00415	1	1	1	0.457262
	6/7/2019	1	0.000631	0.017277	0.847638	1	2.9E-06	1	1	1	0.005617
	6/8/2019	1	0	0.064371	1	1	0	1	1	1	1
	6/9/2019	1	0	1	1	1	2.6E-06	1	1	1	1
	6/10/2019	1	0.241195	0.004142	1	1	0	1	1	1	0.311124
	6/11/2019	1	0	0.017277	0.847643	1	7.2E-06	1	1	1	0.341397

	6/12/2019	1	0	0.197102	0.622365	1	0	1	1	1	1
Blossom 6	6/6/2019	1	1.4E-06	1	1	1	0.00359	1	1	1	1
	6/7/2019	1	0.004167	1	1	1	1.58E-05	1	1	1	0.31453
	6/8/2019	1	1.19E-05	1	1	1	0.000021	1	0.363546	1	1
	6/9/2019	1	0.001783	1	1	1	0	1	0.5791	1	1
	6/10/2019	1	0.100864	0.064388	1	1	0.000461	1	0.619613	1	1
	6/11/2019	0.133488	3.07E-05	1	1	0.056233	0	1	1	1	0.652851
	6/12/2019	1	0.000816	1	1	1	0	1	1	1	1
Blossom 7	6/6/2019	1	0.135092	1	1	1	0	1	1	0.983076	0.462901
	6/7/2019	1	0.798827	0.06436	1	1	0	1	1	1	0.776272
	6/8/2019	1	3.55E-05	1	1	1	0	1	1	1	0.419036
	6/9/2019	1	1+D70	1	1	1	0	1	1	1	1
	6/10/2019	1	0.012432	0.06436	1	1	0	1	1	1	1
	6/11/2019	1	0	1	1	1	0	1	1	1	1
	6/12/2019	1	7.6E-06	1	1	1	0	0.921216	1	1	1
Blossom 8	6/6/2019	0.016938	0	1	1	1	0	1	1	1	0.9917
	6/7/2019	0.347171	0	1	0.005885	1	0.056092	1	1	1	0.976329
	6/8/2019	0.002492	0	0.459564	0.941584	1	0	1	1	1	0.056725
	6/9/2019	1	0	0.06439	1	1	0	1	1	1	0.988105
	6/10/2019	0.081622	0	1	0.590467	1	0	1	1	1	0.430042
	6/11/2019	0.097874	0	1	1	1	0	1	1	1	0.078345
	6/12/2019	1	0	1	1	1	0	1	1	0.337196	0.051048
Blossom 9	6/6/2019	4E-07	0	1	1	1	8E-07	1	1	1	0.811577
	6/7/2019	0	0	0.989241	1	1	0	1	1	1	1
	6/8/2019	0.012	0	1	0.740043	1	0	1	1	1	1
	6/9/2019	1	0	1	1	1	0	1	1	1	0.906818
	6/10/2019	0.011547	0	1	0.740848	1	0	1	1	1	1
	6/11/2019	0.002047	0	1	1	1	0	1	1	1	1
	6/12/2019	2.96E-05	0	1	1	1	0.002989	1	1	1	1
Blossom 10	6/6/2019	1	0.04241	1	1	1	0.02748	1	1	1	0.011249

	6/7/2019	0.648008	0.024554	0.376536	0.245774	1	0.138986	1	1	1	0.173027
	6/8/2019	1	0.079146	0.065752	1	1	0	1	1	0.946159	1
	6/9/2019	1	0.002095	0	2.75E-05	1	0.059856	1	1	0	0
	6/10/2019	0.892561	0.002735	0.00107	0.357073	1	0.000178	1	1	1	0
Blossom 11	6/6/2019	1	0.220028	0.419785	0.054742	1	1E-07	1	1	1	1
	6/7/2019	0.130146	0.24139	1	1	1	0	1	1	1	0.311148
	6/8/2019	0.018421	0.096986	1	1	1	0	1	1	1	1
	6/9/2019	1	0.000581	1	1	1	0	1	1	1	0.691662
	6/10/2019	0.912208	1E-07	2E-07	0.965323	1	0	1	1	0.145216	1
	6/11/2019	1	0.000233	1	1	1	0	1	1	0.826684	0.914433
	6/12/2019	1	1	1	1	1	0	1	1	1	1
Blossom 12	6/6/2019	1	0.000957	0.06436	1	1	0	1	1	1	0.445505
	6/7/2019	1	0.050181	1	1	1	0	1	1	1	0.444025
	6/8/2019	1	0	1	1	1	0	1	1	1	1
	6/9/2019	1	0.004819	1	1	1	0	1	1	1	0.610497
	6/10/2019	1	0.041822	0	1	1	0.026208	1	1	1	0.180526
	6/11/2019	1	0.555662	0.004142	1	1	0	1	1	1	0.658288
	6/12/2019	1	0.541635	1	1	1	0	1	1	1	0.47052
Blossom 13	6/6/2019	3.5E-06	0.320467	1	1	1	0.057746	0.084546	1	1	0
	6/7/2019	0.123854	1	1	1	1	0.030083	1	1	1	0
	6/8/2019	1	0.001591	1	1	1	0.385844	1	1	1	0
	6/9/2019	1	0.232997	1	1	1	0.219175	1	1	1	0
	6/10/2019	0.254249	1.83E-05	0.165213	1	1	0.184902	1	1	1	0
	6/11/2019	0.131523	0.000278	1	1	1	0	1	1	1	0
	6/12/2019	0.125659	0.637734	1	1	1	3.1E-06	1	0.693305	1	0
Blossom 14	6/6/2019	1	0.000106	1	1	1	0	1	1	1	1
	6/7/2019	1	1E-07	1	1	1	0	1	1	1	0.342773
	6/8/2019	1	0	0.061153	1	1	0	1	1	1	1
	6/9/2019	0.635874	0	1	0.075041	1	0	1	1	1	0.997057
	6/10/2019	0.495482	1E-07	0.26434	0.706078	1	0	0.919918	1	1	1

	6/11/2019	0.528905	0	0.262933	0.703691	1	0	0.900577	1	1	0.964484
	6/12/2019	1	0	1	1	1	0	1	1	1	1
Blossom 15	6/6/2019	1	1	0.070909	1	1	1	1	1	0.144472	0
	6/7/2019	0.124873	0.499075	1	1	1	0.000161	0.142826	1	1	0.120455
	6/8/2019	1	1.24E-05	0.06436	1	1	0.566036	1	1	1	0
	6/9/2019	1	0.011816	1	1	1	0.003215	1	0.615141	1	0
	6/10/2019	1	1	0.067919	1	1	5.42E-05	1	1	0.267663	8.2E-06
	6/11/2019	1	0	1	1	1	0	1	1	1	0
	6/12/2019	1	1	1	1	1	0	1	0.803506	1	0
Blossom 16	6/6/2019	0.072119	0	1	0.594162	1	1	1	1	1	0
	6/7/2019	0.015197	0	1	1	1	1	1	1	1	0.895479
	6/8/2019	1	0	1	1	1	1	1	1	1	0.27376
	6/9/2019	0.647927	0	0.37654	0.245779	1	0.960019	1	1	1	1
	6/10/2019	1	0	1	0.203221	1	1	1	1	1	0
	6/11/2019	1	0	1	0	1	1	1	1	1	0.672016
	6/12/2019	0.390145	0	1	0.396297	1	1	1	1	1	1
Blossom 17	6/6/2019	0.586777	7.7E-06	1	0.076777	1	0.383738	1	1	1	1
	6/7/2019	1	0.34952	0.06436	1	1	0.008304	1	1	1	1
	6/8/2019	1	3.8E-06	1	1	1	0.043122	1	1	1	1
	6/9/2019	1	0.146901	1	1	1	1.11E-05	1	1	1	0.193977
	6/10/2019	1	1	0.06804	1	1	0.127568	1	1	0.213926	1
	6/11/2019	1	0.000415	0.067566	1	1	0.000673	1	1	0.854442	1
	6/12/2019	1	0.011823	1	1	1	0.001387	1	1	1	1
Blossom 18	6/5/2019	1	1	1	1	1	1	1	1	1	1
	6/6/2019	1	1	1	1	1	1	1	1	1	1
	6/7/2019	0.124867	0	1	1	1	0.43385	1	0.537825	1	1
	6/8/2019	1	0	1	0.041299	1	0	1	1	1	0.997163
	6/9/2019	1	0	0.197042	0.622176	1	0	1	1	1	0.296988
	6/10/2019	1	1	1	1	1	1	1	1	1	1
	6/11/2019	0.127754	0	1	1	1	5.17E-05	1	1	1	1

	6/12/2019	1	0	1	0.203222	1	0.031795	1	1	1	1
Blossom 19	6/6/2019	1	1	1	1	1	0.103397	1	1	1	1
	6/7/2019	1	1	1	1	1	0.103397	1	1	1	1
	6/8/2019	1	1	1	1	1	0.000114	1	1	1	1
	6/9/2019	1	1	1	1	1	1	1	1	0.191535	1
	6/10/2019	0.001875	1	1	1	1	1	1	1	1	1
	6/11/2019	1	0.000324	1	1	1	0.076319	1	1	1	1
	6/12/2019	1	1	1	1	1	0.010691	1	1	1	1

Appendix E – Resume for Dr. Eric Britzke

Education

Ph.D., Environmental Sciences with Concentration in Biology, Tennessee Technological University, 2003.
M.S., Biology, Missouri State University, 1998.
B.S., Biology, Missouri State University, 1994.

Work Experience

United States Army Engineer Research and Development Center, 11/08 – Present. Research Wildlife Biologist.
Independent Consultant, 6/05 – 11/08. Biologist.
East Arkansas Community College, 9/04 – 6/05. Environmental Science Specialist.
Clemson University, 9/03 – 8/04. Post Doctoral Fellow.
Tennessee Technological University, 1/01 – 5/01. Instructor.
Tennessee Technological University, 5/99 – 5/03. Graduate Research Assistant.
United States Forest Service, 10/98 – 11/98; 5/99- 8/99. Biological Aid.
Missouri State University, 8/95 – 5/98. Graduate Teaching Assistant
Missouri State University, 2/95–10/95; 1/97 – 12/97; 2/98–10/98. Graduate Research Assistant.

Organizations, Panels, Committees, and Awards

Conservation Research Award, National Military Fish and Wildlife Association, 2014
Achievement Medal for Civilian Service, 2013
DoD representative, WNS National Plan Steering committee
WNS Coordination Team, WNS National Plan
Chair, WNS Disease Surveillance Working Group
National Military Fish and Wildlife Association, 2009- Present
Central Regional Director, 2011-2013
Chair, Bat Working Group, 2012-2014
Southeastern Bat Diversity Network, 1999 – Present.
Member of the Board of Directors 2003-2007
American Society of Mammalogists, 1995 - 2012
Wildlife Society, 2004 – 2012
Student Presentation Award Sigma XI, 1995, 1st place.
Golden Key National Honor Society
Wings Across the Americas Bat Conservation Award, 2008
Wings Across the Americas Bat Conservation Award, 2010

Publications

Swift, J. F., R. F. Lance, X. Guan, E. R. Britzke, D. L. Lindsay, and C. E. Edwards. In Press. Multifaceted DNA metabarcoding: validation of a non-invasive, next-generation approach to studying bat populations. Evolutionary Applications. XX:XX-XXX.

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Appendix F – Photos of bat detector deployment sites taken from the rear and side of the detector

ALC 1


ALC 2


ALC 3


ALC 4


Blossom 1


Blossom 2


Blossom 3


Blossom 4


Blossom 5


Blossom 6


Blossom 7


Blossom 8


Blossom 9


Blossom 10


Blossom 11


Blossom 12


Blossom 13


Blossom 14


Blossom 15


Blossom 16


Blossom 17


Blossom 18


Blossom 19


US Army Corps of Engineers
Baltimore District

Rare, Threatened and Endangered Species Surveys

U.S. Army Garrison Adelphi Laboratory Center and Blossom Point Research Facility
Prince Georges and Charles Counties, Maryland

Prepared for: **U.S. Army Garrison Adelphi Laboratory Center,**
Environmental Division
2800 Powder Mill Road
Adelphi, Maryland 20783

Prepared by: **U.S. Army Corps of Engineers, Baltimore District**
10 South Howard Street
Baltimore, Maryland 21201

April 2016

RARE, THREATENED AND ENDANGERED SPECIES SURVEYS

U.S. ARMY GARRISON ADELPHI LABORATORY CENTER AND BLOSSOM POINT RESEARCH FACILITY
Prince Georges and Charles Counties, Maryland

Prepared for:

U.S. Army Garrison Adelphi Laboratory Center
Environmental Division
2800 Powder Mill Road
Adelphi, Maryland 20783

Prepared by:

U.S. Army Corps of Engineers
Baltimore District
10 South Howard Street
Baltimore, Maryland 21201

April 2016

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1.0 INTRODUCTION

The U.S. Army Corps of Engineers, Baltimore District (USACE) conducted Rare, Threatened and Endangered (RTE) flora and fauna surveys at U.S. Army Garrison Adelphi Laboratory Center (ALC) and Blossom Point Research Facility (BPRF). RTE surveys were conducted at both facilities between 23 June and 12 August 2015 to assess the potential presence of state or federally-listed plant and animal species and/or habitat which could support such species. ALC, headquarters of the Army Research Laboratory, is an active military research and development facility, approximately 202 acres in size, located partly in both Prince Georges and Montgomery Counties, Maryland (Figure 1). BPRF, a satellite installation to ALC, is an active military testing range, approximately 1,600 acres in size, located in Charles County, Maryland (Figure 2).

2.0 STUDY PURPOSE

The purpose of this study was to conduct a one-time survey of ALC and BPRF to note any occurrences of RTE species and habitat types that may potentially support RTE species. This survey is a supplement to the existing Integrated Natural Resource Management Plan (INRMP) and Planning Level Surveys at ALC and BPRF.

An endangered species is defined as any species that is in danger of extinction throughout all or a significant portion of its range. The Endangered Species Act (ESA) of 1973 requires the Department of the Interior to identify and list these species. A threatened species is defined as any species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Only species listed by the Department of Interior are protected under the ESA. Due to habitat loss and species fluctuations, the lists of protected species are constantly changing. Species designated as rare, species of concern, or special concern by the federal government or state and local agencies are not legally protected, but populations of species with these designations are tracked by various resource agencies, including the United States Fish and Wildlife Service (USFWS) and the Maryland Department of Natural Resources (MDNR) Natural Heritage Program.

Pursuant to Section 7 of the ESA, information on the potential existence of RTE plant and wildlife species in the project area was researched using the existing INRMP (2014) and the agency correspondence conducted as part of the INRMP.

3.0 METHODS

This study was accomplished through (1) a desktop reconnaissance of available studies conducted on and around the environs of ALC and BPRF; (2) field surveys at the installations to document species and habitat findings; and (3) creation of maps depicting findings.

3.1 Desktop Reconnaissance

Prior to conducting field surveys, USACE reviewed available data from the ALC and BPRF INRMP (2014), the agency coordination associated with the INRMP, and the Planning Level

Adelphi
Laboratory Center
Adelphi
Laboratory Center
Figure 1. Adelphi Laboratory Center
Location
Montgomery and Prince George's Counties, MD
November 2015
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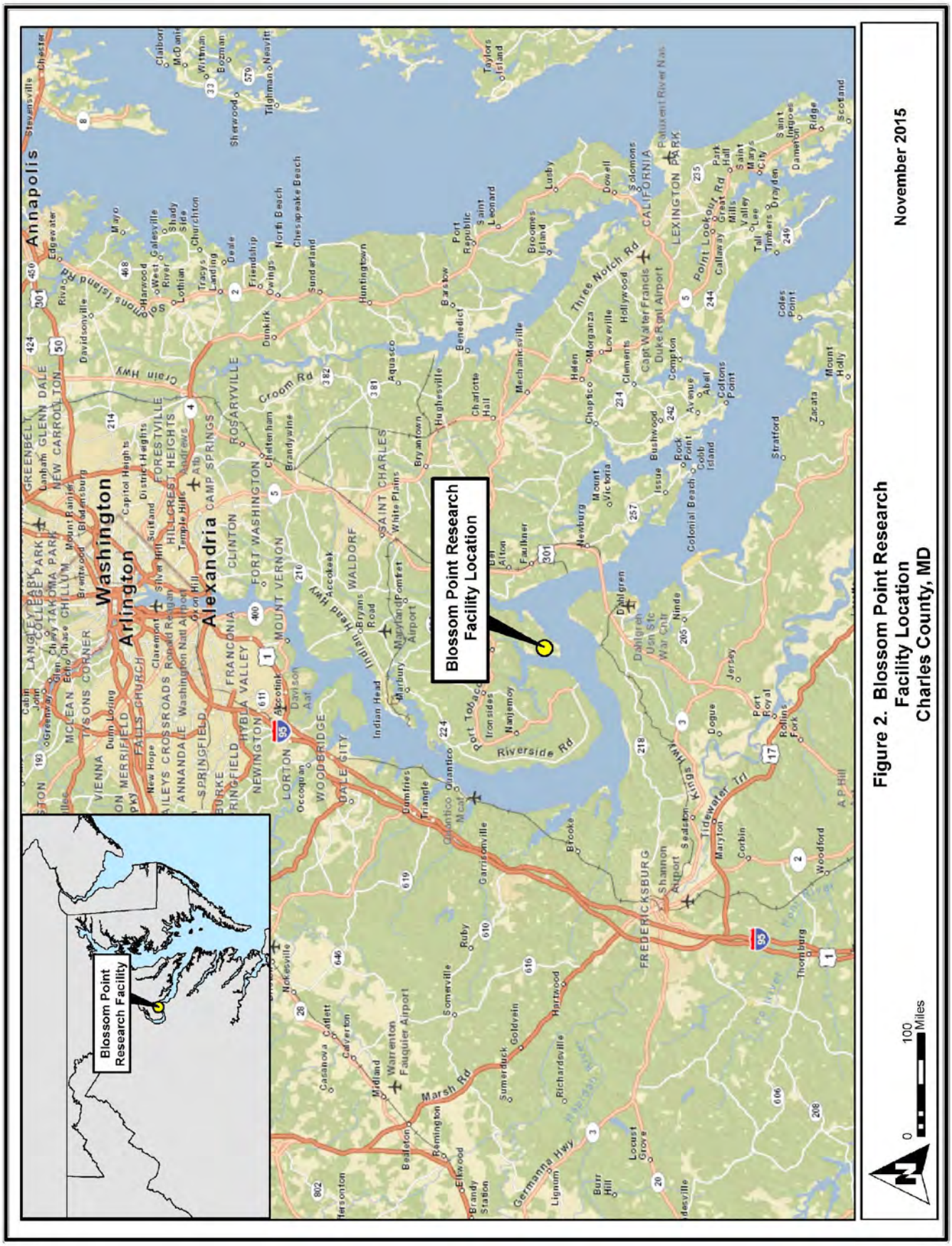
Miles
N


Blossom Point Research Facility Location
Blossom Point Research Facility
Figure 2. Blossom Point Research Facility Location Charles County, MD
November 2015
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Miles
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Surveys (2011). The review indicated previous records of two state-listed RTE species on ALC, Long's rush (*Juncus longii*) and capitate beaked-rush (*Rhynchospora cephalantha*), and potential habitat for RTE species on both ALC and BPRF.

The USFWS and DNR were contacted during the INRMP update in 2014 for information regarding threatened and endangered species and significant habitats on or in the vicinity of the installations. The response correspondence (dated 2013) received from those agencies can be found in the current INRMP (2014). In brief, the response follows:

Federally-Listed Species
USFWS stated that there are no records of Federally-listed species on ALC or BPRF. Habitat for the Federally-listed small whorled pogonia (*Isotria medeloides*) is present on BPRF, though this plant is believed to be extirpated from the State of Maryland. The area of the Potomac River surrounding BPRF may provide spawning habitat for the Atlantic Sturgeon (*Acipenser oxyrinchus*), a federally endangered fish species. Additionally, sensitive joint-vetch (*Aeschynomene* virginica) is known or believed to occur in both Prince Georges and Charles Counties. The following is a link to federally listed species found in Maryland: http://ecos.fws.gov/tess_public/reports/species-listed-by-state-report?state=MD&status=listed

State-Listed Species
On ALC, MDNR indicated the presence of two state-endangered plant species and one highly state-rare habitat, a fall-line terrace gravel bog, in which the two listed species are found. MDNR stated that there were no records of state-listed RTE species on BPRF. Several species and habitats of concern were noted on BPRF, to include bald eagles, waterfowl habitat, habitat for the state endangered rainbow snake, Forest Interior Dwelling Species (FIDS) habitat, terrapin and horseshoe crab spawning habitat, largemouth bass habitat and striped bass and anadromous fish species spawning habitat in the Potomac River. The following is a link to Maryland's listed species: http://dnr2.maryland.gov/wildlife/Pages/plants_wildlife/rte/espaa.aspx

3.2 Data Collection

The RTE surveys were conducted at ALC from 30 June to 2 July, 2015 and at BPRF from 22-24 June and 10-12 August, 2015. The surveys utilized the Trimble GeoXH handheld GPS system for location data collection yielding sub-meter horizontal accuracy. Photographs and the GPS location of any observed RTE species were taken. GPS data was then downloaded to ArcGIS for mapping. This survey horizontally references the North American Datum of 1983 (NAD83), Geographic Coordinate System, World Geodetic System 1984.

3.3 Survey Methods

The surveys were conducted using visual search along transects. A team of two people followed rough transects, spaced approximately 20-30 feet apart, throughout the sites. At ALC, 6 survey days (3 days per surveyor), 8 hours each, were spent in the survey for a total of 48 hours of survey. At BPRF, 12 survey days (6 days per surveyor), 8 hours each, were spent in the survey for a total of 96 hours of survey.

Observations of avian and other wildlife species were recorded as they were encountered. Wildlife species presence were determined by direct observation of an individual, tracks, scat, calls, dens, nests, or any other means available. Particular attention was paid to habitat types that support the threatened or endangered species that may possibly utilize the survey areas.

4.0 SURVEY RESULTS

4.1 Adelphi Laboratory Center

No state or federally-listed RTE species of flora or fauna were observed during the 2015 survey.

The survey was concentrated in undeveloped areas, including forested areas and stream corridors and wetlands. Special attention was given to the Powder Mill Bog, a Fall-line Terrace Gravel Wetland, which is considered a highly state-rare habitat (Figure 3). Two state endangered plant species, Long's rush and capitate beaked-rush, which were recorded in Powder Mill Bog previously, were not observed during planning level surveys in 2011.

Although, the Powder Mill Bog remnant is still intact, neither of the two state-listed plants, mentioned above, were observed during the 2015 survey. However, this highly state-rare habitat could still provide potential habitat for those species, or other RTE species, in the future. Some encroachment of non-native, invasive species, especially Japanese stiltgrass (*Microstegium vimineum*) was noted in the Powder Mill Bog.

Habitat for FIDS, some of which are listed as RTE, does exist on-site and is contiguous with similar habitat in the surrounding area. These large tracts of forest are important habitat for certain bird species and may also serve as summer foraging and roosting habitat for the federally-listed Northern Long-Eared Bat (*Myotis septentrionalis*) and Indiana Bat (*Myotis sodalis*).

Habitat for the spotted turtle (*Clemmys guttata*) is present on ALC. The spotted turtle is currently under a 12 month review period, as of July 2015, to be considered for listing as threatened or endangered.

Figure 3. Location of Powder Mill Bog Remnant on ALC Montgomery and Prince George's Counties, MD

4.2 Blossom Point Research Facility

No federally-listed species of flora or fauna were observed; however, one state rare/watchlist species was observed on site. A single American chestnut (*Castanea dentata*) (Figure 4) was located. The tree had a diameter at breast height (DBH) of 6 inches and a height of approximately 30 feet. It exhibited no signs of the chestnut blight. The American chestnut is state-listed as S2/S3 (State rare/watchlist). The tree was associated with a mature mixed forest type of southern red oak (*Quercus falcata*), white oak (*Quercus alba*), bitternut hickory (*Carya cordiformis*), Virginia pine (*Pinus virginiana*), loblolly pine (*Pinus taeda*), highbush blueberry (*Vaccinium corymbosum*), southern arrowwood (*Viburnum dentatum*), and glaucous greenbrier (*Smilax glauca*).

Habitat for the federally-endangered small-whorled pogonia was observed throughout the site within the mature upland hardwood and mixed deciduous/coniferous forests. The site visits were timed to occur during the flowering period of small-whorled pogonia, but no individuals were observed.

Habitat for the state-endangered rainbow snake (*Farancia erytrogramma*) was noted throughout the site. Habitat is listed as streams, swamps and marshes with floating vegetation for cover. A herptofaunal survey in 2011 (Benedict, 2011) did not locate any individuals. No individual rainbow snakes were observed during this survey.

Habitat for FIDS, some of which are listed as RTE, does exist on-site and is contiguous with similar habitat in the surrounding area. These large tracts of forest are important habitat for certain bird species and may also serve as summer foraging and roosting habitat for the federally-listed Northern Long-Eared Bat and Indiana Bat.

The spotted turtle was observed on BPRF during the planning level surveys in April 2012. Suitable habitat for the spotted turtle is common throughout BPRF. The spotted turtle is under a 12 month review period, as of July 2015, to be considered for listing as threatened or endangered.


Location of American Chestnut
Figure 4. Location of American Chestnut on Blossom Point Research Facility
Facility Location: Charles County, MD
November 2015
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100
Miles
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5.0 CONCLUSIONS/RECOMMENDATIONS

The RTE species surveys were conducted between 23 June and 12 August 2015 at Adelphi Laboratory Center and Blossom Point Research Facility, Prince Georges and Charles Counties, Maryland, respectively. The purpose was to survey for the potential presence of RTE species and/or potential suitable habitat for RTE species.

No state or federally-listed species were observed on ALC. The remnant of the Powder Mill Bog, a highly state-rare habitat was observed. Two state-listed species, which were observed in Powder Mill Bog previously, were not observed during this survey. It is recommended that invasive species control measures be performed on a regular basis in order to preserve the native communities on-site, especially the Powder Mill Bog remnant, which is experiencing some invasive growth.

No federally-listed species were observed on BPRF; one state-listed species was observed. A single American chestnut was located, which is listed as S2/S3 (State rare/watchlist). The American chestnut, once a dominant tree species in eastern forests and valuable to wildlife as well as an important timber species, has been almost eliminated by the chestnut blight, caused by the introduced fungus *Endothia parasitica*. American chestnuts in good condition should be reported to the Maryland State Forest Service for possible use in the propagation of a variety that is resistant to the blight.

Potential habitat for the federally-endangered small-whorled pogonia and the state-endangered rainbow snake was regularly encountered on BRPF, but neither of these two species were observed during this survey.

At both sites, surveys for both the northern long-eared bat and Indiana bat should be performed in order to determine the presence or absence of these federally-listed species. Projects requiring the removal of trees and/or forested area should be coordinated with the USFWS in order to determine potential impacts to the two species.

Should the spotted turtle be listed under the ESA in the future, further surveys may be necessary, especially in areas of proposed projects.

The results of this survey should not be interpreted as meaning that no other potential RTE species exist on the sites. For areas proposed for development, a more in-depth study of the specific site should be performed, as well as future periodic surveys of the entire sites to monitor for potential new occurrences of RTE species.

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APPENDIX A

Photographs

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General overview of forest at ALC

General overview of Paint Branch at ALC

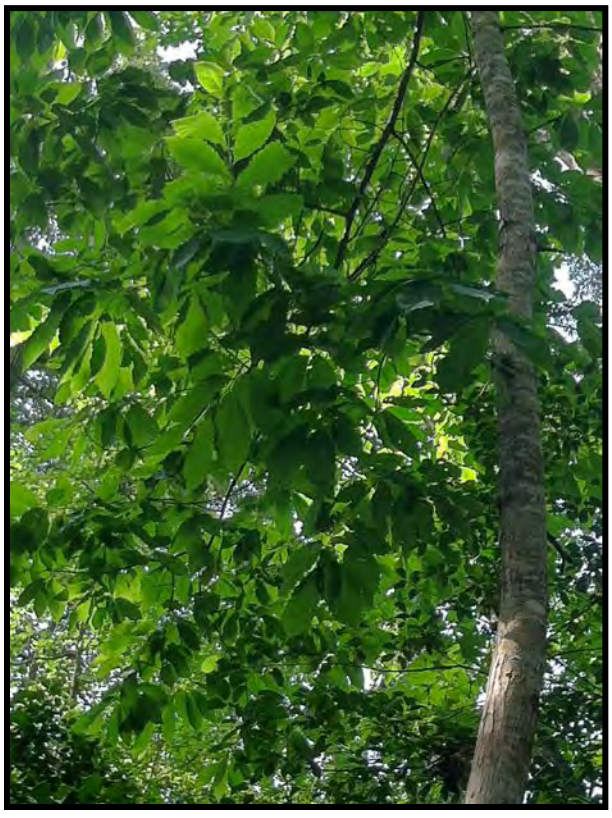
Powder Mill Bog remnant at ALC

Tributary to Paint Branch at ALC

General overview of forested wetland at BPRF

General overview of tidal wetland at BPRF

General overview of forest at BPRF



American chestnut at BPRF-State rare/watchlist

APPENDIX B

Fact Sheets

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FACT SHEET:

Common name: Capitate beakrush or Bunched beaksedge

Scientific name: *Rhynchospora cephalantha*

Status in Maryland: Endangered

Wetland Indicator Status: Obligate (OBL) wetland species

Description: Plants perennial, cespitose, 40–100(–150) cm; rhizomes absent. Culms arching, leafy, obscurely and convexly trigonous, multi-ribbed, slender to stoutish. Principal leaves overtopped by culm; blades linear, flat proximally, 1.5–3 mm wide, apex tapering, trigonous. Inflorescences: spikelet clusters 3–several, widely spaced, often equidistant, mostly hemispheric to globose, occasionally lobed, 1–2 cm thick; bracteal leaves much exceeding subtended inflorescence. Spikelets dark red-brown to dark brown, lance ellipsoid to ellipsoid, 4–5(–6) mm, apex acute; fertile scales elliptic, 3–3.5(–4.5) mm, apex acute, midribs 3, laterals indistinct. Flowers: perianth bristles 6, reaching tubercle tip, retrorsely (rarely antrorsely) barbellate. Fruits 1(–2) per spikelet, 3.5–4(–4.2) mm; body brown with pale center, obovoid distal to stipe, lenticular, 2–2.3 × 1–1.5(–2) mm; tubercle triangular-subulate, (1–)1.5–2 mm, at least 0.5 mm wide at base.

Habitat: Bogs, sandy silts, peaty seeps and shores, and boggy clearings and streams and savanna bogs. Rare, mostly or entirely in the inner Coastal Plain.

Photo courtesy of UCF Arboretum

Fruiting summer—fall. Sandy silts, sands, and peats of shores, boggy streams, seeps, savannas, and savanna bogs; 0—200 m; Ala., Del., Fla., Ga., La., Md., Miss., N.J., N.Y., N.C., S.C., Tex., Va.

Indiana Bat
(Myotis sodalis)

The Indiana bat is an endangered species. Endangered species are animals and plants that are in danger of becoming extinct. Threatened species are those that are likely to become endangered in the foreseeable future. Identifying, protecting, and restoring endangered and threatened species are primary objectives of the U.S. Fish and Wildlife Service's endangered species program.

Photo by Rich Fields

Indiana bats eat up to half their body weight in insects each night.

What is the Indiana Bat?

Description

The scientific name of the Indiana bat is *Myotis sodalis* and it is an accurate description of the species. Myotis means "mouse ear" and refers to the relatively small, mouse-like ears of the bats in this group. Sodalis is the Latin word for "companion." The Indiana bat is a very social species; large numbers cluster together during hibernation. The species is called the Indiana bat because the first specimen described to science in 1928 was based on a specimen found in southern Indiana's Wyandotte Cave in 1904.

The Indiana bat is quite small, weighing only one-quarter of an ounce (about the weight of three pennies). In flight, it has a wingspan of 9 to 11 inches. The fur is dark-brown to black. The Indiana bat is similar in appearance to many other related species. Biologists can distinguish it from similar species by comparing characteristics such as the structure of the foot and color variations in the fur.

Habitat

Indiana bats hibernate during winter in caves or, occasionally, in abandoned mines. For hibernation, they require cool, humid caves with stable temperatures, under 50° F but above freezing. Very few caves within the range of the species have these conditions.

Hibernation is an adaptation for survival during the cold winter months when no insects are available for bats to eat. Bats must store energy in the form of fat before hibernating. During the six months of hibernation the stored fat is their only source of energy. If bats are disturbed or cave temperatures increase, more energy is needed and hibernating bats may starve.

After hibernation, Indiana bats migrate to their summer habitat in wooded areas where they usually roost under loose tree bark on dead or dying trees. During summer, males roost alone or in small groups, while females roost in larger groups of up to 100 bats or more. Indiana bats also forage in or along the edges of forested areas.

Reproduction

Indiana bats mate during fall before they enter caves to hibernate. Females store the sperm through winter and become pregnant in spring soon after they emerge from the caves.

After migrating to their summer areas, females roost under the peeling bark of dead and dying trees in groups of up to 100 or more. Such groups are called maternity colonies. Each female in the colony gives birth to only one pup per year. Young bats are nursed by the mother, who leaves the roost tree only to forage for food. The young stay with the maternity colony throughout their first summer.

Feeding Habits

Indiana bats eat a variety of flying insects found along rivers or lakes and in uplands. Like all insect-eating bats, they benefit people by consuming insects that are considered pests or otherwise harmful to humans. Their role in insect control is not insignificant – Indiana bats eat up to half their body weight in insects each night.

Range

Indiana bats are found over most of the eastern half of the United States. Almost half of all Indiana bats (207,000

in 2005) hibernate in caves in southern Indiana. In 2005, other states which supported populations of over 40,000 included Missouri (65,000), Kentucky (62,000), Illinois (43,000) and New York (42,000). Other states within the current range of the Indiana bat include Alabama, Arkansas, Connecticut, Iowa, Maryland, Michigan, New Jersey, North Carolina, Ohio, Oklahoma, Pennsylvania, Tennessee, Vermont, Virginia, West Virginia. The 2005 population estimate is about 457,000 Indiana bats, half as many as when the species was listed as endangered in 1967.

Why is the Indiana Bat Endangered?

Human Disturbance

Indiana bats, because they hibernate in large numbers in only a few caves, are extremely vulnerable to disturbance. During hibernation, they cluster in groups of up to 500 per square foot. Since the largest hibernation caves support from 20,000 to 50,000 bats, it is easy to see how a large part of the total population can be affected by a single event. Episodes of large numbers of Indiana bat deaths have occurred due to human disturbance during hibernation.

Cave Commercialization and Improper Gating

The commercialization of caves – allowing visitors to tour caves during hibernation – drives bats away. Changes in the structure of caves, such as blocking an entrance, can change the temperature in a cave. A change of even a few degrees can make a cave unsuitable for hibernating bats. Some caves are fitted with gates to keep people out, but improper gating that prevents access by bats or alters air flow, temperature, or humidity can also be harmful. Properly constructed gates are beneficial because they keep people from disturbing hibernating bats while maintaining temperature and other requirements and allowing access for bats.

Summer Habitat Loss or Degradation

Indiana bats use trees as roosting and foraging sites during summer months. Loss and fragmentation of forested habitats can affect bat populations.

Pesticides and Environmental Contaminants

Insect-eating bats may seem to have an unlimited food supply, but in local areas, insects may not be plentiful because of pesticide use. This can also affect the quality of the bats' food supply. Many scientists believe that population declines occurring today might be due, in part, to pesticides and environmental contaminants. Bats may be affected by eating contaminated insects, drinking contaminated water, or absorbing the chemicals while feeding in areas that have been recently treated.

What is Being Done to Prevent Extinction of the Indiana Bat?

Listing

Prompted by declining populations caused by disturbance of bats during hibernation and modification of hibernacula, the Indiana bat was listed in 1967 as "in danger of extinction" under the Endangered Species Preservation Act of 1966. It is listed as "endangered" under the current Endangered Species Act of 1973. Listing under the Endangered Species Act protects the Indiana bat from take (harming, harassing, killing) and requires Federal agencies to work to conserve it.

Recovery Plan

The Endangered Species Act requires that recovery plans be prepared for all listed species. The U.S. Fish and Wildlife Service developed a recovery plan for the Indiana bat in 1983 and is now revising that Plan. The recovery plan describes actions needed to help the bat recover.

Habitat Protection

Public lands like National Wildlife Refuges, military areas, and U.S. Forest Service lands are managed for Indiana bats by protecting forests. This means ensuring that there are the size and species of trees needed by Indiana bats for roosting; and providing a supply of dead and dying trees that can be used as roost sites. In addition, caves used for hibernation are managed to maintain suitable conditions for hibernation and eliminate disturbance.

Education and Outreach

Understanding the important role played by Indiana bats is a key to conserving the species. Helping people learn more about the Indiana bat and other endangered species can lead to more effective recovery efforts.

U.S. Fish & Wildlife Service
1 Federal Drive
Fort Snelling, Minnesota 55111
612/713-5350
http://www.fws.gov/midwest/endangered

December 2006

FACT SHEET:

Common name: Long's Rush

Scientific name: *Juncus longii*

Status in Maryland: Endangered

Wetland Indicator Status: Obligate (OBL) wetland species

Photo courtesy of Kerry Wixted

Description: Stems usually single or sometimes 2-3, 4-10 dm tall, arising from a cordlike stolon up to 2 dm long. Leaves rigid, deep green and narrow. Cyme hemispherical, 1-11 cm long, about half as broad. Flowers 2.5-3.5 mm long, petals olive brown with white margins. Seeds fusiform, yellowish, 8-12 ribbed, white tails unequal.

Flowering-May through September.

Habitat: Early successional seepages with exposed clay or peaty soils, bogs. Rare, endemic to the southeastern United States.

Northern Long-Eared Bat

Myotis septentrionalis

The northern long-eared bat is federally listed as a threatened species under the Endangered Species Act. ***Endangered*** species are animals and plants that are in danger of becoming extinct. ***Threatened*** species are animals and plants that are likely to become endangered in the foreseeable future. Identifying, protecting and restoring endangered and threatened species is the primary objective of the U.S. Fish and Wildlife Service's Endangered Species Program.

Photo by Steve Taylor, University of Illinois

This northern long-eared bat, observed during an Illinois mine survey, shows visible symptoms of white-nose syndrome.

What is the northern long-eared bat?

Appearance: The northern long-eared bat is a medium-sized bat with a body length of 3 to 3.7 inches and a wingspan of 9 to 10 inches. Their fur color can be medium to dark brown on the back and tawny to pale-brown on the underside. As its name suggests, this bat is distinguished by its long ears, particularly as compared to other bats in its genus, *Myotis*.

Winter Habitat: Northern long-eared bats spend winter hibernating in caves and mines, called hibernacula. They use areas in various sized caves or mines with constant temperatures, high humidity, and no air currents. Within hibernacula, surveyors find them hibernating most often in small crevices or cracks, often with only the nose and ears visible.

Summer Habitat: During the summer, northern long-eared bats roost singly or in colonies underneath bark, in cavities or in crevices of both live trees and snags (dead trees). Males and non-reproductive females may also roost in cooler places, like caves and mines. Northern long-eared bats seem to be flexible in selecting roosts, choosing roost trees based on suitability to retain bark or provide cavities or crevices. They rarely roost in human structures like barns and sheds.

Reproduction: Breeding begins in late summer or early fall when males begin to swarm near hibernacula. After copulation, females store sperm during hibernation until spring. In spring, females emerge from their hibernacula, ovulate and the stored sperm fertilizes an egg. This strategy is called delayed fertilization.

After fertilization, pregnant bats migrate to summer areas where they roost in small colonies and give birth to a single pup. Maternity colonies of females and young generally have 30 to 60 bats at the beginning of the summer, although larger maternity colonies have also been observed. Numbers of bats in roosts typically decrease from the time of pregnancy to post-lactation. Most bats within a maternity colony give birth around the same time, which may occur from late May or early June to late July, depending where the colony is located within the species' range. Young bats start flying by 18 to 21 days after birth. Maximum lifespan for the northern long-eared bat is estimated to be up to 18.5 years.

Feeding Habits: Like most bats, northern long-eared bats emerge at dusk to feed. They primarily fly through the understory of forested areas feeding on moths, flies, leafhoppers, caddisflies, and beetles, which they catch while in flight using echolocation or by gleaning motionless insects from vegetation.

Range: The northern long-eared bat's range includes much of the eastern and north central United States, and all Canadian provinces from the Atlantic Ocean west to the southern Yukon Territory and eastern British Columbia. The species' range includes 37 States and the District of Columbia: Alabama, Arkansas, Connecticut, Delaware, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, Virginia, West Virginia, Wisconsin, and Wyoming.

Why is the northern long-eared bat in trouble?

White-nose Syndrome: No other threat is as severe and immediate as

this. If this disease had not emerged, it is unlikely that northern long-eared bat populations would be experiencing such dramatic declines. Since symptoms were first observed in New York in 2006, white-nose syndrome has spread rapidly from the Northeast to the Midwest and Southeast; an area that includes the core of the northern long-eared bat's range, where it was most common before this disease. Numbers of northern long-eared bats (from hibernacula counts) have declined by up to 99 percent in the Northeast. Although there is uncertainty about the rate that white-nose syndrome will spread throughout the species' range, it is expected to continue to spread throughout the United States in the foreseeable future.

Other Sources of Mortality:
Although no significant population declines have been observed due to the sources of mortality listed below, they may now be important factors affecting this bat's viability until we find ways to address WNS.

Impacts to Hibernacula: Gates or other structures intended to exclude people from caves and mines not only restrict bat flight and movement, but also change airflow and microclimates. A change of even a few degrees can make a cave unsuitable for hibernating bats. Also, cave-dwelling bats are vulnerable to human disturbance while hibernating. Arousal during hibernation causes bats to use up their energy stores, which may lead to bats not surviving through winter.

Loss or Degradation of Summer Habitat: Highway construction, commercial development, surface mining, and wind facility construction permanently remove habitat and are activities prevalent in many areas of this bat's range. Many forest management activities benefit bats by keeping areas forested rather than converted to other uses. But, depending on type and timing, some forest management activities can cause mortality and temporarily remove or degrade roosting and foraging habitat.

Wind Farm Operation: Wind turbines kill bats, and, depending on the species, in very large numbers. Mortality from windmills has been documented for northern long-eared bats, although a small number have been found to date. However, there are many wind projects within a large portion of the bat's range and many more are planned.

What Is Being Done to Help the Northern Long-Eared Bat?

Disease Management: Actions have been taken to try to reduce or slow the spread of white-nose syndrome through human transmission of the fungus into caves (e.g. cave and mine closures and advisories; national decontamination protocols). A national plan was prepared by the Service and other state and federal agencies that details actions needed to investigate and manage white-nose syndrome. Many state and federal agencies, universities and non-governmental organizations are researching this disease to try to control its spread and address its affect. See www.whitenosesyndrome.org/ for more.

Addressing Wind Turbine Mortality: The Service and others are working to minimize bat mortality from wind turbines on several fronts. We fund and conduct research to determine why bats are susceptible to turbines, how to operate turbines to minimize mortality and where important bird and bat migration routes are located. The Service, state natural resource agencies, and the wind energy industry are developing a Midwest Wind Energy Habitat Conservation Plan, which will provide wind farms a mechanism to continue operating legally while minimizing and mitigating listed bat mortality.

Listing: The northern long-eared bat is listed as a threatened species under the federal Endangered Species Act. Listing a species affords it the protections of the Act and also increases the priority of the species for funds, grants, and recovery opportunities.

Hibernacula Protection: Many federal and state natural resource agencies and conservation organizations have protected caves and mines that are important hibernacula for cave-dwelling bats.

What Can I Do?

Do Not Disturb Hibernating Bats: To protect bats and their habitats, comply with all cave and mine closures, advisories, and regulations. In areas without a cave and mine closure policy, follow approved decontamination protocols (see http://whitenosesyndrome.org/topics/decontamination). Under no circumstances should clothing, footwear, or equipment that was used in a white-nose syndrome affected state or region be used in unaffected states or regions.

Leave Dead and Dying Trees Standing: Like most eastern bats, the northern long-eared bat roosts in trees during summer. Where possible and not a safety hazard, leave dead or dying trees on your property. Northern long-eared bats and many other animals use these trees.

Install a Bat Box: Dead and dying trees are usually not left standing, so trees suitable for roosting may be in short supply and bat boxes may provide additional roost sites. Bat boxes are especially needed from April to August when females look for safe and quiet places to give birth and raise their pups.

Support Sustainability: Support efforts in your community, county and state to ensure that sustainability is a development goal. Only through sustainable living will we provide rare and declining species, like the northern long-eared bat, the habitat and resources they need to survive alongside us.

Spread the Word: Understanding the important ecological role that bats play is a key to conserving the northern long-eared and other bats. Helping people learn more about the northern long-eared bat and other endangered species can lead to more effective recovery efforts. For more information, visit www.fws.gov/midwest/nleb and www.whitenosesyndrome.org

Join and Volunteer: Join a conservation group; many have local chapters. Volunteer at a local nature center, zoo, or national wildlife refuge. Many state natural resource agencies benefit greatly from citizen involvement in monitoring wildlife. Check your state agency websites and get involved in citizen science efforts in your area.

FACT SHEET:

Common Name: Rainbow Snake

Scientific Name: *Farancia erytrogramma erytrogramma*

Photo courtesy of Lance Benedict

Size:
36 inches – 44 inches. Record: 60 inches.

Appearance:

- This beautiful glossy iridescent snake is like no other in Maryland.
- It has 3 red stripes on a blue-black background running the length of its body.
- The belly is primarily red with paired rows of black spots.
- The tail is short and ends in a sharp tip, which it may use to probe the ground.
- The scales are usually keelless but there may be some keeled scales above the vent.
- The anal plate is usually divided, but may also be single.

Habitats:

This is a highly aquatic species, preferring swamps, marshes, and slow-moving streams. They tolerate brackish water. They will also be found on dry land, burrowing in moist soil, muck or a sandy substrate.

How to Find:

This is a highly rare species in Maryland. These snakes are swimmers and burrowers. Young may be found by looking under boards or other cover near streams. This snake is state listed as Endangered in Maryland. If you find one, please contact the MD DNR Wildlife and Heritage Service.

Distribution in Maryland:

Found infrequently on the western portion of the Coastal Plain and possibly in the Potomac valley into Montgomery County.

Information for Fact Sheet Courtesy of Maryland Department of Natural Resources Website.

Small Whorled Pogonia

Isotria medeoloides

States where the small whorled pogonia, an orchid, is found.

Photos by USFWS; Sarena Selbo (right) and Susi vonOettingen (left)

The small whorled pogonia is a threatened species. Threatened species are animals and plants that are likely to become endangered in the foreseeable future. Endangered species are animals and plants that are in danger of becoming extinct. Identifying, protecting, and restoring endangered and threatened species is the primary objective of the U.S. Fish and Wildlife Service's endangered species program.

What is the small whorled pogonia?

Appearance - The small whorled pogonia is a member of the orchid family. It usually has a single grayish-green stem that grows about 10 inches tall when in flower and about 14 inches when bearing fruit. The plant is named for the whorl of five or six leaves near the top of the stem and beneath the flower. The leaves are grayish-green, somewhat oblong and 1 to 3.5 inches long. The single or paired greenish-yellow flowers are about 0.5 to 1 inch long and appear in May or June. The fruit, an upright ellipsoid capsule, appears later in the year.

Range - Although widely distributed, the small whorled pogonia is rare. It is found in 17 eastern states and Ontario, Canada. Populations are typically small with less than 20 plants. It has been extirpated from Missouri, New York, Vermont, and Maryland.

Habitat - This orchid grows in older hardwood stands of beech, birch, maple, oak, and hickory that have an open understory. Sometimes it grows in stands of softwoods such as hemlock. It prefers acidic soils with a thick layer of dead leaves, often on slopes near small streams.

What is the small whorled pogonia? (continued)

Reproduction - This pogonia flowers from mid-May to mid-June, with the flowers lasting only a few days to a week. It may not flower every year but when it does flower, one or two flowers are produced per plant. If pollinated, a capsule forms that contains several thousand minute seeds. The pogonia appears to self-pollinate by mechanical processes. The flower lacks both nectar guides and fragrance and insect pollination has not been observed.

Why is the small whorled pogonia threatened?

Habitat Loss and Degradation - The primary threat to the small whorled pogonia is the past and continuing loss of populations when their habitat is developed for urban expansion. Some forestry practices eliminate habitat. Also, habitat may be degraded or individual plants lost because of recreational activities and trampling.

Collection - As with all rare orchids, the small whorled pogonia is vulnerable to collecting for commercial or personal use.

What Is being done to prevent extinction of the small whorled pogonia?

Listing - The small whorled pogonia was added to the U.S. List of Endangered and Threatened Wildlife and Plants in 1982 as an endangered species. In 1994 it was reclassified to threatened.

Recovery Plan - The U.S. Fish and Wildlife Service prepared a recovery plan and revised that plan in 1992. The Recovery Plan describes and prioritizes actions needed to help recover the species.

Research - Many small whorled pogonia populations are being monitored to determine long-term population trends. Habitat management techniques, such as reducing shade through selected tree removal are being investigated.

Habitat Protection - A variety of government and private conservation agencies are working to preserve the small whorled pogonia and its habitat. Voluntary protection agreements have also been made with some private landowners.

What can I do to help prevent extinction of species?

Learn - Learn more about the small whorled pogonia and other endangered and threatened species. Understand how the destruction of habitat leads to loss of endangered and threatened species and our nation's plant and animal diversity.

Volunteer - Volunteer at your local zoo, wildlife refuge or nature center. Work with their staff or other community members to maintain and restore local habitat.

Protect – Protect native plants by cleaning your shoes after hiking to avoid spreading invasive plants seeds and staying on trails if you are hiking in an area with rare plants in the the understory.

Grow Natives - Grow native plants in your lawn and garden but obtain the plants from local nurseries, do not dig up native plants from natural areas. Avoid using invasive, non-native plants in landscaping, such as purple loosestrife, bush honeysuckles and burning bush.

U.S. Fish & Wildlife Service
1 Federal Drive
Fort Snelling, Minnesota 55111
612/713-5350
http://www.fws.gov/midwest/endangered

January 2008

Fact Sheet: Spotted Turtle
Clemmys guttata

Description:

- Length (carapace): 3-5 in (7.5-12.5 cm)
- Sexual dimorphism: Males tend to have brown eyes and chin and a slightly concave plastron (lower shell), females have orange eyes, a yellow chin and a flat plastron. Females are slightly larger than males on average.
- Physical Description: a very small turtle. The carapace is smooth, without obvious growth ridges on the scutes. The plastron has visible growth ridges, but these are not a reliable way to age the individual.
- Coloration: As the name suggests, spotted turtles have yellow spots on their carapace, which is dark brown or black. Older individual's spots may be faded, and some individuals lack spots. The plastron is yellow or orange, and has a large black spot in each scute that grows larger with age. The head is black, with varying amounts of yellow spots, and a yellow or orange blotch on either side. The underside of the neck is reddish- orange to pink.

Habitat and Range:

- Geographic range: Great Lakes region and Atlantic seaboard, from southern Canada to Florida
- Preferred Habitat: Shallow wetlands, including wet meadows, bogs, swamps, ponds, ditches, and other small, calm bodies of water.

Diet:

- Omnivorous
    - Animal diet includes invertebrates, small fish, small frogs and tadpoles. Will also occasionally feed on carrion.
    - Plant diet includes algae and aquatic plants, especially the seeds of water lilies.

Adaptations:

- Have a shell for protection
- Flattened shell and webbed feet aid in swimming
- Can slow their heartbeat so they need less oxygen when under water
- Like other cold-blooded creatures, they will bask in the sun for warmth, but retreat into

the water if they need to cool off
- No teeth, but jaws have tough, horny plates for gripping food
- During the winter, the turtles will hibernate by burying themselves in the mud. In the peak heat of summer they are also known to become dormant, seeking shelter from the heat on land, under tree roots.

Lifespan:

- 30+ years

Ecosystem relationships:

- Predators: Preyed on by a wide variety of species, but most common predators are raccoons and muskrats.
- Interspecies competitors: Spotted turtles compete with other aquatic turtles, wading birds, predatory fish and some mammals for prey items.
- Role/ Niche: Spotted turtles fit an important role as both predators of invertebrates and other spall prey, and as a source of food for larger predators.

Reproduction:

- Breeding season: courtship and mating occurs in early spring, and females lay eggs in late spring.
- Behavior: Males pursue females in the water, where breeding takes place. Females find nesting spots in sunny locations with moist, well drained soil.
- Incubation: 11 weeks, faster with warmer temperatures. Sex of offspring dependent on temperature during the middle of the incubation period, with cooler temperatures producing more males, and warmer temperatures producing more females.
- Offspring: 3-4 eggs per clutch on average, usually only one clutch per year, but multiple clutches possible, especially in captivity.
- Maturation: Spotted turtles reach reproductive maturity at about 7-14 years old.

Activity:

- Diurnal

Conservation Status and Threats:

- Listed on the IUCN Red List as Endangered.
- Threats
    - The biggest threat to spotted turtles is habitat loss and degradation.
    - The species currently survives in sporadic localized populations, many of which are in decline. This population fragmentation makes them vulnerable to extinction, since the genetics of isolated populations tends to become stagnant.
- Conservation efforts:
    - As an endangered species, spotted turtles are protected from the pet trade and from killing by local and federal regulations.
    - Further habitat protection and restoration is needed to ensure the survival of this species.

APPENDIX H:
Amphibian and Reptile Species Surveys

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US Army Corps of Engineers
Baltimore District

Amphibian and Reptile Species Surveys

U.S. Army Garrison Adelphi Laboratory Center and Blossom Point Research Facility
Prince Georges and Charles Counties, Maryland

Prepared for: **U.S. Army Garrison Adelphi Laboratory Center,**
Environmental Division
2800 Powder Mill Road
Adelphi, Maryland 20783

Prepared by: **U.S. Army Corps of Engineers, Baltimore District**
2 Hopkins Plaza
Baltimore, Maryland 21201

January 2019

AMPHIBIAN AND REPTILE SPECIES SURVEYS

U.S. ARMY GARRISON ADELPHI LABORATORY CENTER AND BLOSSOM POINT RESEARCH FACILITY
Prince Georges and Charles Counties, Maryland

Prepared for:

U.S. Army Garrison Adelphi Laboratory Center
Environmental Division
2800 Powder Mill Road
Adelphi, Maryland 20783

Prepared by:

U.S. Army Corps of Engineers
Baltimore District
2 Hopkins Plaza
Baltimore, Maryland 21201

January 2019

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1.0 INTRODUCTION

The U.S. Army Corps of Engineers, Baltimore District (USACE) conducted amphibian and reptile surveys at U.S. Army Garrison Adelphi Laboratory Center (ALC) and Blossom Point Research Facility (BPRF). Surveys were conducted at both facilities between March and June 2018 to record presence of various species of amphibians and reptiles found on the facilities. ALC, headquarters of the Army Research Laboratory, is an active military research and development facility, approximately 207 acres in size, located in both Prince Georges and Montgomery Counties, Maryland (Figure 1). BPRF, a satellite installation to ALC, is an active military testing range, approximately 1,600 acres in size, located in Charles County, Maryland (Figure 1).

2.0 STUDY PURPOSE

The purpose of this study was to conduct surveys during spring, summer and fall of ALC and BPRF to record the various species of amphibian and reptile which occur on both sites. This survey is a supplement to the existing Integrated Natural Resource Management Plan (INRMP) and Planning Level Surveys at ALC and BPRF.

Additionally, both installations were chosen to be part of a Department of Defense study on Snake Fungal Disease (SFD). During the course of the amphibian and reptile surveys, samples of any snakes encountered were taken to be analyzed for the presence of the disease.

3.0 METHODS

This study was accomplished through (1) a desktop reconnaissance of available studies conducted on and around the environs of ALC and BPRF; (2) field surveys at the installations to document species; and (3) creation of maps depicting findings.

3.1 Desktop Reconnaissance

Prior to conducting field surveys, USACE reviewed available data from the 2014 ALC and BPRF INRMP and associated agency coordination, the 2011 Planning Level Surveys, the 2015 Rare, Threatened and Endangered Species Survey, and *A Herptofaunal Survey of Blossom Point Research Facility with Emphasis on the Rainbow Snake, Farancia erytrogramma* (2011).

The USFWS and DNR were contacted during the INRMP update in 2014 for information regarding threatened and endangered species and significant habitats on or in the vicinity of ALC and BPRF. Correspondence (dated 2013) received from those agencies can be found in the current INRMP (2014).

Figure 1. Location of Adelphi Laboratory Center and Blossom Point Research Facility

3.2 Data Collection

The amphibian and reptile surveys were conducted at ALC and BPRF from March to October 2018. The surveys utilized the Trimble GeoXH handheld GPS system for location data collection yielding sub-meter horizontal accuracy. Photographs and the GPS locations of Focal Areas and snake samples were collected. ArcGIS was used for mapping of the GPS data. This survey horizontally references the North American Datum of 1983 (NAD83), Geographic Coordinate System, World Geodetic System 1984.

3.3 Survey Methods

The surveys were conducted using ARVES (amphibian and reptile visual encounter surveys) a standard survey method, which does not utilize ground intrusive techniques, such as pit fall traps and drift fences (Heyer et al. 1994). Based on knowledge from previous surveys and document review, Focal Areas on each installation were selected (Figures 2 and 3), which had the optimal habitat for both early season amphibian breeding and later season habitat for reptiles and non-breeding amphibians. Focal areas included natural and man-made vernal pools, wetlands, streams and floodplains, storm water management ponds, and other habitats with food, cover and water. Remaining areas, outside of the Focal Areas, of both installations were divided into rough transects, which were sampled by a team of two people, spaced approximately 30-40 feet apart, during multiple site visits throughout the sampling period. All movable debris (logs, rocks etc.) in the Focal Areas and along transects were surveyed under and replaced in the original location. Night call surveys were performed on ALC in April 2017, which involved listening for frog calls at various locations throughout the installation.

Sampling for SFD occurred during regular amphibian and reptile surveys. Any snakes encountered were captured and swabbed for skin/DNA samples, including samples of visible skin lesions, which may be caused by the disease. Snake sample locations on ALC and BPRF can be found in Figures 2 and 3. Swab samples have been sent to the University of Illinois Wildlife Epidemiology Lab to test for the presence of the fungus, *Ophidiomyces ophiodiicola*, which causes the disease. A fact sheet on SFD from Cornell University Wildlife Health Laboratory is located in Appendix C.

4.0 SURVEY RESULTS

4.1 Adelphi Laboratory Center

Thirteen species of amphibians and reptiles were observed on the installation, including two species of salamander, five species of frogs and toads, two turtle species, three snake species and one species of lizard. The results are presented in Table 1.

None of the species observed are state- or federally-listed species covered under the Endangered Species Act. Nine individual snakes, from two species, were sampled for SFD. The results of the snake sampling are summarized in Table 2. Three snakes sampled exhibited skin lesions which are commonly associated with SFD. Lab results have not been received to date to confirm the cause of the lesions.

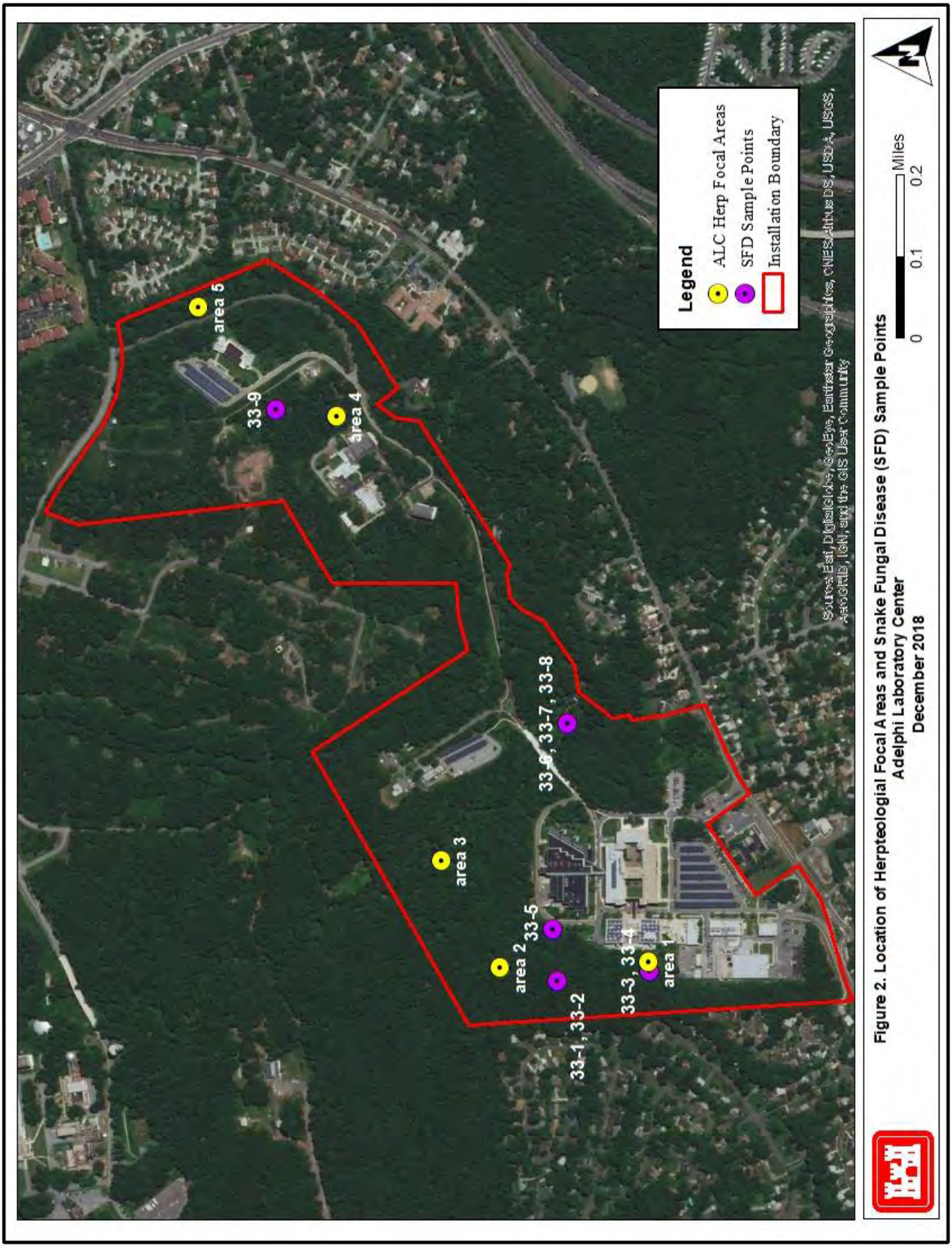

Figure 2. Location of Herpteological Focal Areas and Snake Fungal Disease (SFD) Sample Points
Adelphi Laboratory Center
December 2018

Figure 3. Location of Herpetological Focal Areas and SFD on Blossom Point Research Facility
December 2018

Table 1: Amphibian and Reptiles Observed at ALC and BPRF

Common name	Scientific name	Habitat	Tally	Status	Installation
AMPHIBIANS					
NEWTS AND SALAMANDERS					
Spotted salamander	*Ambystoma maculatum*	vernal pool and marsh fringe	12	Secure	BPRF
Red-spotted newt (red eft)	*Notophthalmus viridescens viridescens*	vernal pool fringe	1	Secure	BPRF
Red-backed salamander	*Plethodon cinereus*	upland forest	6	Secure	ALC
Four-toed salamander	*Hemidactylium scutatum*	vernal pool fringe	1	Secure	BPRF
Northern two-lined salamander	*Eurycea bislineata*	Hillendale run	4	Secure	ALC
Marbled salamander	*Ambystoma opacum*	vernal pool fringe	1	Secure	BPRF
FROGS AND TOADS					
Spring peeper	*Pseudacris crucifer*	Vernal pool/storm ponds	10+	Secure	ALC/BPRF
Gray treefrog	*Hyla versicolor*	deciduous upland and wetland forests	10+	Secure	ALC/BPRF
Bull frog	*Lithobates catesbeiana*	wetlands and streams	3	Secure	ALC/BPRF
Northern green frog	*Lithobates clamitans melanota*	wetlands and streams	10+	Secure	ALC/BPRF
Northern cricket frog	*Acris crepitans crepitans*	forested and emergent wetlands	5	Secure	BPRF
Southern leopard frog	*Lithobates sphenocephalus utricularius*	forested and emergent wetlands	1	Secure	BPRF
Fowlers toad	*Anaxyrus fowleri*	upland deciduous/mixed forest	7	Secure	BPRF
Eastern American toad	*Anaxyrus americanus americanus*	upland deciduous/mixed forest	10+	Secure	ALC/BPRF
REPTILES					
TURTLES					
Spotted turtle	*Clemmys guttata*	forested and emergent wetlands	8	Secure	BPRF
Snapping turtle*	*Chelydra s. serpentina*	Hillendale Run	1	Secure	ALC
Eastern mud turtle	*Kinosternon s. subrubrum*	shoreline/tidal marsh	2	Secure	BPRF
Eastern box turtle	*Terrapine c. carolina*	deciduous upland and wetland forests	10+	Secure	ALC/BPRF
Painted turtle	*Chrysemys p. picta*	vernal pools/marsh	3	Secure	BPRF

SNAKES					
Eastern worm snake	*Carphophis amoenus amoenus*	upland deciduous forest	5	Secure	ALC/BPRF
Black racer	*Coluber constrictor constrictor*	upland deciduous forest/maintained lawn	4	Secure	BPRF
Northern water snake	*Nerodia sipedon sipedon*	shoreline/tidal marsh/storm water management pond	8	Secure	ALC/BPRF
Eastern black rat snake**	*Pantherophis alleghaniensis*	upland deciduous forest/maintained lawn	3	Secure	BPRF
Eastern hog-nosed snake**	*Heterodon platirhinos*	upland pine forest	1	Secure	BPRF
Eastern garter snake*	*Thamnophis sirtalis sirtalis*	upland deciduous forest/maintained lawn	3	Secure	ALC/BPRF
LIZARDS					
Five-lined skink	*Plestiodon fasciatus*	upland deciduous forest	10+	Secure	ALC/BPRF
Broad-headed skink	*Plestiodon laticeps*	upland deciduous forest	3	Secure	BPRF
Little brown skink	*Scincella lateralis*	upland mixed forest	1	Secure	BPRF

*Indicates a species observed at ALC during previous surveys
** Indicates a species observed at BPRF during previous surveys

4.2 Blossom Point Research Facility

Twenty-five species of amphibians and reptiles were observed on the installation, including three species of salamander, one species of newt, eight species of frogs and toads, four turtle species, six snake species and three species of lizard. The results are presented in Table 1.

None of the species observed are state- or federally-listed species covered under the Endangered Species Act. Five individual snakes, from two species, were sampled for SFD. The results of the snake sampling are summarized in Table 2. Two snakes sampled exhibited skin lesions which are commonly associated with SFD. Lab results have not been received to date to confirm the cause of the lesions.

Habitat for the state-endangered rainbow snake (*Farancia erytrogramma*) was noted throughout the site. Habitat is listed as streams, swamps and marshes with floating vegetation for cover. A herptofaunal survey in 2011 (Benedict, 2011) did not locate any individuals. No individual rainbow snakes were observed during this survey. Future surveys by boat/canoe within the tidal marshes may provide a greater probability of observing this highly cryptic reptile.

Table 2: Snakes Sampled for SFD at ALC and BPRF

Common name	Scientific name	Sample number	Habitat	Lesions (Y/N)	Age class
ALC					
Eastern worm snake	*Carphophis amoenus amoenus*	33-1	decaying log in mature forest	Y	adult
Eastern worm snake	*Carphophis amoenus amoenus*	33-2	decaying log in mature forest	N	adult
Northern water snake	*Nerodia sipedon sipedon*	33-3	SWM outfall	Y	adult
Northern water snake	*Nerodia sipedon sipedon*	33-4	SWM outfall	Y	adult
Northern water snake	*Nerodia sipedon sipedon*	33-5	log pile behind sampling station	N	adult
Northern water snake	*Nerodia sipedon sipedon*	33-6	under filter cloth on rock in Paint Branch	N	juvenile
Northern water snake	*Nerodia sipedon sipedon*	33-7	under filter cloth on rock in Paint Branch	N	juvenile
Northern water snake	*Nerodia sipedon sipedon*	33-8	under filter cloth on rock in Paint Branch	N	juvenile
Eastern worm snake	*Carphophis amoenus amoenus*	33-9	under debris next to building	N	adult
BPRF					
Black racer	*Coluber constrictor constrictor*	32-1	under port-a-pot	Y	adult
Black racer	*Coluber constrictor constrictor*	32-2	log pile near port-a-pot	Y	adult
Black racer	*Coluber constrictor constrictor*	33-3	grass roadside	N	adult
Eastern worm snake	*Carphophis amoenus amoenus*	33-4	decaying log in dry vernal pool	N	adult
Black racer	*Coluber constrictor constrictor*	33-5	road mortality	N	hatchling

5.0 CONCLUSIONS/RECOMMENDATIONS

The amphibian and reptile surveys were conducted between March and October 2018 at Adelphi Laboratory Center and Blossom Point Research Facility, Prince Georges and Charles Counties, Maryland, respectively. The purpose was to record the presence of amphibian and reptile species observed on both installations.

Twenty-eight species of amphibians and reptiles (3 species of which were observed during previous surveys) were observed on the installation. Five species of salamander, one species of

newt, eight species of frogs and toads, five turtle species, six snake species, and three species of lizard. The number of snake species observed during the surveys was substantially lower than the potential number of snake species for the area and given that suitable habitat for multiple species is present at the sites. Future surveys may observe greater diversity with the inclusion of more extensive night surveys and aquatic surveys by boat/canoe within the tidal marshes.

None of the species observed are state- or federally-listed species covered under the Endangered Species Act. Fourteen individual snakes, from three species, were sampled for SFD. Five of the snakes sampled exhibited skin lesions which are commonly associated with SFD. Lab results have not been received to date to confirm the cause of the lesions.

Guidelines and recommendations provided in the ALC and BPRF INRMP, Habitat Management Plan, Forest Management Plan, and the DoD Strategic Plan for Amphibian and Reptile Conservation and Management (Appendix B) should continue to be followed for the protection and management of amphibian and reptile species and surrounding habitats.

The results of this survey should not be interpreted as meaning that no other potential amphibian and reptile species exist on the sites. For areas proposed for development, a more in-depth study of the specific site should be performed, as well as future periodic surveys of the entire sites to monitor for potential new occurrences of amphibian and reptile species.

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U.S. Army Adelphi Laboratory Center. 2017. U.S. Army Adelphi Laboratory Center. Habitat Management Plan. ALC Department of Public Works, Adelphi, Maryland.

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APPENDIX A

Photographic Record

Photo 1 – Representative natural Vernal pool - BPRF Focal Area 1

Photo 2 – Representative man-made vernal pool – BPRF Focal Area 4

Photo 3 – Palustrine forested wetland – BPRF Focal Area 5

Photo 4 – Eastern box turtle - ALC

Photo 5 – Northern water snake eating American eel - ALC

Photo 6 – Four-toed salamander - BPRF

Photo 7 – Spotted salamander egg mass from vernal pool - BPRF

Photo 8 – Spotted salamanders - BPRF

Photo 9 – Palustrine emergent wetland - BPRF

Photo 10 – Marbled salamander larvae - BPRF

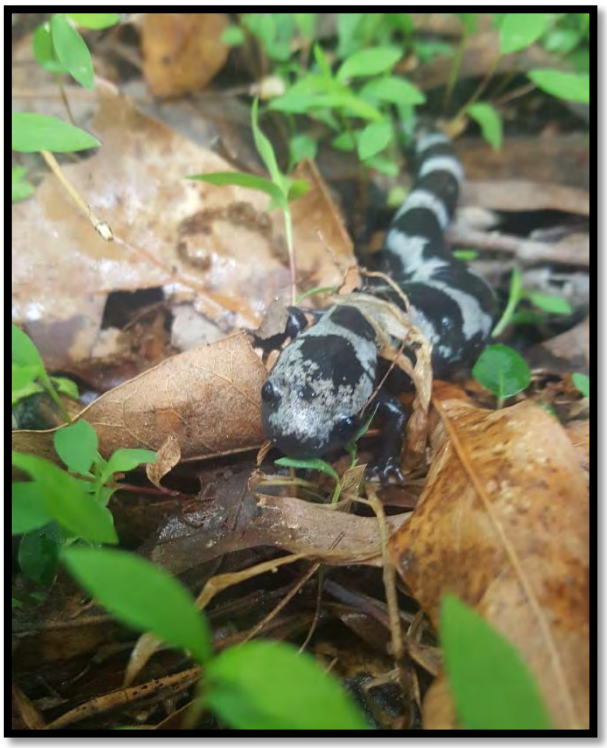

Photo 11 – Marbled salamander - BPRF

Photo 12 – Spotted turtle - BPRF

Photo 13 – Mud turtle - BPRF

Photo 14 – Southern leopard frog- BPRF

Photo 15 – Northern cricket frog - BPRF

Photo 16 – Red eft – juvenile form of red-spotted newt - BPRF

Photo 17 – Northern watersnake sampled for snake fungal disease - ALC

Photo 18 – Juvenile northern watersnake sampled for snake fungal disease - ALC

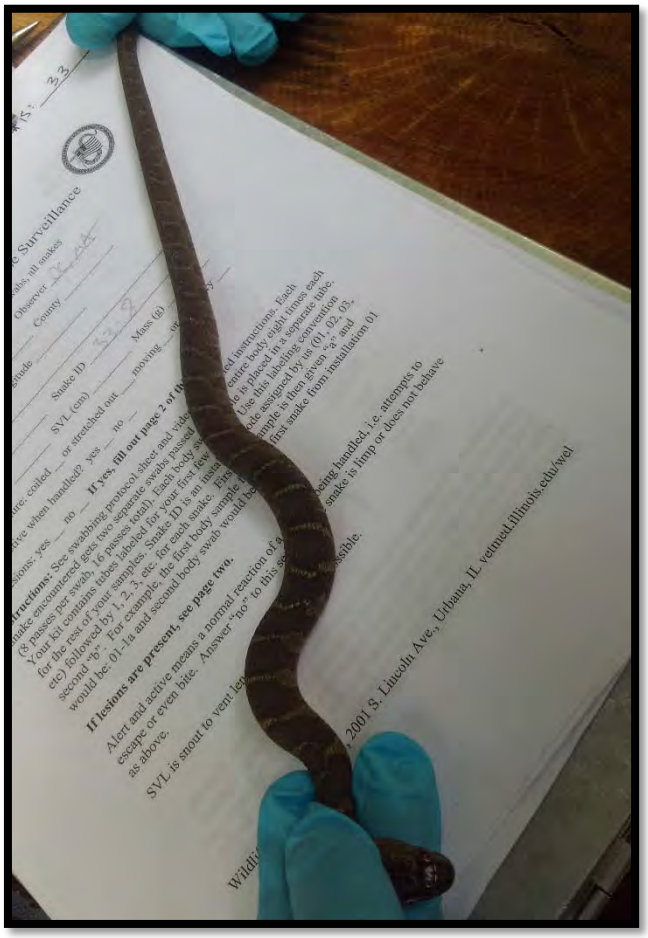

Photo 19 – Juvenile northern water snake sampled for snake fungal disease - ALC

Photo 20 – Black racer with lesion sampled for snake fungal disease - BPRF

Photo 21 – Black racer sampled for snake fungal disease - BPRF

Photo 22 – Black racer sampled for snake fungal disease - BPRF

Photo 23 – Worm snake sampled for snake fungal disease - BPRF

Photo 24 – Eastern box turtle – male (top left) and female - BPRF

Photo 25 – American toad - ALC

APPENDIX B

Strategic Plan for Amphibian and Reptile Conservation and Management on Department of Defense Lands

Strategic Plan for Amphibian and Reptile Conservation and Management on Department of Defense Lands

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
3400 DEFENSE PENTAGON
WASHINGTON, DC 20301-3400

ENERGY,
INSTALLATIONS
AND ENVIRONMENT

FEB 19 2015

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS, ENERGY AND ENVIRONMENT)
ASSISTANT SECRETARY OF THE NAVY (ENERGY, INSTALLATIONS AND ENVIRONMENT)
ASSISTANT SECRETARY OF THE AIR FORCE (INSTALLATIONS, ENVIRONMENT AND ENERGY)
DIRECTOR, DEFENSE LOGISTICS AGENCY

SUBJECT: Strategic Plan for Amphibian and Reptile Conservation and Management on Department of Defense Lands

The Department of Defense's core responsibility is to defend our Nation and care for our Service personnel and their families. Consistent with this objective, the American public also expects us to protect and conserve the land, sea, and airspace we require for military operations. *The Strategic Plan for Amphibian and Reptile Conservation and Management on Department of Defense Lands* document is intended to help natural resource managers better address the conservation and protection of amphibians and reptiles and their habitats; to help Commanders comply with the Endangered Species Act and the National Environmental Policy Act; and to help both Commanders and resource managers achieve their mission objectives by providing relevant technical guidance on priorities such as:

- implementing proactive, habitat-based management strategies that maintain healthy landscapes and training lands in ways that sustain and enable DoD's mission activities;
- promoting proven conservation partnerships to help leverage financial and human resources to achieve common goals, such as preventing species from becoming listed as threatened or endangered; and
- minimizing environmental encroachment, which continues to impact the military's ability to conduct operations in once-remote areas.

This document provides a framework for our natural resources managers to use as they update, revise, and implement Integrated Natural Resources Management Plans to ensure that we are supporting Commanders by meeting environmental requirements and mission readiness. In updating this Strategic Plan, we worked closely with many of your staff, I appreciate the time and effort they invested, and wholeheartedly support this endeavor. I ask that you join me in its advocacy and distribute this document as widely as possible.

My lead for amphibian and reptile conservation and management activities is Mr. L. Peter Boice, at (571) 372-6905 or by email at l.p.boice.civ@mail.mil.

John Conger
Performing the Duties of the Assistant Secretary of Defense
(Energy, Installations and Environment)

Attachment:
As stated

ABOUT THE COVER

The Timber Rattlesnake (*Crotalus horridus*) was chosen to reflect the long-standing relationship DoD and the Military Services have with protecting both our nation and its resources. This species first appeared on military colors on the original Gadsden flag image which served as 'an emblem of vigilance... of magnanimity and true courage.' Ultimately, the use of this species on the cover is meant to represent how DoD protects the natural resources with which it has been entrusted, and how those resources in turn provide for and protect the military's ability to prepare for its warfighting and peacekeeping duties.

ACKNOWLEDGEMENTS

Our thanks to all who contributed to the development and completion of this document. Peter Boice contributed invaluable technical and financial support during all phases of the development of this Plan. Joe Hautzenroder provided the original inertia for the two senior authors to begin developing this Plan formally, as well as funding for the final printing. The National State and Federal Coordinators for Partners in Amphibian and Reptile Conservation, Priya Nanjappa and Ernesto Garcia respectively, were deeply involved for the duration in the planning, drafting, and editing of this Plan. Their expertise and friendly support was an essential element to the success of completing the final Plan. Thanks are also extended to the following representatives from the Military Services who assisted in guiding this Plan through the process to formal endorsement: Dan Cecchini, Tammy Conkle, Sue Goodfellow, Julie Jeter, Junior Kerns, Melissa Mertz, John Mire, Ryan Orndorff, Kevin Porteck, Jay Rubinoff, Steve Sekscienski, Bob Shirley, and Bill Spicer. The following individuals contributed to the text of the Plan during the initial drafting: Jim Asmus, Paul Block, Mike Lannoo, Melissa Mertz, David McNaughton, Kyle Rambo, Jacque Rice, Abigail Rosenberg, Jay Rubinoff, Vanessa Shoblock, Sheridan Stone, Richard Whittle, Todd Wills, and Christy Wolf. Logistical support was provided by Erica Adler, Tasha Foreman, and Maggie Fusari. Anna Banda and John Ouellette provided support for the final formatting and printing. The following individuals also are acknowledged for their support and contribution: Ed Carter, John Hockersmith, Amy Krause, Brian Moyer, Betty Phillips, and Zachary Reichold.

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Credits

Front Cover Photo: Timber Rattlesnake (*Crotalus horridus*), Chris Taylor

Back Cover Photo: Common Chameleon (*Chamaeleo chameleon*), Paul Block

Page 2 Photo: Eastern Box Turtle (*Terrapene carolina*), Paul Block

Page 3 Photos: Green Treefrog (*Hyla cinerea*); American Alligator (*Alligator mississippiensis*), Paul Block

Document Purpose

The purpose of this document is to summarize current reptile and amphibian related challenges and concerns on Department of Defense (DoD) lands, and to highlight reptile and amphibian strategies and priorities that can inform and enhance DoD's natural resource conservation and management activities. Success will be achieved by implementing proactive, habitat-based management strategies that maintain healthy landscapes and training lands in ways that sustain and enable DoD's testing, training, operations, and safety mission.

"A country worth defending is a country worth preserving."

—Major General Michael R. Lehnert, United States Marine Corps (Ret.)

Long-nosed Snake (*Rhinocheilus lecontei*)


© Tim Burr

Desert Tortoise (*Gopherus agassizii*)


© Seth Berry

Rough Greensnake (*Opheodrys aestivus*)


© James Atki

Gila Monster (*Heloderma suspectum*)


© Bradford Hollingsworth

Northwestern Salamander (*Ambystoma gracile*)


© Paul Block

Barred Anole (*Anolis stratulus*)

Overview

The DoD's primary responsibility is to ensure that our soldiers, sailors, marines, and air personnel have the operational and logistical flexibility they need to test and train to the fullest extent possible. To meet these objectives, the Military Services frequently require the use of large expanses of undeveloped land, much of which contains ecologically significant natural resources. DoD recognizes that protecting and conserving its lands and waters is necessary both to ensure a sustainable training platform and to minimize the potential for regulatory and statutory restrictions. As a result of DoD's environmental protection efforts, some of America's highest-quality wetlands, prairies, forests, and other unique natural areas occur on DoD lands.

Approximately 32 percent of the world's amphibians are known to be threatened or extinct.[1] Reptiles also are in decline, and one in five of the world's reptile species may soon be extinct, including over 40 percent of all turtle species.[2] In the United States, nearly all native amphibians inhabit only a portion of their historic range. Six of 34 amphibian species[3] and 18 of the 40 reptile species[4] listed by the U.S. Fish and Wildlife Service (USFWS) as threatened or endangered under the Endangered Species Act (ESA) occur on DoD lands, and dozens of amphibian and reptile species managed by DoD are "at-risk" of requiring this protection.[5]

To address these declines, a broad coalition of partners joined together to form the National Partners in Amphibian and Reptile Conservation (PARC) Program.[6] Formed in 1999, National PARC is an inclusive partnership dedicated to the conservation of herpetofauna – reptiles and amphibians – and their habitats. Federal and state agencies, tribes, non-governmental organizations, and industry groups agreed, by signing the Memorandum of Understanding (MOU) Among Federal Agencies for Achieving Objectives of the PARC, "to conserve amphibians, reptiles, and their habitats as integral parts of our ecosystem and culture through proactive and coordinated public/private partnerships." DoD became a signatory to the PARC MOU in 2007 and signed an updated MOU in 2011. DoD has convened subject matter experts and regional workshops to identify efficiencies and inefficiencies in amphibian and reptile management that have helped inform development of this strategic plan.

1 The IUCN Red List of Threatened Species (www.iucnredlist.org).
2 Turtle Taxonomy Working Group [van Dijk, P.P., Iverson, J.B., Rhodin, A.G.J., Shaffer, H.B., and Bour, R.]. 2014.
3 http://ecos.fws.gov/tess_public/pub/SpeciesReport.do?groups=D&listingType=L&mapstatus=1.
4 http://ecos.fws.gov/tess_public/pub/SpeciesReport.do?groups=C&listingType=L&mapstatus=1
5 FY2013 DoD annual environmental management review data.
6 http://parcplace.org.

Amphibians and Reptiles on Department of Defense Lands

Although DoD manages only 3 percent of U.S. federal landholdings, it is steward to more rare, threatened, and endangered species per acre than any other federal land managing agency. Amphibians and reptiles are essential components of the habitats they live in, functioning as both predators and prey. They are excellent indicators of environmental health, and when these species are threatened, DoD must – by law – fund recovery efforts that take resources away from other needs. More importantly, DoD can lose its ability to train personnel and test the equipment needed to keep our nation secure.

From 1991-2013, DoD spent more than $142 million on the conservation and management of listed reptile species and an additional $17 million on listed amphibian species – expenditures on the desert tortoise alone neared $110 million. On the benefit side of the equation, by investing funds to manage these species, DoD has been able to maintain much of its training flexibility and capabilities. And, because herpetofauna occupy a wide array of habitats, these expenditures often have benefit to multiple species as well as to personnel who live and recreate on the base. That is, protecting the lands needed to train also creates open and natural areas that personnel can use for game hunting/fishing, wildlife viewing, hiking, etc.

Flat-tailed Horned Lizard (*Phrynosoma mcallii*)

To address herpetofauna management and mission-related issues in a coordinated and proactive way, installation natural resources managers work through their Military Service chains of command to communicate about issues related to species conservation, inventories, research, and monitoring, as well as education, outreach, and training. Effectively managing amphibians and reptiles at the installation level via the Integrated Natural Resource Management Plan (INRMP) and beyond the installation fenceline directly enables the Military Services to focus on their primary responsibility of ensuring that DoD has the operational and logistical flexibility necessary for testing and training exercises.

For example, by proactively managing at-risk species and their habitats, DoD can help prevent species from becoming federally listed, as was the case with the Flat-tailed Horned Lizard, which was not listed – in part – as a result of DoD's efforts. Similarly, the Island Night Lizard was delisted from the ESA in May 2014 in large part because of the successful management and recovery efforts on Navy's San Nicolas and San Clemente Islands, while the Arroyo Toad is proposed for down-listing from "Endangered" to "Threatened" status under the ESA, again in large part as a result of the management actions and strategies in place at Marine Corps Base Camp Pendleton, Naval Base Coronado, Naval Weapons Station Seal Beach Detachment Fallbrook, and Fort Hunter Liggett.

Arroyo Toad (*Anaxyrus californicus*)

Threats to Amphibian and Reptile Habitats and Populations

- **Habitat degradation and loss** are the primary causes of species decline. When the lands and waters amphibians and reptiles need to breed, disperse, migrate, feed, and rest are fragmented (i.e., patchy or disconnected), these animals can experience declines in diversity and increased mortality.
- **Climate change** has enormous potential to affect amphibians and reptiles. Increasing temperatures mean altered moisture and precipitation, salt water intrusion into fresh water areas, higher intensity coastal storm surges, changing temperature patterns and growing seasons, increased threats from non-native species and diseases, and changes to the quality and temperature of rivers, lakes, ponds, streams, swamps, wetlands, bogs, vernal pools, and other water habitats that are critical to the survival of many herpetofauna species.
- **Invasive non-native species** may degrade and reduce viable habitat for native species. By definition, invasive non-native species adversely affect habitats and bioregions economically, environmentally, and/or ecologically. When people release non-native species into the environment, they can devastate native wildlife and plants (e.g., Burmese Python in the Everglades, Tamarisk in the American Southwest).
- **Feral and nuisance animal species**, whether domesticated or wild, can threaten herpetofauna populations via resource competition, predation, and habitat degradation. Feral cats, for example, eat large numbers of native and sometimes endangered wildlife, including those on military installations.
- **Diseases** that affect amphibians and reptiles are on the rise. In the last decade, the growth and spread of harmful pathogens and diseases has resulted in population reductions, range contractions, regional extirpations, and even extinctions. Some of these diseases are made worse by climate change.[7]
- **Wildlife Trade/Harvest** is a multibillion-dollar international industry that commonly targets amphibians and reptiles. The persistent lure of profit from trade in exotic species, both legal and illegal, has resulted in very harmful collection practices, especially by the traders who over-collect species and destroy habitats. DoD personnel, especially when deployed overseas, receive training so they do not accidentally purchase items made from CITES-protected species.[8]

7 http://amphibiaweb.org/declines/ClimateChange.html
8 CITES: the Convention on International Trade in Endangered Species (www.cites.org).

Oriente Knight Anole (*Anolis smallwoodi palardis*)

Objectives

The following strategic objectives serve to guide DoD conservation activities in ways that help ensure compliance with the Sikes Act; support Secretary of Defense and DoD Natural Resource Program priorities; and promote communications, coordination, and other efficiencies when managing DoD's amphibians and reptiles and the resources they need to survive and thrive.

- Develop and maintain an amphibian and reptile species inventory (e.g., spreadsheets) for DoD installations with an INRMP, based on information requested through the designated Military Service headquarters points of contact with OSD.
- Maintain and make available up-to-date biological information relevant to the management of listed, at-risk, and common species (e.g., natural history, species' range on and off installation) so installations can determine which amphibian and reptile species have the greatest potential to affect mission activities, and develop strategies and guidance to incorporate into their INRMPs to manage those species.
- Develop training and education materials specific to DoD, as requested by designated Military Service headquarters points of contact.
- Identify opportunities and/or partners to promote regional conservation and cost-sharing, for both on- and off-installation efforts.
- Establish and maintain regular communications with OSD and the Military Services through monthly updates to the Conservation Committee.

Eastern Cottonmouth (*Agkistrodon piscivorus piscivorus*)

Roles and Responsibilities

The following Roles and Responsibilities will help achieve the objectives outlined above.

Organization	Roles and Responsibilities
OASD (EI&E)	♦ Cooperate and coordinate with other federal agencies to conserve amphibians, reptiles, and their habitats through proactive and coordinated public/private partnerships. ♦ Disseminate and promote the *DoD Plan for Amphibian and Reptile Conservation and Management on Department of Defense Lands* to designated Military Service headquarters points of contact. ♦ Disseminate and promote the MOU between DoD and other federal agencies regarding the PARC Federal Agencies Steering Committee to designated Military Service headquarters points of contact. ♦ Ensure that the Military Service headquarters points of contact incorporate sound reptile and amphibian management into their conservation programs. ♦ Develop policy and guidance in full cooperation with designated Military Service headquarters points of contact to support the management of amphibians and reptiles on DoD lands, if needed. ♦ Maintain regular communication with the Military Services headquarters points of contact.
Military Service Natural Resources Headquarters Designated Points of Contact	♦ Designate Military Service headquarters points of contact. ♦ Disseminate through their respective chains of command the *DoD Plan for Amphibian and Reptile Conservation and Management on Department of Defense Lands*. ♦ Disseminate through their respective chains of command the MOU between DoD and other federal agencies regarding the PARC Federal Agencies Steering Committee. ♦ Develop Military Service-specific policy and guidance to support the management of amphibians and reptiles on DoD lands, if needed. ♦ Cooperate and coordinate with other federal agencies to conserve amphibians, reptiles, and their habitats through proactive and coordinated public/private partnerships as appropriate. ♦ Ensure Military Service programs incorporate appropriate reptile and amphibian management into their natural resource programs and Integrated Natural Resources Management Plans with special emphasis on proposed, listed, and candidate species. ♦ Maintain regular communication with OASD (EI&E).

Harlequin Coralsnake (*Micrurus fulvius*)

Ornate Chorus Frog (*Pseudacris ornate*)

Yellow-backed Spiny Lizard (*Sceloporus uniformis*)

Conclusion

Amphibians and reptiles face ever-increasing challenges to their survival. From habitat loss and expanding human populations to rise in disease and impacts from climate change, our Nation's herpetofauna are experiencing unprecedented declines. This plan provides a framework for accomplishing DoD-wide conservation objectives related to the protection of amphibians, reptiles, and their habitats as part of a comprehensive effort to manage natural resources in ways that preclude mission conflicts and loss of training capabilities that can result from conservation-based regulatory restrictions.

Ultimately, the success of DoD's herpetofauna conservation efforts will be measured in terms of their impact to readiness and operational freedom, as well as to reptile and amphibian conservation. DoD is committed to working collaboratively with all stakeholders to achieve the goals and objectives outlined in this plan.

Appendix I

Acronyms and Abbreviations

CITES	Convention on International Trade in Endangered Species
DoD	Department of Defense
ESA	Endangered Species Act
INRMP	Integrated Natural Resources Management Plan
MOU	Memorandum of Understanding
OASD (EI&E)	Office of the Assistant Secretary of Defense (Energy, Installations & Environment)
OSD	Office of the Secretary of Defense
PARC	Partners in Amphibian and Reptile Conservation
POC	Point of Contact
USFWS	U.S. Fish and Wildlife Service

Green Sea Turtle (*Chelonia mydas*)

Appendix II

ESA Listed Amphibian and Reptile Species That Occur on DoD Lands (FY2013)[9]

Common Name	Scientific Name	Group
Reticulated Flatwoods Salamander	*Ambystoma bishopi*	amphibians
California Tiger Salamander	*Ambystoma californiense*	amphibians
Frosted Flatwoods Salamander	*Ambystoma cingulatum*	amphibians
Sonoran Tiger Salamander	*Ambystoma mavortium stebbinsi*	amphibians
Arroyo Toad	*Anaxyrus californicus*	amphibians
Houston Toad	*Anaxyrus houstonensis*	amphibians
California Red-legged Frog	*Rana draytonii*	amphibians
Sierra Nevada Yellow-legged Frog	*Rana sierrae*	amphibians
American Alligator	*Alligator mississippiensis*	reptiles
Loggerhead Sea Turtle	*Caretta caretta*	reptiles
Green Sea Turtle	*Chelonia mydas*	reptiles
American crocodile	*Crocodylus acutus*	reptiles
Leatherback Sea Turtle	*Dermochelys coriacea*	reptiles
Eastern Indigo Snake	*Drymarchon couperi*	reptiles
Bog Turtle	*Glyptemys muhlenbergii*	reptiles
Puerto Rican Boa	*Epicrates inornatus*	reptiles
Hawksbill Sea Turtle	*Eretmochelys imbricata*	reptiles
Mohave Desert Tortoise	*Gopherus agassizii*	reptiles
Gopher Tortoise	*Gopherus polyphemus*	reptiles
Ringed Map Turtle	*Graptemys oculifera*	reptiles
Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	reptiles
Olive Ridley Sea Turtle	*Lepidochelys olivacea*	reptiles
Florida Sand Skink	*Plestiodon reynoldsi*	reptiles
Giant Garter Snake	*Thamnophis gigas*	reptiles

[9] Names based on Crother, B. I. (ed.). 2012. Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico, With Comments Regarding Confidence in Our Understanding. SSAR Herpetological Circular 39:1-92.

Appendix III

Resources

Amphibian and Reptile Conservancy: www.amphibianandreptileconservancy.org

Amphibian and Reptile Species Database: www.denix.osd.mil/nr/FishandWildlife/TerrestrialAnimals.cfm

Armed Forces Pest Management Board: www.afpmb.org/

Convention on International Trade in Endangered Species (CITES): www.cites.org

Department of Defense Natural Resources Program: www.dodnaturalresources.net

- DoD Partners in Amphibian and Reptile Conservation (PARC): www.dodnaturalresources.net/DoD-PARC.html
- DoD PARC Photo Website: https://dodparcphotolibrary.shutterfly.com/
- DoD Partners in Flight: www.DoDPIF.org
- DoD Legacy Resource Management Program: www.dodlegacy.org/legacy/index.aspx

Endangered Species Act (ESA), Section 1531 of title 16 United States Code: www.fws.gov/laws/lawsdigest/esact.html

Environmental Security Technology Certification Program: www.serdp-estcp.org

Habitat Management Guidelines for Amphibians and Reptiles series: www.parcplace.org/parcplace/publications/habitat-management-guidelines.html

Inventory and Monitoring Guide: www.parcplace.org/parcplace/publications/inventory-and-monitoring-guide.html

National Environmental Policy Act, Sections 4321 et seq. of title 42 United States Code: www.epa.gov/compliance/nepa

National Military Fish and Wildlife Association: www.nmfwa.net

National Partners in Amphibian and Reptile Conservation: www.parcplace.org

National Reptile & Amphibian Advisory Council, Reptile & Amphibian Law Support Center: http://nraac.org/laws

PARC 2014 Year of the Salamander: www.parcplace.org/parcplace/news-a-events/2014-year-of-the-salamander.html

PARC 2013 Year of the Snake: www.parcplace.org/parcplace/news-a-events/2013-year-of-the-snake.html

PARC 2012 Year of the Lizard: www.parcplace.org/parcplace/news-a-events/year-of-the-lizard.html

PARC 2011 Year of the Turtle: www.parcplace.org/parcplace/news-a-events/year-of-the-turtle.html

Priority Amphibian and Reptile Conservation Areas (PARCAS): www.parcplace.org/parcplace/publications/parcas-priority-amphibian-and-reptile-conservation-areas.html

Sikes Act, Sections 670a-670o of Title 16 United States Code, as amended: http://www.gpo.gov/fdsys/pkg/USCODE-2011-title16/html/USCODE-2011-title16-chap5C.htm

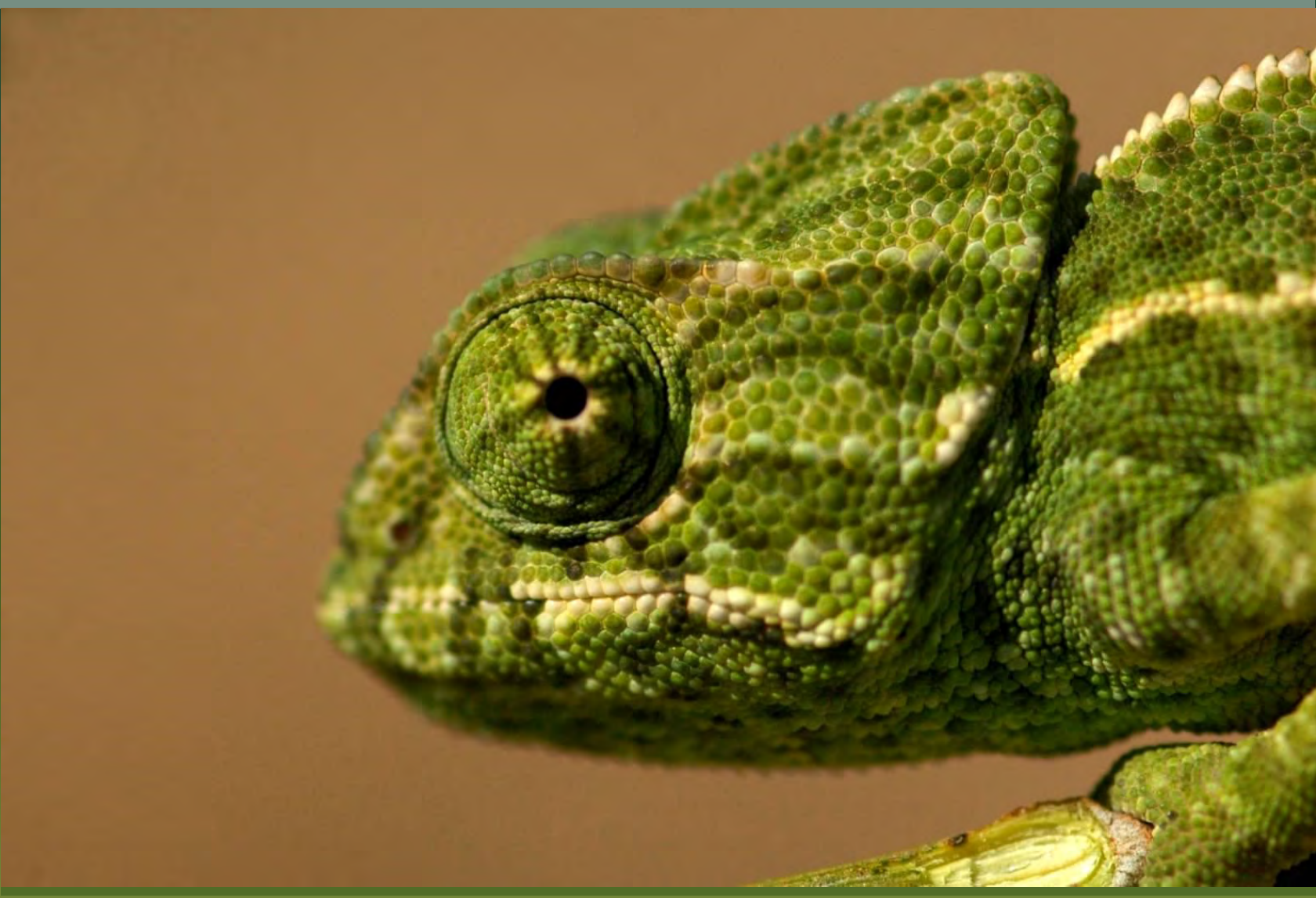
State Wildlife Action Plans: www.teaming.com/state-wildlife-action-plans-swaps

Strategic Environmental Research and Development Program: www.serdp-estcp.org

USFWS Endangered Species Program: www.fws.gov/endangered/species/us-species.html

USFWS Federally Listed Amphibian and Reptile Species: http://ecos.fws.gov/tess_public/pub/SpeciesReport.do?groups=C&listingType=L&mapstatus=1

Ensatina (*Ensatina eschscholtzii*)



DEPARTMENT OF DEFENSE

PARTNERS IN AMPHIBIAN & REPTILE CONSERVATION

DEPARTMENT OF DEFENSE

NATURAL RESOURCES

APPENDIX C

Snake Fungal Disease Fact Sheet

Snake Fungal Disease

Cornell University
College of Veterinary Medicine
Animal Health Diagnostic Center

BASICS

The organism responsible is the fungus *Ophidiomyces ophiodiicola*, within the family Onygenacea. Snake Fungal Disease (SFD) was first definitively identified in a population of Timber Rattlesnakes residing in New Hampshire in 2006.

KNOWN AFFECTED species include milk snakes, black rat snakes, garter snakes, timber rattlesnakes, eastern massasauga, cotton mouth snakes, and black racer snakes.

The characteristic **CLINICAL SIGN** of SFD is facial swelling. The disease can progress from the nasal cavity internally via the eyes, throat, and lungs causing eye infections and pneumonia. The fungus additionally **SPREADS EXTERNALLY** along the neck, body, and tail forming scattered nodules (lumps) or ulcerations.

The fungus can be shed into the environment by infected animals and **SPREAD** from the environment to other snakes, particularly in animals that share dens. There is no definitive evidence of snake to snake transmission. Spread of the fungus to new locations may occur when people track contaminated **SOIL** imbedded in clothing or shoes.

SFD is **DIAGNOSED** by identification of the typical skin lesions as well as laboratory identification of the **FUNGUS** by culture or DNA detection and microscopic examination of tissues.

TREATMENT with antifungal medications has not been successful in colubrid snakes.

DETAILS

Ophidiomyces ophiodiicola is characterized as an **ENVIRONMENTAL SAPROBE**, meaning that it normally feeds on decaying organic matter in the environment. This is evident due to its highly tolerant nature; it can thrive in a wide pH range (5 - 11), it is drought tolerant, and can utilize a number of complex carbon, nitrogen and sulfur compounds. Evidence that this organism is a saprobe makes it likely that infection of snakes is opportunistic.

Ophidiomyces ophiodiicola is closely related to **CHRYSOSPORIUM ANAMORPH NANNIZZIOPSIS VRIESSII (CANV)** complex. Many early reports of snake fungal disease identify CANV as the causative organism but the fungus has since been reclassified.

Both **COLUBRIDS AND PIT VIPERS** in Eastern and Midwestern United States have been identified with SFD. Recent advances in molecular diagnostics have allowed identification of cases dating back as far as 1986.

CLINICAL SIGNS Incubation period is between 30 to 37 days with some showing clinical signs as early as day 12 of inoculation. In rare cases where there are wounds secondary to the infection, the fungus can penetrate the body and cause a **SYSTEMIC FUNGAL INFECTION** resulting in nodules on the coelomic fat pad, kidneys, liver and air sac. Experimental data shows snakes surviving an average of 90 days with SFD and having a 40% **MORTALITY RATE.**

TRANSMISSION Since *O. ophiodiicola* is an environmental saprobe, it is likely that the fungus resides in the soil. There have been a number of cases of captive snake populations becoming infected as well.

Several studies have indicated that **TEMPERATURE** is a significant factor affecting the growth of *O. ophiodiicola*. This suggests that populations hibernating in the lower thermal range of 0 °C - 10 °C should have a reduced infection during the spring and summer than snakes that **HIBERNATE** in the upper thermal range of 0 °C - 10 °C. In addition, data suggest that with increasing global temperatures, snake populations will be more vulnerable to *O.ophiodiicola.*

DIAGNOSIS Methods to identify the fungus include histopathological examination via skin biopsy, fungal culture and real-time or quantitative polymerase chain reaction (rtPCR and qPCR).

Due to its close relationship to *Chrysosporium anamorph Nannizziopsis vriessii* (CANV) complex, *O. ophiodiicola* infections may have been **MISDIAGNOSED**.

Snake fungal disease nodule.
Photo by Brad M. Glorioso, USGS