



# **ENVIRONMENTAL ASSESSMENT FOR IMPLEMENTATION OF THE 2018 INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**

**U.S. Army Garrison Fort Belvoir  
Environmental Division**

September 2018

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**Environmental Assessment for Implementation of the 2018 Integrated  
Natural Resources Management Plan**

**U.S. Army Garrison Fort Belvoir**

Environmental Division  
U.S. Army Garrison Fort Belvoir  
Fort Belvoir, Virginia 22060

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Environmental Assessment for Implementation of the 2018 Integrated Natural  
Resources Management Plan

U.S. Army Garrison Fort Belvoir

Reviewed by:

U.S. Army Garrison Fort Belvoir



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# **Finding of No Significant Impact**

Environmental Assessment of the INRMP

U.S. Army Garrison, Fort Belvoir

Directorate of Public Works

Fort Belvoir, Virginia

**Name of Action:** Environmental Assessment of the Implementation of the Integrated Natural Resources Management Plan

**Description of Proposed Action and Need:** Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and 32 Code of Federal Regulations (CFR) 651, Fort Belvoir has prepared an Environmental Assessment (EA) to evaluate potential environmental effects associated with the proposed implementation of the 2018 Integrated Natural Resources Management Plan (INRMP). This EA was prepared pursuant to the Council of Environmental Quality regulations implementing the provisions of the National Environmental Policy Act (NEPA) and Army Regulation (AR) 200-1, Environmental Protection and Enhancement.

Sikes Act Improvement Act (SAIA) of 1997, as amended through 2004, governs the planning and implementation of conservation programs on military installations, and all other applicable DoD and DA policies and guidance. The SAIA requires the preparation of an INRMP to facilitate the conservation program, and the INRMP must be cooperatively developed with the U.S. Fish and Wildlife Service (USFWS) and the Virginia state fish and wildlife agency. The INRMP reflects the mutual agreement of the USFWS, the Virginia Department of Game and Inland Fisheries (VDGIF), and the Garrison Commander concerning the conservation, protection, and management of natural resources on the installation.

The Proposed Action involves implementation of both ongoing and newly proposed projects under an updated INRMP.

**Alternatives:** An alternative to the Proposed Action evaluated in this EA is the No Action Alternative. The No Action Alternative involves continued implementation of only the existing, ongoing projects and initiatives. This alternative is a continuation of the existing natural resources program. Implementation of the No Action Alternative would not comply with the SAIA.

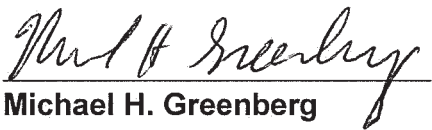
**Environmental Consequences:** The EA incorporated by reference into this Finding of No Significant Impact (FNSI), examines the potential effects of the Proposed Action and the No Action Alternative on the following resource areas: land use, soils, water resources, and biological resources. No impact or negligible impacts to the following resources are anticipated and were not further analyzed in the EA: geology and topography, air quality, cultural resources, hazardous materials and wastes, traffic and transportation, utilities, socioeconomics, noise, visual and aesthetic resources, environmental justice, and protection of children.

**Summary of Environmental Impacts:** It is anticipated that the Proposed Action would result in no or negligible impacts to geology and topography, air quality, cultural resources, hazardous materials and wastes, traffic and transportation, utilities, socioeconomics, noise, visual and aesthetic resources, environmental justice, and protection of children. Minor long-term positive impacts to land use would be anticipated from improvements to publically accessible major trails and associated facilities, and major renovations to fishing piers. Minor long-term positive impacts to soils are anticipated due to tree plantings which protect against erosion by providing vegetative groundcover. Minor short-term adverse impacts are anticipated to water resources, specifically surface water, which may occur during stream and shoreline restoration projects. Minor long-term positive impacts to biological resources are anticipated from treatment of invasive vegetation, re-planting lost trees at a 2:1 ratio, as well as collecting data to understand and better manage conditions. No significant impacts on human health or the environment are expected to result from the Proposed Action.

**Notice of Availability:** A Notice of Availability was published on July 12 & 19, 2018 in the Mount Vernon Voice, the Springfield Connection, the Mount Vernon Gazette, and the Daily Progress, with comments due on August 19, 2018. Copies of the draft EA and draft FNSI were available for review at the Lorton Branch of the Fairfax County Library in Lorton, Virginia; and both the Sherwood Regional and Kingstowne Branches of the Fairfax County Library in Alexandria, Virginia. The EA was also available for review on Fort Belvoir's website: <http://www.belvoir.army.mil/environdocssection2.asp>. The Draft INRMP was also available at these libraries and on Fort Belvoir's website.

**Response to Comments:** Comments from federal, state, and local agencies were received during the review period and were considered by Fort Belvoir for inclusion into the Final Environmental Assessment. No comments were received from the general Public during the 30-day Public review period. For more information, contact the Fort Belvoir Directorate of Public Works, Environmental Division at 703-806-3193.

**Conclusion:** Pursuant to the Council on Environmental Quality (CEQ) regulations; 40 CFR Section 1500-1508 regarding procedural implementation of the National Environmental Policy Act (NEPA) of 1969; and implemented for the Army by 32 CFR Section 651, Environmental Analysis of Army Actions, it is anticipated that the Proposed Action would not have a significant effect on the environment and that this FNSI is appropriate. An environmental impact statement (EIS) will not be prepared.



**Michael H. Greenberg**  
**Colonel, U.S. Army**  
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12/13/2018

**Date**

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# **1. Purpose and Need for Proposed Action**

## **1.1. Introduction**

U.S. Army Garrison Fort Belvoir prepared an Environmental Assessment (EA) to identify and evaluate potential environmental effects from implementing an updated Integrated Natural Resources Management Plan (INRMP). Natural resources on Fort Belvoir are currently being managed using the 2001 INRMP; the 2018 INRMP will replace the 2001 INRMP and serve as a guide for natural resource management practices until the next INRMP update. Implementation of the INRMP would strive to protect and conserve the natural setting at Fort Belvoir, by complying with Sikes Act Improvement Act (SAIA) requirements, environmental regulations, and meeting other mission and community support requirements.

This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969. The NEPA requires all Federal agencies to give appropriate consideration of potential environmental effects of proposed major actions in planning and decision-making. The Council of Environmental Quality (CEQ) is responsible for issuing regulations and implementing the provisions of 40 Code of Federal Regulations (CFR) Parts 1500-1508. CEQ regulations are supplemented by procedures adopted on an agency-specific basis. For the Department of the Army (DA), the pertinent regulations are contained in 32 CFR 651, *Environmental Analysis of Army Actions*. Development and Implementation of INRMPs are included in 32 CFR Part 651.33, *Actions normally requiring an EA*. While required to assess environmental impacts and evaluate their significance, an EA is routinely used as a planning document to develop alternatives, evaluate environmental impacts, propose mitigation, and allow for agency and public participation.

This EA documents Fort Belvoir's proposal to manage its natural resources under an updated INRMP by evaluating potential impacts to the environment. The EA evaluates the Preferred Alternative for the proposed action and compares it to the No Action Alternative in accordance with NEPA and the Army NEPA regulation. The EA was also developed to determine whether the action warrants a Notice of Intent (NOI) to prepare an Environmental Impact Statement or supports a Finding of No Significant Impact (FNSI).

## **1.2. Purpose and Need**

The purpose of implementing the INRMP is to carry out the resource-specific management measures that will enable Fort Belvoir to effectively manage the use and condition of natural resources and comply with all applicable laws and

regulations. Fort Belvoir must update and review its INRMP in accordance with the SAIA of 1997, and the most recent Department of Defense (DoD) and DA SAIA policy and guidance. Moreover, both the INRMP and the natural resources program that it supports must meet the guidance and regulations provided in DoD Instruction 4715.03 (Natural Resources Conservation Program) and AR 200-1 (Environmental Protection and Enhancement). These guidance documents and policies collectively require a planning and management approach consistent with mission support, versatile use, integration, ecosystem or landscape-level management, and environmental compliance and stewardship.

The need is to support the military mission by meeting the requirements of the SAIA, which governs the planning and implementation of conservation programs on military installations, and all other applicable DOD and DA policies and guidance. Specifically, this entails managing the Fort Belvoir Natural Resource Program with an INRMP based on current information, and projects and activities relevant to this information. The Fort Belvoir Natural Resources program is currently implementing the 2001 INRMP. The Natural Resource program philosophy continues to be ecosystem-based with a commitment to biodiversity conservation, as stated in the 2001 INRMP. This philosophy aligns with the requirements of the SAIA. However, the 2001 INRMP contains information and priorities relevant to that time period. There have been changes to on-site conditions, regulations and policies, protected species, and installation planning documents since 2001. A review of this document for "operation and effect" as required by the SAIA determined that an updated document is required to adequately meet SAIA purposes and requirements. Managing the Natural Resources program with an INRMP that contains current information and priorities would not only meet the requirements of the SAIA, but would also provide structure and clarity for the future of the program, allowing for the optimization of military resources.

The INRMP must be cooperatively developed with the United States Fish and Wildlife Service (USFWS) and the Virginia Department of Game and Inland Fisheries (VDGIF). The resulting plan reflects the mutual agreement of all three parties concerning conservation, protection, and management of natural resources on the installation. Finally, the SAIA requires that the INRMP be reviewed as to operation and effect on a regular basis, but not less than every 5 years.

### **1.3. Background**

The installation was originally established in 1912, as Camp A.A. Humphreys on a 1,500-acre tract to provide training grounds for Army engineers stationed in the Washington Barracks at Fort McNair. Congress approved the official transfer of the US Army Engineer School to Camp Humphreys in December 1917 and

acquired an additional 4,800 acres (mainly north of U.S. Route 1) by 1920. Camp Humphreys was designated as Fort Belvoir in 1935 in honor of the historic Belvoir plantation. The installation trained engineers until June 1988 when the Engineer School was officially moved to Fort Leonard Wood, Missouri. Fort Belvoir was transferred from the Military District of Washington (MDW) to the U.S. Army Installation Management Command (IMCOM) in October 2006. Under the Base Realignment and Closure (BRAC) Act of 1988, Fort Belvoir developed as the principal administrative, housing, and logistics center of the US Army in the National Capital Region. Under the BRAC Act of 2005, Fort Belvoir's on-post military/civilian population increased from 29,978 to more than 40,000.

Fort Belvoir is located south of Washington DC in southeastern Fairfax County Virginia (Figure 3.1). Southeastern Fairfax County has a number of sizable tracts in public ownership, or in private ownership and under conservation management (Figure 3.3). These include Huntley Meadows County Park adjacent and to the north of Main Post; Woodlawn Plantation and Pole Road Park adjacent and to the east of Main Post; Grist Mill Park, Mount Vernon Estate, Fort Hunt National Park, and George Washington Memorial Parkway to the east; and, Pohick Bay Regional Park, Gunston Hall Plantation, Potomac River Mason Neck National Wildlife Refuge Complex (now known as the Potomac River Eagle Conservation Area), and Mason Neck State Park to the southwest. As shown in Figure 3.3, these areas align as a fairly contiguous corridor of undeveloped land/open space.

Fort Belvoir has five designated Special Natural Areas on post (Figure 5.3). These areas have natural resources that have been assigned a high conservation priority through federal or state statute or regulation (e.g., Endangered Species Act, Bald and Golden Eagle Protection Act), Department of Defense (DoD) or DA policy (e.g., DoDI 4715.03), DoD-partnered programs (e.g., Chesapeake Bay Program, PIF Program), state program (Natural Heritage Program), or have been recognized as being important to local or regional ecosystem function (e.g., wildlife migratory routes). These areas include the Accotink Bay Wildlife Refuge (ABWR), Jackson Miles Abbott Wetland Refuge (JMAWR), T-17 Refuge, Fort Belvoir Forest and Wildlife Corridor (FWC), and the Accotink Creek Conservation Corridor.

## **1.4. Mission**

Fort Belvoir's mission is to operate and maintain the installation; provide quality installation support and services to its customers; and to plan, maintain, and execute mobilization readiness, military operations, and contingency missions. Since the departure of the Engineer School in 1988, the emphasis of Fort Belvoir's mission has shifted away from land-disturbing training activities to providing logistical and administrative support to its tenants. Despite this shift, training activities are still an integral part of Fort Belvoir's mission. Present-day

military training at Fort Belvoir consists mainly of troop field activities such as land navigation, rescue operations, expert field medical training, and aviation training. Training activities such as these have in the past, benefited from habitat management activities due to an overlap between requirements for biological diversity and the training environment. Fort Belvoir will conserve the biological diversity on their 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.

## **1.5. Assessment Approach**

To reduce redundancy with previous relevant documents, the CEQ NEPA Regulations (40 CFR, Parts 1500-1508) encourage incorporation by reference of information and analysis from previous EAs. This approach entails referencing specific analyses, discussions, and conclusions of the earlier documentation without providing detailed discussion in the present EA. Consistent with CEQ guidance and DA policy, this EA incorporates information from the Fort Belvoir 2001 INRMP EA where applicable.

Conditions are described based on the most current written sources of information, supplemented by personal communications with USAG (United States Army Garrison) staff, particularly with respect to proposed land use changes and development on the installation. However, it must be noted that installation Real Property Master Plan is re-evaluated and updated on a 5-year basis, and several other installation planning documents or regulations are currently being revised and updated.

## **1.6. Public and Interagency Coordination and Review**

Public and agency participation in the NEPA process promotes open communication between the Army and the public to enhance better decision-making. All persons and organizations having a potential interest in the proposed action, including residential communities adjacent to Fort Belvoir, are encouraged to participate in the NEPA process.

A Notice of Availability was released in July 2018 to appropriate local, state, and Federal agencies to provide the opportunity for review of the EA and Draft FNSI. Copies of the Public Notice, coordination letters, mailing list, and response letters are included in Appendix B. Comments must be received within 30 days of the publishing date of the Notice of Availability to be considered.

Copies of the EA will be available for review at the Lorton Branch of the Fairfax County Library in Lorton, Virginia; and both the Sherwood Regional and Kingstowne Branches of the Fairfax County Library in Alexandria, Virginia until

August 13, 2018. The EA will also be available for review on Fort Belvoir's website: <http://www.belvoir.army.mil/environdocssection2.asp>. During the 30-day public comment period, any comments submitted by agencies, organizations, or members of the public on the EA or Draft FNSI will be considered.

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## **2. Description of the Proposed Action and Alternatives**

U.S. Army Garrison Fort Belvoir, through coordination with the USFWS and the VDGIF, proposes to manage Fort Belvoir's natural resources by implementing an updated INRMP. The INRMP will comply with environmental laws, regulations, and policies, including the SAIA of 1997, Department of Defense Instruction 4715.03 and Army Regulation 200-1. The INRMP will be consistent with other installation plans, including but not limited to the master plan, design guidelines, Integrated Cultural Resources Management Plan (ICRMP), Integrated Pest Management Plan, and the Stormwater Pollution Prevention Plan. It will also conserve and protect Fort Belvoir's natural resources; build upon relationships established with federal, state, and local agencies, universities, nonprofit organizations, and the public while supporting the military mission. The INRMP will support the military mission while providing for the protection of environmentally sensitive resources such as wetlands, mature forests, riparian habitats, and rare wildlife and vegetation communities that occur on the installation.

### **2.1. Preferred Alternative**

The Proposed Action included in this EA is for the implementation of the 2018 INRMP that will serve as the roadmap for Fort Belvoir's natural resources program for the years 2018 through 2032. The 2018 INRMP will be reviewed annually to maximize its usefulness to installation natural resources personnel. The Preferred Alternative is implement an INRMP to guide Fort Belvoir's natural resource management activities. This includes fish and wildlife management, threatened and endangered species preservation, post-wide water resources protection, vegetation management, wildland fire management, pest management, bird/wildlife aircraft strike hazard management, and outdoor recreation program enhancements. All management activities would be integrated and implemented in the context of the installation's mission support needs and regional setting.

The INRMP is a working document in which adaptive management principles are used to ensure goals, objectives, and strategies are realistic and effective. The INRMP goals, objectives, and strategies may be adjusted based on changes to the military mission, monitoring and survey results, or regulatory changes.



## **2.2. No Action Alternative**

Under the No Action Alternative, management of natural resources would continue as provided in the 2001 INRMP. The No Action Alternative represents status quo. All INRMP component plans and activities would maintain baseline activities for each program, except in situations where mission activity or policy changes have resulted in changes to the baseline, independent of natural resources management. Although the No Action Alternative does not satisfy the need for the proposed action, it is included in the environmental analysis to provide a baseline for comparison with the Preferred Alternative and is analyzed in accordance with CEQ regulations for implementing NEPA.

## **2.3. Alternatives Eliminated from Further Study**

As part of the NEPA process, potential alternatives to the Proposed Action must be evaluated. For alternatives to be considered reasonable and warrant further detailed analysis they must be affordable, implementable, and meet the purpose and need for the proposal based on the project requirements.

One Alternative considered involved a compliance-driven approach to natural resources management where only those natural resource components that are required by law would be managed. This alternative would not involve an ecosystem-based approach to natural resources management, where the ecosystem as a whole is considered rather than a single issue or species, but would manage natural resources only required by a statutory or regulatory rule (i.e., Clean Water Act [CWA] or Endangered Species Act [ESA]). While this alternative would likely avoid any notice of violation(s) for noncompliance, this alternative would not comply with the spirit of the SAIA, as amended, for natural resources management.



### **3. Affected Environment and Environmental Consequences**

This chapter identifies the affected environment and discloses the potential environmental consequences of the Proposed Action and the No Action Alternative. This chapter contains a description of the current environmental conditions on Fort Belvoir. As stated in CEQ regulations, 40 CFR 1508.14, the “human environment potentially affected” is interpreted comprehensively to include the natural and physical resources and the relationship of people with that environment. In compliance with the NEPA and CEQ regulations, the description of the affected environment focuses only on those aspects potentially subject to impacts. The affected environmental conditions are shown in Table 3-1.

The CEQ's regulations require that the context and intensity of an impact or effect be considered to determine the significance of the impact. Significance can vary in relation to the context of the proposed action. Context may include considering the effects on a national, regional, or local basis. Both short- and long-term effects may be relevant. Impacts are also evaluated in terms of their intensity or severity. Factors contributing to this intensity or severity include the following:

- The degree to which the action affects public health or safety.
- Unique characteristics of the geographic area such as proximity to cultural resources, park lands, prime farmland, wetlands, wild and scenic rivers, or ecologically critical areas.
- The degree to which effects of the action on the quality of the human environment are likely to be highly uncertain or controversial.
- The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.
- Whether the action is related to other actions with individually insignificant, but cumulatively significant, impacts.
- The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places (NRHP) or may cause loss or destruction of significant scientific or cultural resources.
- The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the ESA.
- Whether the action threatens to violate Federal, state, or local law or requirements imposed for environmental protection.

**Table 3-1: Baseline Conditions Screening Matrix**

<b>Resource Category</b>	<b>Potentially Affected by Proposed Project?</b>	<b>Reason for Non-Applicability Determination</b>
Land Use	Yes	N/A
Soils	Yes	N/A
Geology and Topography	No	Fort Belvoir is in the Piedmont and Coastal Plain Physiographic Provinces, and displays characteristic of both. Topography at the site consists of wide, flat plateaus dissected by steep ravines. No impacts expected.
Air Quality	No	No impacts expected from implementing the INRMP.
Water Resources	Yes	N/A
Coastal Zone	No	Fort Belvoir is located within the Virginia designated coastal zone area managed under the Coastal Zone Management Program (CZMP). Established by an Executive Order and approved in 1978, the CZMP is a network of state laws and policies designated to protect coastal and marine resources. No impacts expected from implementing the INRMP.
Biological Resources	Yes	N/A
Cultural Resources	No	The INRMP includes steps to protect cultural resources sites from damage during implementation of this plan. Review of projects by the Cultural Resources Manager and the NEPA process are used to ensure protection of potential cultural resources while implementing the INRMP.
Hazardous Materials and Wastes	No	No impacts expected from implementing the INRMP.
Traffic and Transportation	No	No impacts expected from implementing the INRMP.
Utilities	No	No impacts expected from implementing the INRMP.
Socioeconomics	No	No impacts expected from implementing the INRMP.
Noise	No	No impacts expected from implementing the INRMP.
Visual and Aesthetic Value	No	No impacts expected from implementing the INRMP.
Environmental Justice	No	No impacts expected from implementing the INRMP.

<b>Table 3-2. Comparison of Impacts for Affected Environment</b>		
<b>Resource Area</b>	<b>Preferred Alternative</b>	<b>No Action Alternative</b>
Land Use	Minor long-term positive impact	No impact
Soils	Minor long-term positive impact	No impact
Water Resources	Minor short-term adverse impact, long term positive impact	No impact
Biological Resources	Minor long-term positive impact	Minor positive impact

### **3.1. Land Use**

Fort Belvoir occupies approximately 8,500 acres in southeastern Fairfax County, Virginia, about 18 miles southwest of Washington, DC and 95 miles north of Richmond, the Virginia state capital (Figure 3.1). Fort Belvoir has two separate land areas – Main Post (approximately 7,700 acres) and Fort Belvoir North Area (FBNA) (approximately 800 acres) roughly 1.5 miles apart. Fort Belvoir is located on the western shore of the Potomac River, approximately 75 miles upstream of the Chesapeake Bay. The installation has more than 12 miles of shoreline, wetland areas, and interior contiguous forested areas. Fort Belvoir’s surrounding local area (metropolitan Washington DC area) and regional area (Chesapeake Bay region) are both experiencing rapid conversions of undeveloped natural areas to developed land uses. Within the metropolitan Washington DC area, Fort Belvoir represents a significant tract of native vegetation in terms of size, diversity, and position relative to the location of off-post tracts of native vegetation. Approximately 65 percent of Fort Belvoir is undeveloped and extensive areas are forested, particularly in the Southwest Area (US Army, 2014). Developed areas are found throughout the installation, with the South Post area being the most densely developed area. Fort Belvoir’s 75-acre subinstallation, Rivanna Station, is located in Albemarle County approximately 95 miles southwest of Fort Belvoir Main Post (Figure 3.2). The subinstallation is predominantly developed/developable land.

Non-military uses such as hunting and fishing, hiking, water-related outdoor recreation activities, guided and self-directed nature walks, and summer day camps are allowed on portions of Fort Belvoir provided they do not conflict with military uses or pose safety risks to the public. There is no public access for non-military use at Rivanna Station.

### **3.1.1. *Environmental Consequences***

#### **3.1.1.1. *Proposed Action***

Implementation of the INRMP would have a minor long-term positive impact on the land use at Fort Belvoir. Proposed INRMP projects such as improvements to publically accessible major trails and associated facilities and major renovations to fishing piers will provide greater accessibility for recreational use. No adverse impacts would result from implementation of the Proposed Action.

#### **3.1.1.2. *No Action Alternative***

The No Action alternative would maintain existing conditions and methodologies for the management of land use at Fort Belvoir. Continuing the practices of the 2001 INRMP without updated information or new projects included in the 2018 INRMP could have an adverse effect on land use as future decisions would not be based on the best available information.

## **3.2. Soils**

A soil resource report was compiled by the online web soil survey provided by the Natural Resource Conservation Service (NRCS) for Fort Belvoir Main Post in July 2016. Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (NRCS, 2006). There are twenty-six soil types present on the Fort Belvoir Main Post with the most abundant soils consisting of Beltsville silt loam (875.1 acres) and Sassafras-Marumsco Complex (753.6 acres). Of the area included in the soil survey, 1,813 acres are described as urban built-up land which includes primarily ridge top or other well-drained, flatter areas that have been minimally to drastically disturbed by construction and development over the years. Areas within the urban built-up unit that are not under buildings or paving are vegetated, generally with lawn and landscape trees and shrubs. At the Rivanna Station substation, the NRCS soil survey data identified 16 soil types, predominantly loams with steep slopes.

### **3.2.1. *Environmental Consequences***

#### **3.2.1.1. *Proposed Action***

Implementation of the INRMP would have a minor long-term positive impact on the soils at Fort Belvoir. INRMP projects such as tree planting protect against erosion by providing vegetative groundcover. No adverse impacts would result from implementation of the Proposed Action.

#### **3.2.1.2. No Action Alternative**

The No Action alternative would maintain existing conditions and methodologies for the management of soils at Fort Belvoir. Continuing the practices of the 2001 INRMP without updated information or new projects included in the 2018 INRMP could have an adverse effect on soils as future decisions would not be based on the best available information.

### **3.3. Water Resources**

Water resources are protected by the CWA, Executive Orders, and state laws and regulations. Fort Belvoir is located in Fairfax County, which lies within the Potomac River Basin of the Chesapeake Bay watershed. Fairfax County is drained by the Potomac River and its five major tributaries; Cameron Run, Hunter Creek, Dogue Creek, Accotink Creek, Pohick Creek, and the Occoquan River.

#### **3.3.1. Groundwater**

Fort Belvoir is underlain by three main aquifers: lower Potomac aquifer, middle Potomac aquifer, and Bacons Castle Formation. The lower Potomac aquifer is the primary aquifer on the installation and in eastern Fairfax County. The lower Potomac aquifer exists between a layer of crystalline bedrock and a thick wedge of clay that contains interbedded layers of sand. Water in this aquifer flows to the southeast; it is recharged in the western section of Fort Belvoir (USAG Fort Belvoir, 2001). Depth to the water table on the installation fluctuates, but it is typically 10 to 35 feet below ground surface. However, the water table may be at or near the surface near streams in the form of shallow, unconfined aquifers or perched water tables (USAG Fort Belvoir, 2001). At Rivanna Station, bedrock is dense and relatively impermeable; groundwater in the area is accessed through fractures in the bedrock.

#### **3.3.2. Surface Water**

Fort Belvoir is located on the Potomac River in the Chesapeake Bay watershed (Figure 5.1). There are three named tributaries to the Potomac River on the installation: Accotink Creek, Pohick Creek, and Dogue Creek. Accotink Creek and Pohick Creek flow into the Potomac River near each other and form Gunston Cove on the Potomac River. The installation also contains the headwaters to Mason Run, which is a tributary to Accotink Creek, and several other unnamed tributaries. Accotink Creek flows through the center of the installation, and both Dogue Creek and Pohick Creeks form the northeast and southwest boundaries of Fort Belvoir, respectively. A total of 106 miles of streams occur on the installation, including 28 miles of perennial stream, and 32 miles of intermittent streams (USAG Fort Belvoir, 2001). Rivanna Station is within the Rivanna River

subwatershed of middle James River Basin of the Chesapeake Bay watershed. The subinstallation is situated along the North Fork of the Rivanna River.

Laws and regulations have been implemented to protect water quality. The Federal Water Pollution Control Act, as amended by the CWA of 1977, establishes water quality standards for restoring and maintaining the integrity of the nation's water. "Water quality standards define the goals for a water body by designating its uses, setting criteria to measure attainment of those uses, and establishing policies to protect water quality from pollutants." Section 305(b) of the CWA, requires that states report on the status of water quality of their navigable waters every two years. Section 303(d) requires that states identify impaired waters; waters where the water quality does not meet standards for the designated use. Section 303(d) also requires that the state identify impaired waters for which Total Maximum Daily Loads (TMDLs) will be developed to improve water quality. A TMDL "is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards."

Fairfax County adopted a Chesapeake Bay Preservation Ordinance that designates RPAs and Resource Management Areas (RMAs) within in the county. RPAs are sensitive lands at or near the shoreline or streambank that have an intrinsic water quality value due to the ecological and biological processes they perform. RPAs include tidal wetlands, tidal shores, nontidal wetlands connected by surface flow and contiguous to tidal wetlands or tributary perennial streams, and a minimum 100-foot buffer landward of the previous RPA components, riparian areas, and major floodplains (USAG Fort Belvoir, 2001). All lands not designated as RPAs in Fairfax County are classified as RMAs. Fort Belvoir recognizes the RPA designation but, being a Federal entity, is not subject to the provisions of the Fairfax County ordinance. As a result, Fort Belvoir does not use RPA maps produced by Fairfax County; instead, the Army delineates the RPA on the installation. In addition to RPA areas, Fort Belvoir places a 35-foot buffer around all intermittent streams. Wider buffer areas are taken into consideration during the planning process and employed where practicable.

The threshold of significance for water resources impacts would be exceeded if the alternative would result in any of the following:

- Change to regional groundwater patterns or depletion of groundwater;
- Alteration of local surface water;
- Notable adverse impact on natural and beneficial floodplain values; or substantial degradation of wetlands without mitigation

### **3.3.3. Wetlands**



As of the 1997 baseline inventory, approximately 1,250 acres of wetlands were identified on Fort Belvoir's Main Post and approximately 26 acres on Fort Belvoir North Area using the baseline wetland surveys (Paciulli, Simmons and Associates, Ltd., 1997a; 1999b). These figures remain relatively unchanged at this time. In total, this represents approximately 11% and 3% of the two installation areas, respectively. As shown in Figures 5.5-5.9, the predominant wetland type on Fort Belvoir is Palustrine Forested, which tends to occur in association with the riparian areas of Accotink, Dogue, and Pohick Creeks. Other wetlands typically found within the limits of Fort Belvoir include Palustrine Emergent and Palustrine Scrub-Shrub.

In 2007, Fort Belvoir performed a wetland delineation and obtained a jurisdictional determination for all of FBNA as well as a large portion of main post under BRAC 2005. A final wetland delineation and jurisdictional determination was also obtained in 2009 for numerous American Water infrastructure upgrade projects. These were the last large updates to baseline wetland inventories. A wetland delineation of Rivanna Station in 2016 identified approximately 2.5 acres of wetlands and open water.

### **3.3.4. *Environmental Consequences***

#### **3.3.4.1. *Proposed Action***

Impacts to groundwater and wetlands are not expected from implementation of the INRMP. Impacts to surface water may occur during stream and shoreline restoration projects. All required temporary erosion and sediment control measures would be employed for work near streams, but temporary short-term adverse impacts are likely. In order to minimize potential impacts, for all stream and shoreline restoration projects greater than 2,500 square feet, an Erosion and Sediment Control (ESC) plan and a stormwater management plan would be developed. The ESC plan would include temporary erosion and sediment control measures. The ESC plan and stormwater management plan would be prepared utilizing the requirements for water quality and quantity found in the Virginia Technical Criteria Part IIB (9VAC25-870-62 through 9VAC25-870-92). Appropriate temporary erosion and sediment control measures or permanent stormwater Best Management Practices (BMPs) will be employed to minimize impacts to water quality and potential increase in stormwater runoff. Monitoring of the outfalls would occur to ensure water quality is maintained during and after the restoration projects. Stream restoration projects will be reviewed as their scopes become more clearly defined to determine if additional NEPA analysis is required.

#### **3.3.4.2. *No Action Alternative***

The No Action alternative would maintain existing conditions and methodologies for the management of water resources at Fort Belvoir. Continuing the practices

of the 2001 INRMP without updated information or new projects included in the 2018 INRMP could have an adverse effect on water resources as future decisions would not be based on the best available information.

### **3.4. Biological Resources**

Potential impacts to plants, wildlife, and fish are evaluated in accordance with applicable regulations including but not limited to the Endangered Species Act of 1973, the Fish and Wildlife Conservation Act of 1980, the Magnuson-Stevens Fishery Conservation and Management Act, as amended, the Migratory Bird Treaty Act, and EO 13112 on Invasive Species.

#### **3.4.1. Vegetation**

Approximately 60 percent of Fort Belvoir (Main Post and FBNA combined) is undeveloped and supports predominantly forest communities. The other major native vegetation community types are tidally flooded marsh and shrub-scrub communities. Vegetative cover in the remaining 40 percent of Fort Belvoir consists primarily of improved grounds associated with the installation's developed land uses. Within the metropolitan Washington DC area, Fort Belvoir represents a significant tract of native vegetation in terms of size, diversity, and position relative to the location of off-post tracts of native vegetation. Approximately 25 percent of Rivanna Station, predominantly the steep sloped area, is forested.

#### **3.4.2. Fish and Wildlife**

The quality of the natural habitat on Fort Belvoir is reflected by the diverse fish and wildlife documented on post. Fort Belvoir provides habitats for 43 species of mammals, 277 species of birds, 32 species of reptiles, 27 species of amphibians and 65 species of fish. More than 3,300 acres of land have been set aside on Fort Belvoir for wildlife including the Accotink Bay Wildlife Refuge, the Jackson Miles Abbott Wildlife Refuge, T-17 Refuge, the Accotink Creek Conservation Corridor, and Fort Belvoir Forest and Wildlife Corridor. Fort Belvoir also participates in the Partners in Flight Program. Partners in Flight is a partnership between federal and state agencies, industry, non-governmental organizations and others, with the goal of conserving North American birds.

#### **3.4.3. Endangered, Threatened and Rare Species**

Much of the installation's rare wetland community types, and their associated rare plant and animal species, are contained within the Special Natural Areas. The Fort Belvoir Real Property Master Plan (RPMP) designates the three installation refuges, the two installation corridors, wetlands and steep-sloped areas as environmentally constrained areas. Such conservation land-use



designations protect the habitat in these areas from loss to development or land disturbing training activities.

Table 3-3 summarizes species that are potentially found on Fort Belvoir and their federal, state, National Listing Workplan (NLW), and the Army Species at Risk (ASAR) status.

<b>Table 3-3: Species documented or potentially occurring on Fort Belvoir with federal, state protection or on the USFWS National Listing Workplan or identified by Army as Species at Risk for Listing</b>					
<b>Species</b>	<b>Scientific Name</b>	<b>Federal</b>	<b>State</b>	<b>NLW</b>	<b>ASAR</b>
Small whorled pogonia	<i>Isotria medeoloides</i>	Threatened	Endangered		
Northern long-eared bat	<i>Myotis septentrionalis</i>	Threatened	Threatened		
Tricolored bat	<i>Perimyotis subflavis</i>		Endangered	X	
Little brown bat	<i>Myotis lucifugus</i>		Endangered	X	
Peregrine falcon	<i>Falco peregrinus</i>		Threatened		
Wood turtle	<i>Glyptemys insculpta</i>		Threatened	X	
Spotted turtle	<i>Clemmys guttata</i>			X	
Northern Virginia well amphipod	<i>Stygobromus phreaticus</i>			X	X
Tidewater Amphipod	<i>Stygobromus indentatus</i>			X	
Monarch butterfly	<i>Danaus plexippus</i>			X	
Rusty patched Bumble bee	<i>Bombus affinis</i>	Endangered			
Atlantic Sturgeon	<i>Acipenser oxyrinchus</i>	Endangered	Endangered		
Brook Floater*	<i>Alasmidonta varicose</i>		Endangered		

James Spinemussel*	<i>Pleurobema collina</i>		Endangered		
Migrant Loggerhead Shrike*	<i>Lanius ludovivianus migrans</i>		Threatened		
Loggerhead Shrike*	<i>Lanius ludovicianus</i>		Threatened		
Appalachian Grizzled Skipper*	<i>Pyrgus Wyandot</i>		Threatened		
Atlantic Pigtoe*	<i>Fusconia masoni</i>		Threatened		
Green Floater*	<i>Lasmigona subviridis</i>		Threatened		
* Rivanna Station Only					

Table 3-4. Rivanna Station State Listed Species		
Common Name	Scientific Name	State Status
Brook Floater	<i>Alasmidonta varicosa</i>	State Endangered
James Spinemussel	<i>Pleurobema collina</i>	State Endangered
Migrant Loggerhead Shrike	<i>Lanius ludovivianus migrans</i>	State Threatened
Loggerhead Shrike	<i>Lanius ludovicianus</i>	State Threatened
Appalachian Grizzled Skipper	<i>Pyrgus wyandot</i>	State Threatened
Atlantic Pigtoe	<i>Fusconia masoni</i>	State Threatened
Green Floater	<i>Lasmigona subviridis</i>	State Threatened

The ESA of 1973 requires federal agencies to ensure that their action is not likely to jeopardize the continued existence of any endangered or threatened species (animal and plant species) or result in the destruction or adverse modification of designated critical habitat.

The threshold of significance for biological resources impacts would be exceeded if the alternative would:

- Jeopardize the continued existence of any federally listed threatened or endangered species or result in destruction of critical habitat;
- Decrease the available habitat for commonly found species to the extent that the species could no longer exist in the area; or
- Eliminate a sensitive habitat such as breeding areas, habitats of local significance, or rare or state-designated significant natural communities needed for the survival of a species.

- Substantially degrade or minimize habitat.

#### **3.4.4. *Environmental Consequences***

##### **3.4.4.1. *Proposed Action***

Implementation of the updated INRMP is expected to have a minor long-term positive impact on biological resources (vegetation, fish and wildlife) at Fort Belvoir. Projects to improve biological resources include treatment of invasive vegetation, re-planting lost trees at a 2:1 ratio, performing habitat enhancement in streams or ponds, as well as collecting data to understand and better manage conditions. This additional information will allow Fort Belvoir to better manage its biological resources and will assist with the documentation of environmental compliance necessary for implementation of future projects. No adverse impacts would result from implementation of the Proposed Action.

##### **3.4.4.2. *No Action Alternative***

The No Action alternative would maintain existing conditions and methodologies for the management of natural resources. As development replaces open space, vegetation in the remaining undeveloped areas is increasingly subject to disruption by invasions of exotic vegetation, stormwater-related erosion and sedimentation, overuse by humans, and over-browsing by wildlife. Continuing the practices of the 2001 INRMP without updated information or new projects included in the 2018 INRMP could have an adverse effect on biological resources as future decisions would not be based on the best available information.

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## **4. Resources Not Evaluated in this EA**

To the extent possible, analyses of the resources presented in this EA are streamlined based on the anticipated level of potential impact. The focus of this EA is on the potential environmental impacts associated with the implementation of the INRMP while balancing the needs of sensitive environmental resources and the surrounding human environment. The following resource areas are not analyzed in this EA because the Proposed Action either has no potential to affect them or the potential impacts would be negligible:

### **4.1. Geology and Topography**

The natural geologic character and the general topography of the installation would not be impacted under the Proposed Action. No major grading or excavation of land is required under the Proposed Action and no long term effects to geology and topography are anticipated. As a result, impacts to geology and topography are not analyzed in this EA.

### **4.2. Air Quality**

Air Quality is protected by the Clean Air Act (CAA). In compliance with the 1970 CAA and the 1977 and 1990 CAA Amendments, the USEPA has promulgated National Ambient Air Quality Standards (NAAQS). The NAAQS were enacted for the protection of the public health and welfare, allowing for an adequate margin of safety. Fort Belvoir complies with air quality requirements and regulations. Emissions related to the implementation of the INRMP, specifically from vehicles and machinery used for cutting and thinning trees and stream restoration projects, would be temporary and only occur during project implementation. The estimated emissions associated with tree cutting and thinning are very low, and therefore, no impacts to air quality are expected and no further analysis is included in this EA.

### **4.3. Cultural Resources**

The Proposed Action is not expected to impact cultural resources. The ICRMP for Fort Belvoir was prepared in 2014. It is a 5-year plan for the integrated management of the cultural responsibilities at the U.S. Army Garrison. Among the laws with special consequence to Fort Belvoir are the National Historic Preservation Act (NHPA), the Native American Graves Protection and Repatriation Act (NAGPRA), and the Archaeological Resources Protection Act (ARPA). 304 archaeological sites were identified at Fort Belvoir. Evaluations of the 304 archaeological sites have been reviewed by the State Historic

Preservation Office (SHPO); one site, Belvoir Manor and Fairfax Gravesite, is listed in the National Register, 17 sites are NRHP-eligible, 138 are non-eligible, and 148 sites require further study to determine their eligibility status. All projects relating to implementation of the INRMP would be avoided in areas of known cultural resources at Fort Belvoir. No impacts to cultural resources are expected and no further analysis is included in this EA. Section 106 of the National Historic Preservation Act of 1966 requires federal agencies to take into account the effects of their undertakings on historic properties, and give the Advisory Council on Historic Preservation a reasonable opportunity to respond. As this INRMP is a planning level document for environmental projects, and not expected to impact cultural resources. The need for Section 106 will be analyzed on a project by project basis.

#### **4.4. Hazardous Materials and Wastes**

Fort Belvoir conducts its hazardous waste management program in compliance with the Resource Conservation and Recovery Act. The installation has a Hazardous Waste Management/Waste Minimization Plan and a Master Spill Plan. In the case of potential contamination, Fort Belvoir's contingency plan is to follow the Master Spill Plan, which includes the notification of the Installation Restoration Program. The cleaning and maintenance departments have replaced toxic and hazardous materials with environmentally friendly chemicals and adhere to an Integrated Pest Management Plan. Fort Belvoir, Environmental Division, also files annual hazardous material and toxic chemical reports in compliance with the Emergency Planning and Community Right-to-Know Act. Additionally, any projects that include contaminant remediation efforts could have a benefit to human health. The Proposed Action would not generate hazardous waste, and therefore is not analyzed in this EA.

#### **4.5. Traffic and Transportation**

Implementation of the Proposed Action would require the use of construction vehicles and also require the use of privately owned vehicles to bring the construction crew onto the installation. The increase in traffic created by the Proposed Action would be a negligible impact to the existing traffic patterns, and as a result, transportation is not analyzed in this EA.

#### **4.6. Utilities**

Implementation of the Proposed Action would not result in the need for any upgrades in utilities that service Fort Belvoir. The Proposed Action would not increase the long-term demand for public utility services and would not affect regional or local water or energy supplies. The Proposed Action would not require

any short-term or long term amounts of electricity, water or other resources supplied by the installation or by regional utilities; therefore, utilities are not analyzed in this EA.

#### **4.7. Socioeconomics**

The Proposed Action to implement the INRMP would not result in changes to population, demographics, income, community services and facilities, or housing. As a result, socioeconomics are not analyzed in this EA.

#### **4.8. Noise**

The Noise Control Act of 1972 (Public Law 92-574) directs federal agencies to comply with applicable federal, state, interstate, and local noise control regulations. Fairfax County Code sets Maximum sound levels of 60 decibels (dB) continuous sounds and 100 dB impulse sounds between 7:00 a.m. and 10:00 p.m., and 55 dB continuous sounds and 80 dB impulse sounds between 10:00 p.m. and 7:00 a.m. in a residential areas. For commercial districts, the maximum sound levels for all times are 65 dB continuous sounds and 100 dB impact sounds. Construction activities are further restricted as they are prohibited between 9:00 p.m. and 7:00 a.m. Sunday through Thursday, or between 9:00 p.m. and 9:00 a.m. on Friday, Saturday, and the day before a Federal holiday. Construction activities are, however, exempt from the Fairfax County ordinance if they occur between 7:00 a.m. and 9:00 p.m. Monday through Friday, and 9:00 a.m. through 9:00 p.m. Saturday, Sunday, and Federal Holidays, provided that a maximum decibel level of 90 dB continuous sound is not exceeded in residential areas. (Fairfax County Code Section 108-4-1). Outdoor Projects included in the implementation of the INRMP which may generate short-term increases in noise within Fort Belvoir include construction noise from stream and shoreline restoration projects, tree cutting and thinning projects, major renovations to fishing piers, and trail and associated facilities renovation projects. These activities would be performed during the noted hours and would comply with all noise ordinances and regulations; therefore, impacts would be negligible. No long-term impacts from the Proposed Alternative are anticipated to the noise environment at Fort Belvoir. Therefore, noise impacts are not analyzed in this EA.

#### **4.9. Visual and Aesthetic Resources**

During the process of implementing the INRMP, construction equipment and equipment to perform surveys will be present at Fort Belvoir, and could attribute to minor short term impacts. Long term impacts are not anticipated since the aesthetic effects would be minimal and would be consistent with current land uses. The projects are contained entirely within the boundary of Fort Belvoir

and would not affect areas outside of the installation. It is anticipated that effects from the Proposed Action would be temporary and minimal and therefore are not analyzed in this EA.

#### **4.10. Environmental Justice**

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations*, directs agencies to address environmental and human health conditions in minority and low-income communities to avoid the disproportionate placement of any adverse effects from federal policies and actions on these populations. Local residents may include low-income populations, but these populations would not be disproportionately affected by the Proposed Action. The proposed implementation of the INRMP would not disproportionally effect minority populations or low income communities, and thus environmental justice is not analyzed in this EA.

#### **4.11. Protection of Children**

Executive Order 13045 on the Protection of Children from Environmental Health and Safety Risks was issued on 21 May 1997. This order requires that Federal agencies identify and address activities that may disproportionately affect children. It defines health and safety risks as “risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest.” These substances include the air we breathe, the food we eat, the water we drink and use for recreation, the soil we live on, and the products we use or are exposed to. Implementing the Proposed Action will not present environmental health and safety risks to children, so protection of children is not further analyzed in this EA.



## 5. Cumulative Impacts

A cumulative impact is defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR 1508.7). Cumulative effects can become potentially critical when the chosen action interacts, either directly or indirectly, with other unrelated actions. This type of interaction should be rare because an INRMP by design incorporates existing installation planning documents and management plans, and is reviewed and updated every 5 years at a minimum. INRMPs are intended to follow an ecosystem or landscape-level approach to natural resources management. They also involve partnerships with Federal, State, and local groups. The above-mentioned characteristics of INRMPs reduce the possibility for cumulative effects arising that have not already been considered in the INRMP. Integrated planning, ecosystem management, and partnering are techniques that, by their nature, reduce cumulative effects. As new, relevant issues or initiatives arise, regardless of the proponent agency, they would be considered in the INRMP during either the annual review or the 5-year review period. In this way, the INRMP is maintained as an active reference document that describes Fort Belvoir’s planned natural resources management.

Table 5-1 summarizes the recently completed, current, and future (2017-2030) projects, and their potential for a cumulative impact.

Implementation of the INRMP would not result in cumulative impacts related to land use, soils, air quality, water resources, or biological resources. The expected adverse impacts would be minor and therefore no long-term cumulative impacts are anticipated

**Table 5-1: Recently Completed, Current, and Future Projects on Fort Belvoir**

<b>Project</b>	<b>Status</b>	<b>NEPA Action</b>
NCE Temporary Parking Lot	Construction completed 2017	Environmental Assessment prepared and FNSI signed in 2015
U.S. Route 1 Improvements at Fort Belvoir	Construction completed August 2017	Environmental Assessment prepared and FNSI signed in 2012
Dewitt Hospital Demolition	Demolition complete 2017	REC prepared in 2012
Staybridge Suites	Construction of hotel complete in 2017, Stormwater structure currently undergoing repair	Environmental Assessment prepared and FNSI signed in 2012
New Commissary	Construction Complete 2017	Environmental Assessment prepared and FNSI signed in 2010
Expansion of INSCOM	Construction on-going since 2014	Environmental Assessment prepared and FNSI signed in 2012
DLA Visitor Control Center	Construction on-going since 2017	REC prepared in 2016
Demolition of Buildings 806 & 807	Construction on-going since 2017	REC prepared in 2017
Skills Training Facility at DAAF	Construction is on-going since early 2016	Environmental Assessment prepared and FNSI signed in 2014
DAAF Hazardous Tree Removal	Project is on-going since late 2016	Environmental Assessment prepared and FNSI signed in 2016

National Museum of the U.S. Army (NMUSA)	Construction is on-going since early 2017	Environmental Assessment prepared and FNSI signed in 2010
National Museum of the US Army Roads and Infrastructure Improvements ( <i>ST 18 RPMP</i> )	Construction is on-going since 2017	RPMP EIS ROD signed 2016
Access Road and Control Point- Lieber Gate ( <i>ST 13 RPMP</i> )	Construction is on-going since 2017	RPMP EIS ROD signed 2016
Communications Line Extension at DAAF	Proposed late 2017-early 2018	Environmental Assessment prepared in 2017
911 <sup>th</sup> Engineering Company Operations Complex	Proposed 2019-2021	Environmental Documentation has yet to be prepared.
Regional Stormwater Management Facility ( <i>ST 14 RPMP</i> )	Construction is on-going since 2017	RPMP EIS ROD signed 2016. REC Prepared in 2016.
Retail Fuel Facility ( <i>ST 35 RPMP</i> )	Future Construction 2018-2019	RPMP EIS ROD signed 2016. REC prepared.
Dogue Creek Bridge Rehabilitation	Future Construction 2018-2019	Environmental Documentation has yet to be prepared.
Outfall 015 Restoration Project	Future Construction 2019-2021	Environmental Documentation has yet to be prepared.
Davidson Army Airfield Development Plan	Early 2019 then implemented in phases over the next three decades	Environmental Documentation has yet to be prepared.
Caisson Platoon Facility Sub-Area Master Plan	2020-2023	Environmental Documentation has yet to be prepared.
Virginia Army National Guard HQ Command Complex	Future Construction 2018-2019	Environmental Documentation has yet to be prepared.

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## 6. Mitigation

Mitigation involves avoiding impacts, minimizing impacts, and taking actions to compensate for unavoidable impacts. Managing Fort Belvoir's natural resources under an INRMP is a positive action that provides overall benefits to a broad range of natural resources while maintaining Fort Belvoir's ability to meet its mission requirements. As part of the integrated planning process, the individual projects that constitute the proposed action have been selected and modified to minimize adverse impacts. Consequently, impact avoidance and minimization have already been considered in the planning process. No required mitigation has been identified and there is no requirement for compensatory mitigation, unless stipulated by the applicable permitting process.

General mitigation monitoring measures can be provided to support the INRMP during the implementation stage of the individual management projects and actions if the project-specific mitigation has the potential for environmental impact. Application of these mitigation monitoring measures may further reduce an adverse effect that may result from implementing a particular management action. The mitigation monitoring measures are presented as a general guide to support implementation and, although they are not required, their use is encouraged by the CEQ to lessen impacts. Mitigation monitoring measures will be undertaken to determine:

- Whether the implementation actions are accomplishing what was intended
- Whether the implementation actions are having unintended consequences
- If unforeseen events are having an impact on implementation of the natural resources management program, as described in the INRMP.

Also, as necessary, subsequent environmental analysis and NEPA documentation will be done for specific management actions if and when they are implemented.

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## 7. Conclusion

Based upon this Environmental Analysis, it is anticipated that the known and potential impacts of the Proposed Action on the physical and natural environment would be of beneficial nature. Implementation of the updated INRMP would result in the efficient management of natural resources at Fort Belvoir. The INRMP establishes procedures and long-range goals for managing natural resources compliance with all applicable federal laws, regulations and installation guidelines. The natural resources manager, in coordination with other elements of the installation, will serve to preclude any significant impacts that may result from natural resources management actions. Implementation of the Proposed Action is not anticipated to result in significant environmental impacts. Based upon this conclusion, preparation of an Environmental Impact Statement is not required for the implementation of the Proposed Action, so a Finding of No Significant Impact will be prepared.

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## **Appendix**

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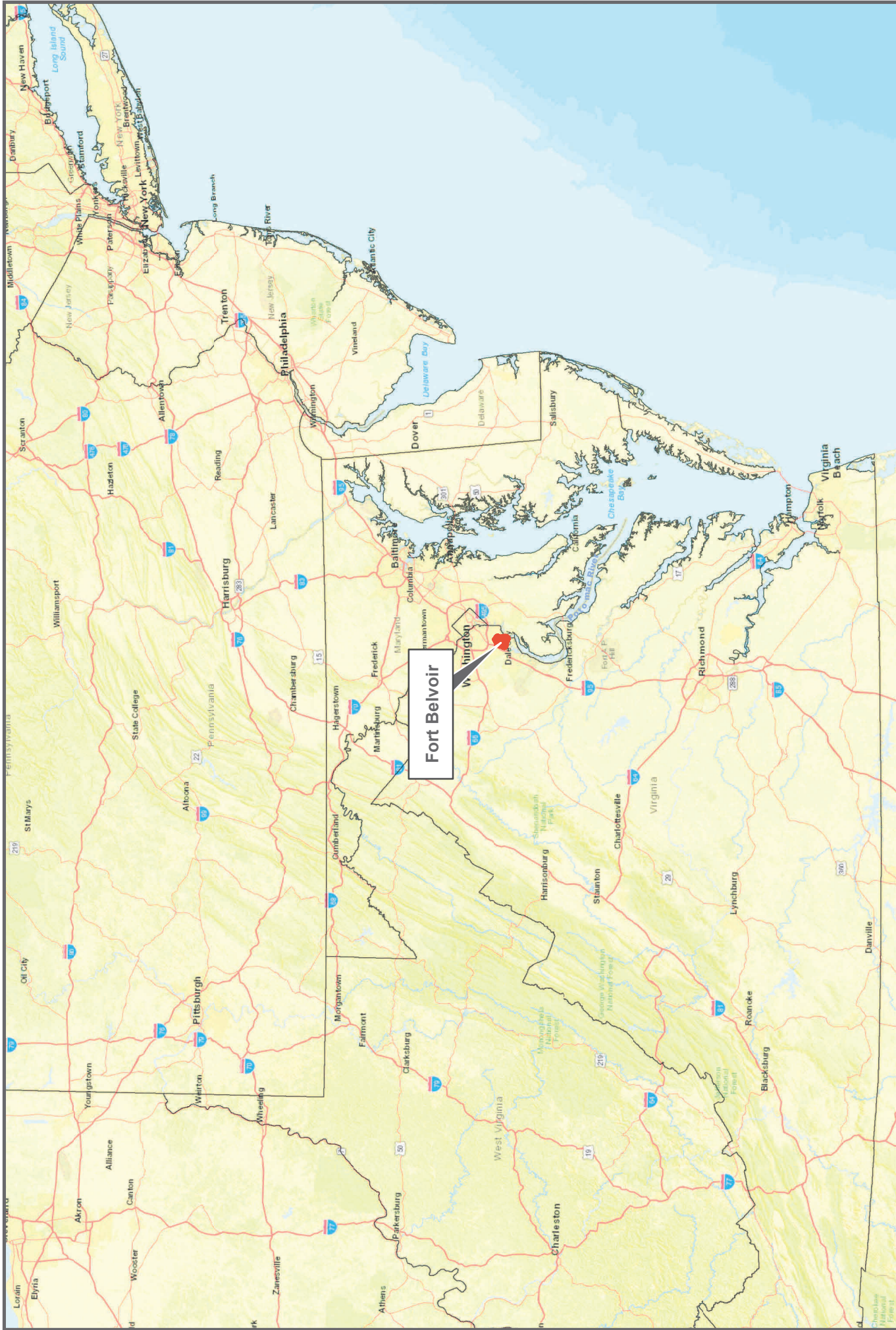
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## **A. Figures**

Most figures are taken from the 2018 INRMP; most figure numbers correspond to the figure numbers in the INRMP, excluding Figure 3.2.

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# GENERAL LOCATION OF FORT BELVOIR

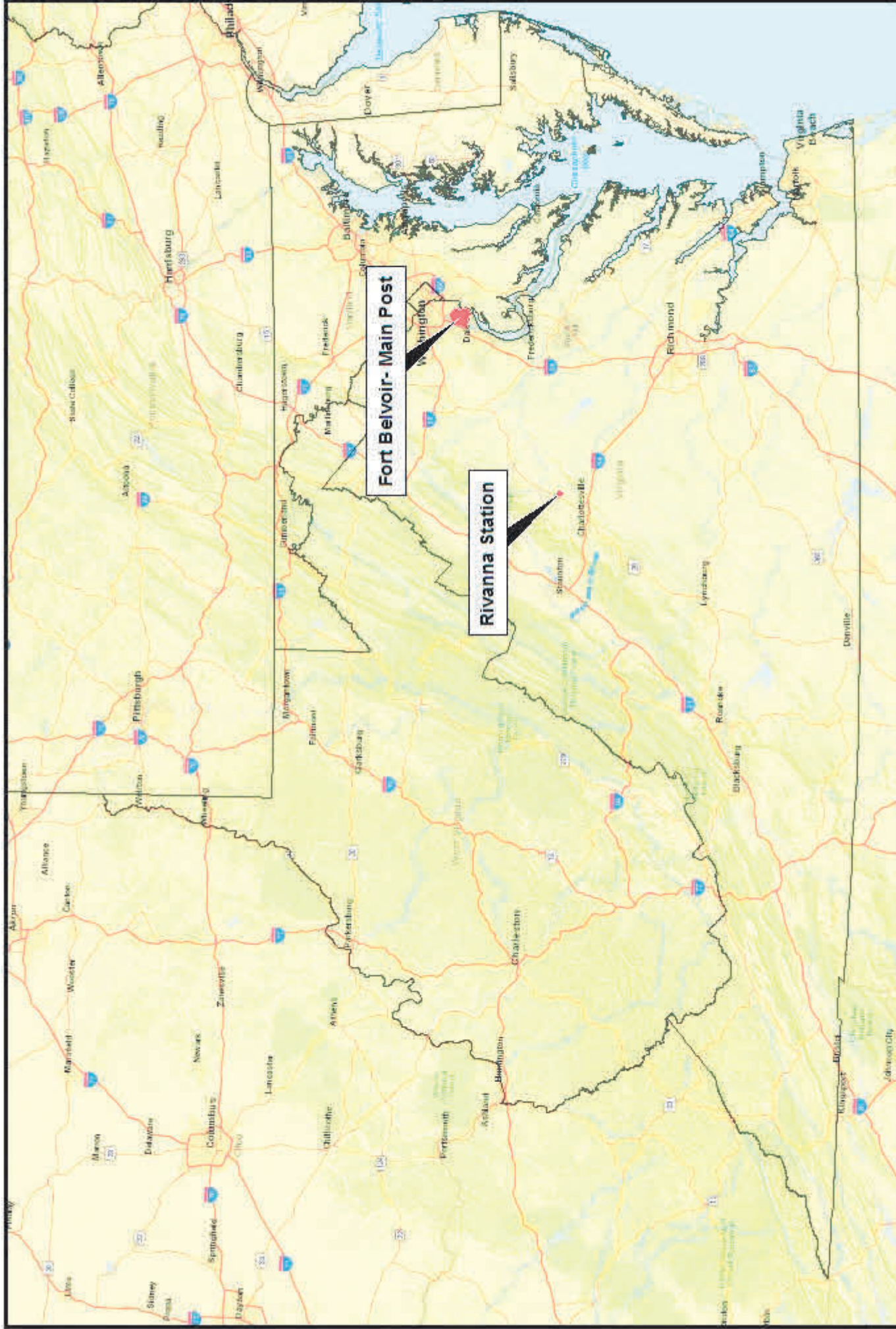
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Figure 3.1

Source: ESRI, USGS

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# GENERAL LOCATION OF FORT BELVOIR AND RIVANNA STATION

Figure 3.2

Source: ESRI, USGS

Unclassified // FOUO

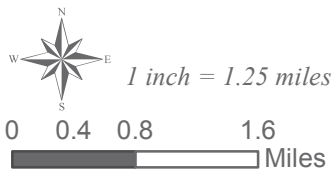
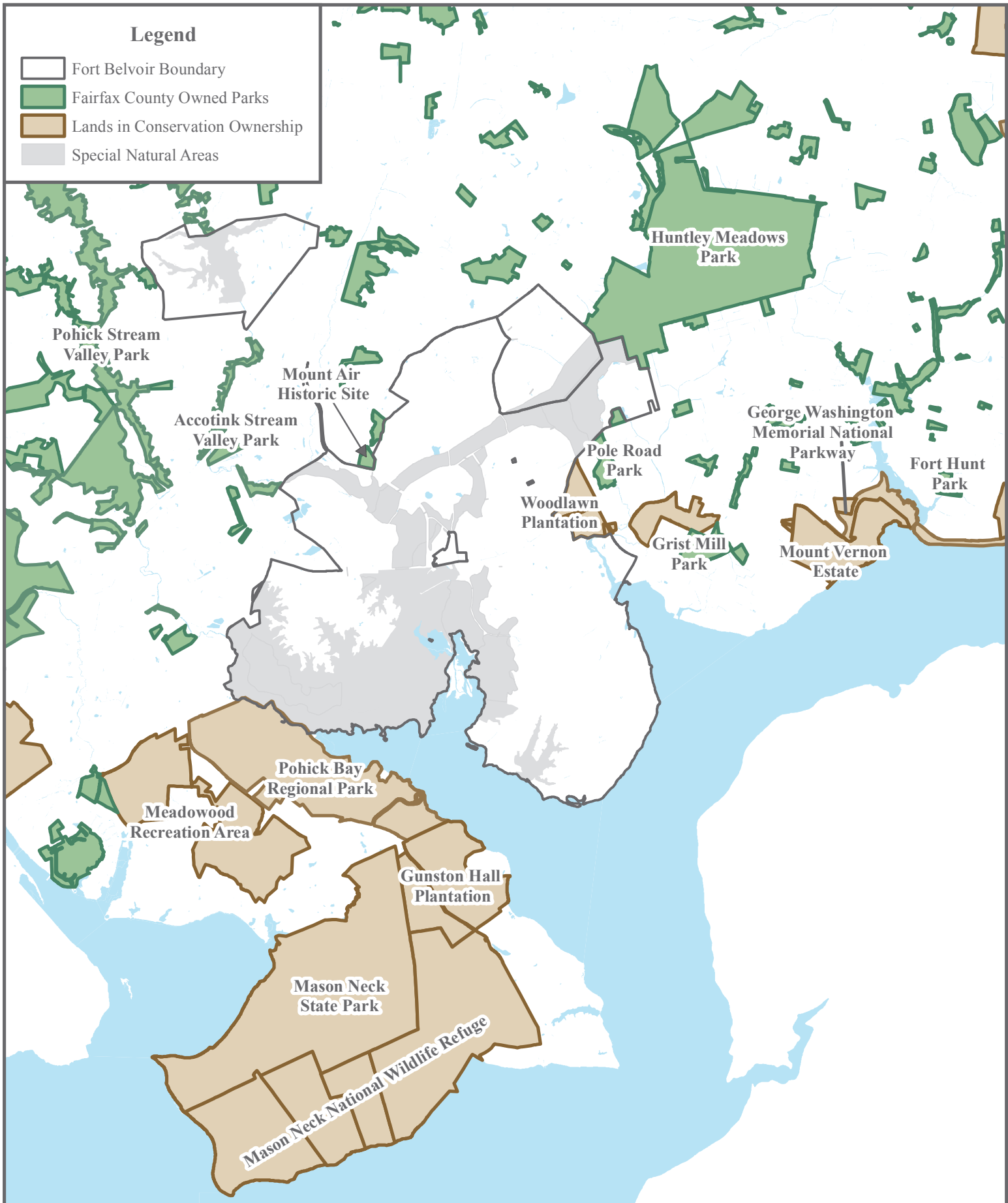
1 in = 47 miles

0 5 10 20 30 40

Miles



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## LANDS IN CONSERVATION OWNERSHIP

**Figure 3.3**

Source: Fairfax County GIS Center,  
Fort Belvoir GIS

Unclassified // FOUO

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## Legend



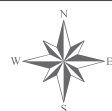
Fort Belvoir Boundary



Chesapeake Bay Watershed



**Fort Belvoir**



1 inch = 50 miles

0 15 30 60  
Miles

# CHESAPEAKE BAY WATERSHED

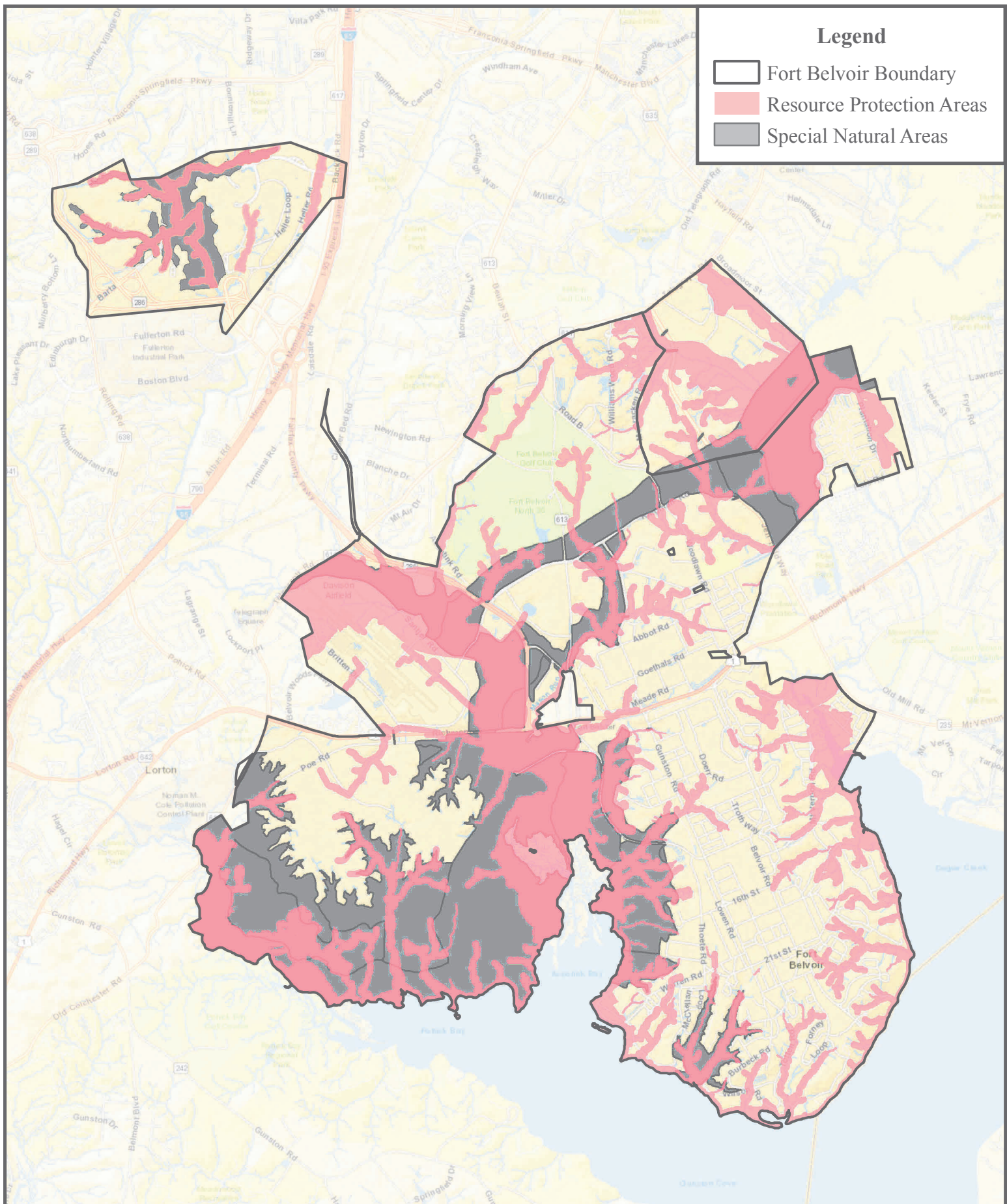
Unclassified // FOUO

**Figure 5.1**

Source: Chesapeake Bay Foundation,  
HUC8 USGS Watersheds, Fort Belvoir GIS

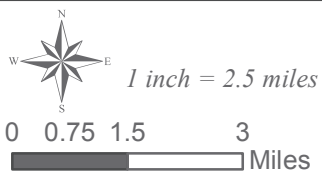
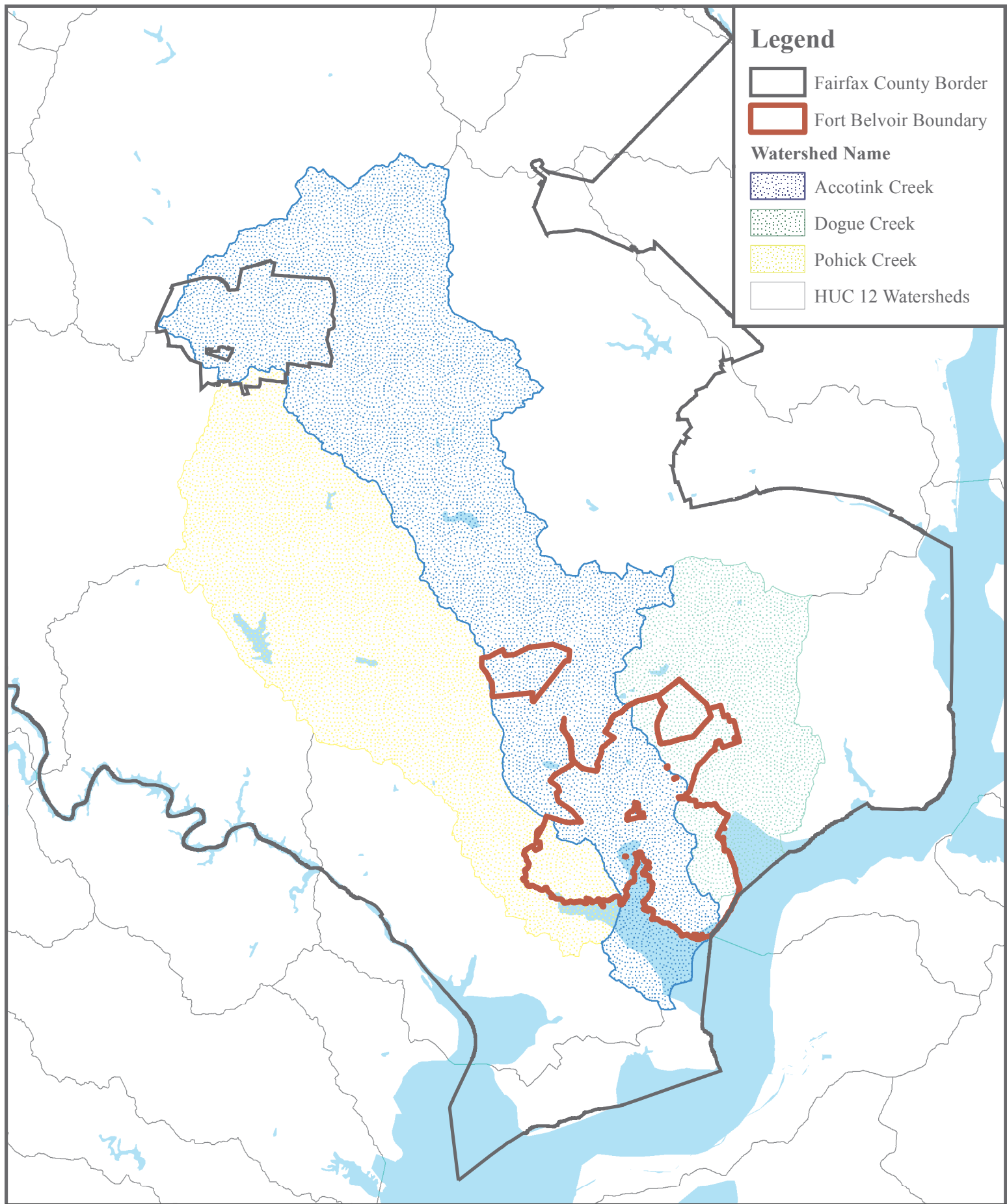
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Unclassified // FOUO

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## MAJOR WATERSHEDS ORIGINATING OUTSIDE of FORT BELVOIR

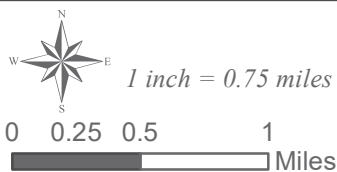
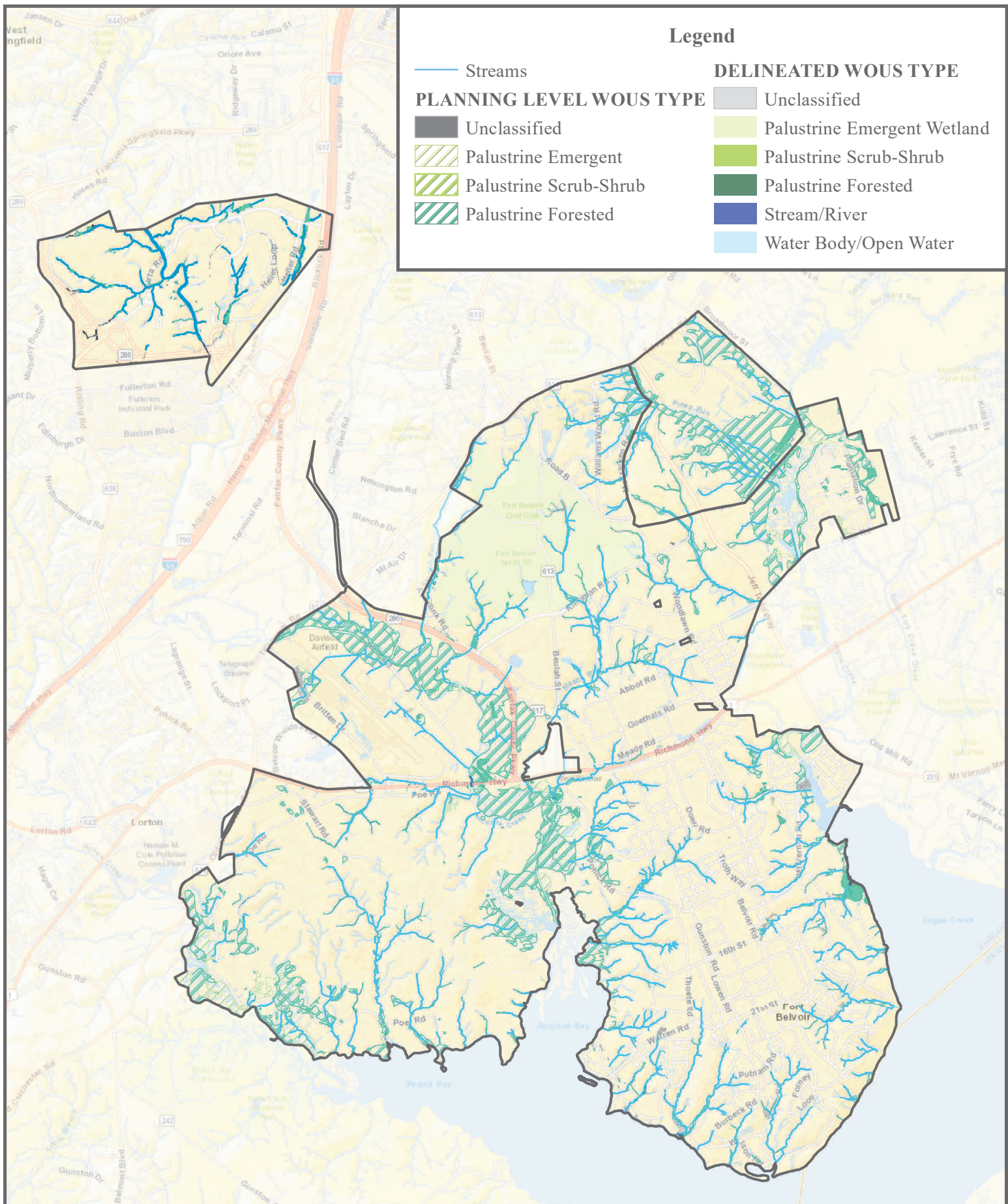
### Figure 5.4

Unclassified // FOUO

Source: Fairfax County Government,  
USGS HUC 12 Watersheds, Fort Belvoir GIS

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# WATERS OF THE US ON FORT BELVOIR

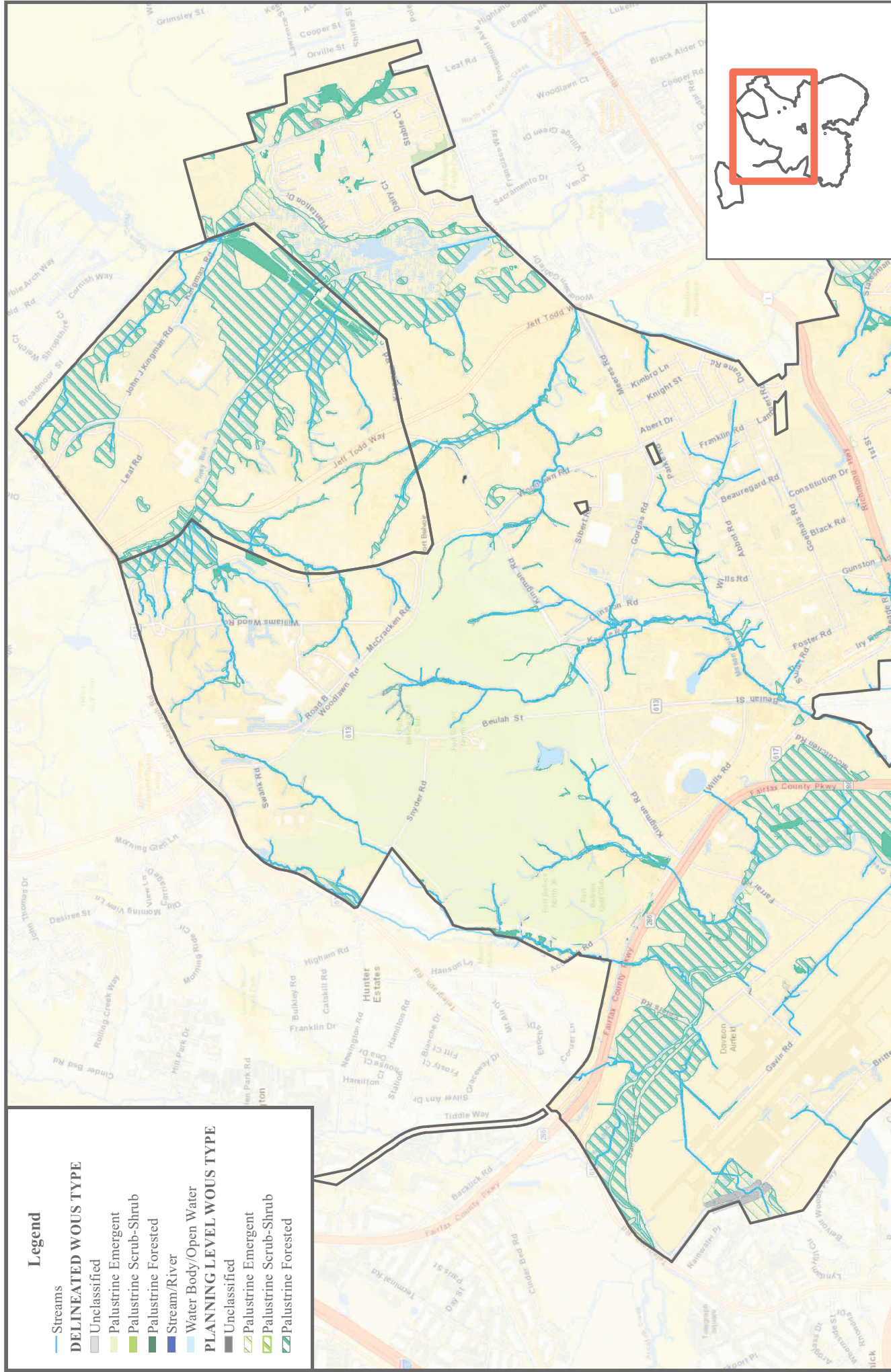
Unclassified // FOUO

**Figure 5.5**

Source: Fort Belvoir 1997 wetland surveys, additional jurisdictional determinations from 1997-2017, Google road maps,

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# FORT BELVOIR WATERS OF THE US,

**NORTH**

Unclassified // FOUO

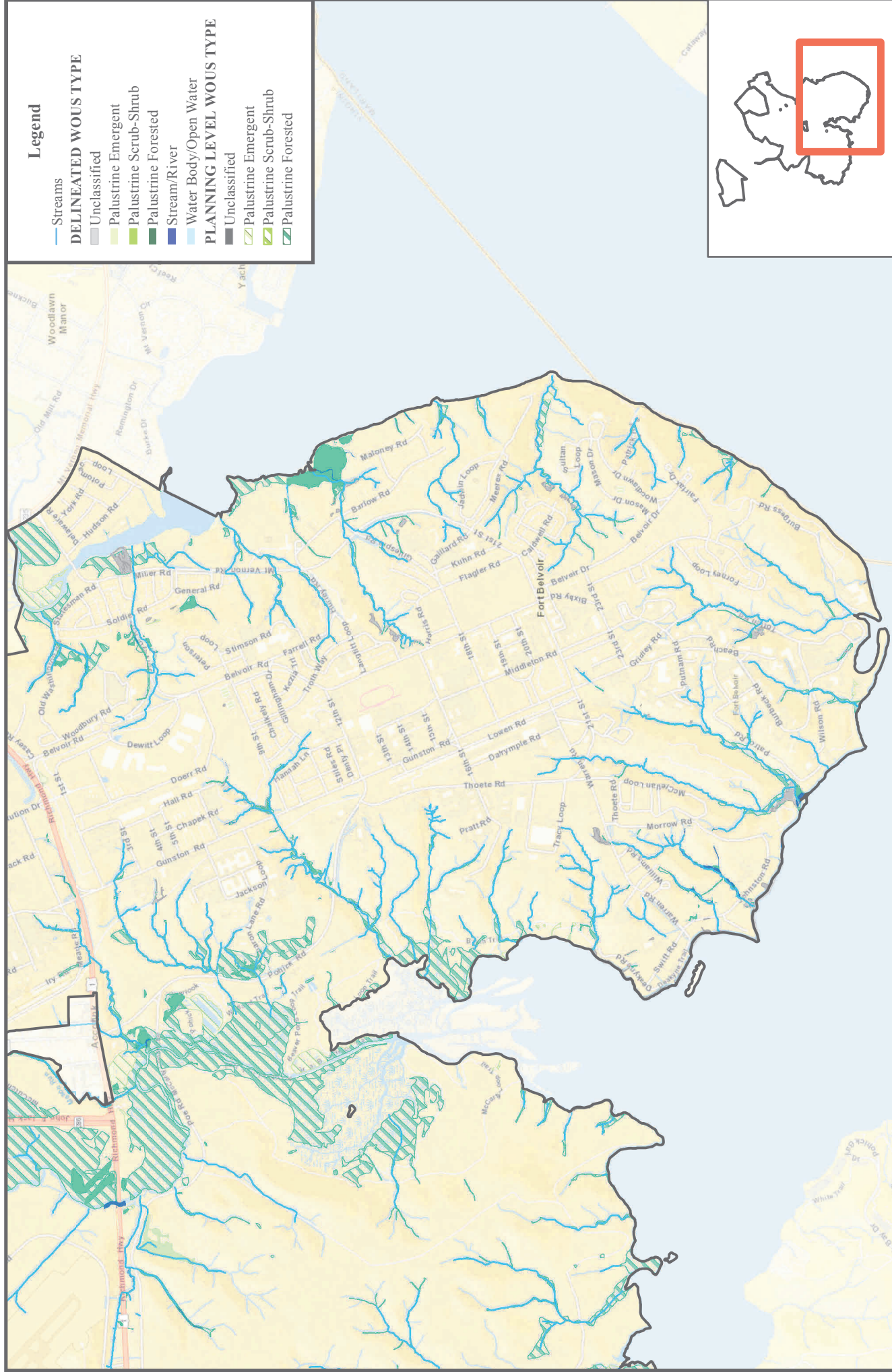
**Figure 5.7**

Source: Fort Belvoir 1997 wetland surveys, additional jurisdictional determinations from 1997-2017, Google road maps



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# WATERS OF THE US ON FORT BELVOIR, SOUTH EAST

**Figure 5.8**

Source: Fort Belvoir 1997 wetland surveys,  
additional jurisdictional determinations from  
1997-2017, Google road maps

1 inch = 0.4 miles

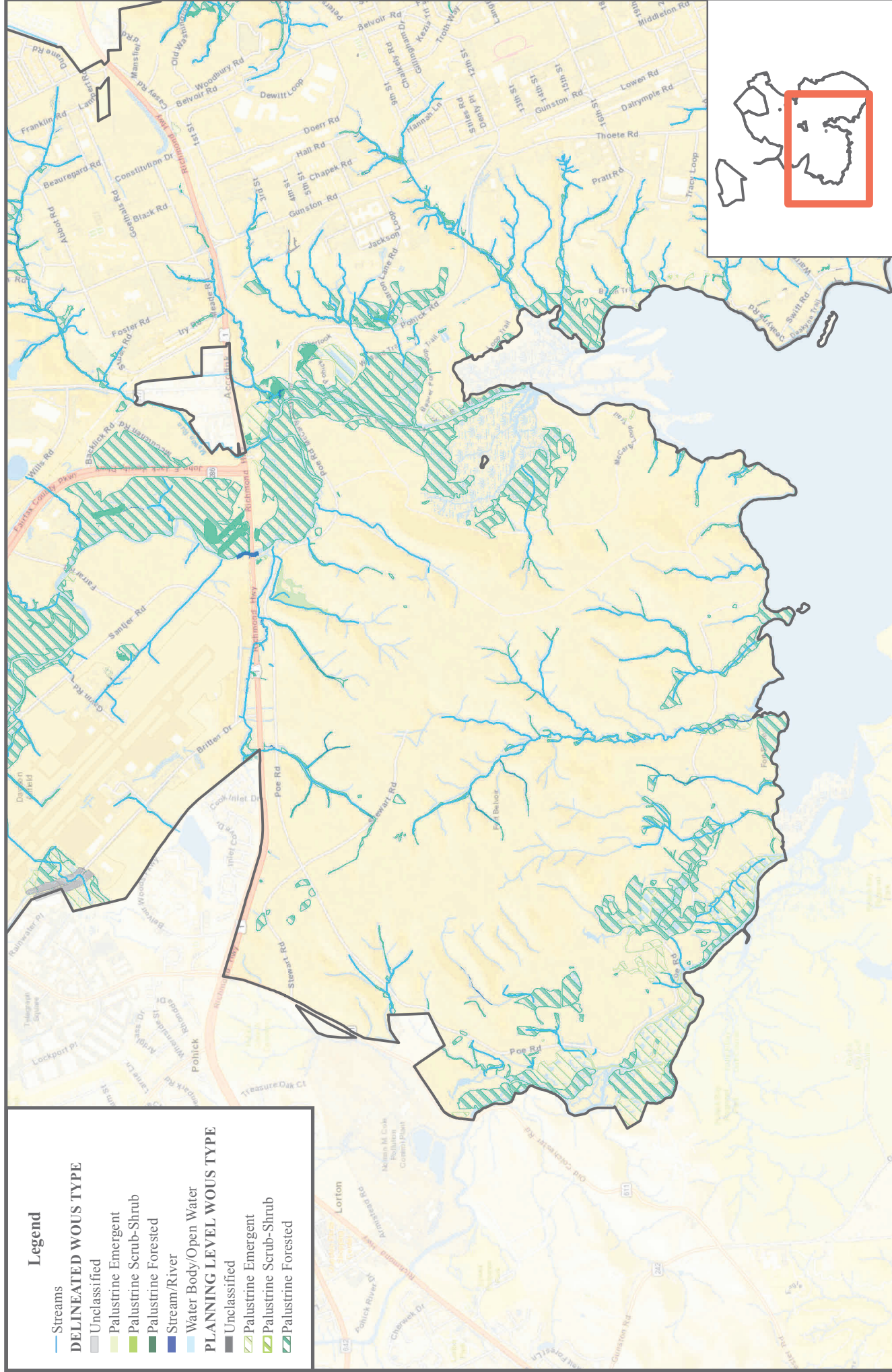
0 0.1250.25 0.5 Miles



Unclassified // FOUO

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## Legend

- Streams
- DELINEATED WOU TYPE**
- Unclassified
- Palustrine Emergent
- Palustrine Scrub-Shrub
- Palustrine Forested
- Stream/River
- Water Body/Open Water
- PLANNING LEVEL WOU TYPE**
- Unclassified
- Palustrine Emergent
- Palustrine Scrub-Shrub
- Palustrine Forested

## WATERS OF THE US ON FORT BELVOIR, SOUTH WEST

**Figure 5.9**

Source: Fort Belvoir 1997 wetland surveys, additional jurisdictional determinations from 1997-2017, Google road maps



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## **B. Notice of Availability, Coordination Letters, and Responses**

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**Notice of Availability of an Environmental Assessment and Draft Finding of  
No Significant Impact for  
Implementation of the 2018 Integrated Natural Resources Management Plan  
Fort Belvoir, Virginia**

Interested parties are hereby notified that the U.S. Army Garrison Fort Belvoir has prepared an Environmental Assessment (EA) and a Draft Finding of No Significant Impact (FNSI) in accordance with the National Environmental Policy Act (NEPA) of 1969, and regulations implementing the procedural provisions of the NEPA, 40 Code of Federal Regulations (CFR) 1500-1508, and Environmental Analysis of Army Actions, 32 CFR 651. The EA analyzes the potential environmental impacts that may occur as a result of the implementation of the 2018 Integrated Natural Resources Management Plan (INRMP) for U.S. Army Garrison Fort Belvoir.

The EA is incorporated by reference in the Draft FNSI. Based on the EA, the Army has determined that implementation of the Proposed Action would have no significant adverse direct, indirect, or cumulative effects on the quality of the human or natural environment. Therefore, an Environmental Impact Statement will not be prepared.

A copy of the EA and Draft FNSI are available for review and comment at the following libraries: Fort Belvoir MWR Library, and Fairfax County Public Library at the following locations: Lorton Branch, Sherwood Regional Branch, and Kingstowne Branch. The documents are also available at: <http://www.belvoir.army.mil/environdocssection2.asp>. Comments on the EA and Draft FNSI should be submitted by mail to Mr. Felix M. Mariani, Fort Belvoir DPW Environmental Division, Building 1442, 9430 Jackson Loop, Fort Belvoir, VA 22060, or [usarmy.belvoir.imcom-atlantic.mbx.enrd@mail.mil](mailto:usarmy.belvoir.imcom-atlantic.mbx.enrd@mail.mil). Comments must be received no later than 30 days after publication of this Notice of Availability.

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### Distribution List

Name	Mailing Address	Type
Ms. Amy Ewing - Manager	Fish and Wildlife Information Services VA Department of Game and Inland Fisheries 7870 Villa Park Dr. Henrico, VA 23228	State Agency
Mr. Ray Fernald - Manager	Virginia Department of Game and Inland Fisheries Environmental Services Section P.O. Box 90778 Henrico, VA 23228	State Agency
Mr. Todd Hafner	Director of Planning and Development Northern Virginia Regional Park Authority 5400 Ox Road Fairfax Station, Virginia 22039	Regional Agency
Ms. Bettina Sullivan	Office of Environmental Review, Virginia Department of Environmental Quality P.O. Box 1105 Richmond, VA 23218	State Agency
Mr. John Bricker	State Conservationist USDA, Natural Resources Conservation Service 1606 Santa Rosa Road, Suite 209 Richmond, Virginia 23229-5014	Federal Agency
Mr. Marcel Acosta	Executive Director National Capital Planning Commission 401 Ninth Street NW, Suite 500, North Lobby Washington, DC 20004	Regional Agency
Ms. Kimberly Damon-Randall	Greater Atlantic Region Fisheries Office National Marine Fisheries Service Protected Resources 55 Great Republic Drive Gloucester, Massachusetts 01930	Federal Agency
Ms. Patricia Soriano	Mount Vernon Group, Sierra Club 5405 Barrister Place Alexandria, Virginia 22304	Non-Government Organization
Ms. Hillary Clawson	Mason Neck Citizens Association P.O. Box 505 Mason Neck, Virginia 22199	Non-Government Organization
Ms. Judy Riffin	Alexandria Friends Meeting at Woodlawn 8990 Woodlawn Road Fort Belvoir, Virginia 22060	Non-Government Organization
Chairman Cathy Ledec	Mount Vernon Council of Citizen's Associations P.O. Box 203 Mount Vernon, Virginia 22121-0203	Non-Government Organization
Chairman David Dale	Mount Vernon Council of Citizen's Associations P.O. Box 203 Mount Vernon, Virginia 22121-0203	Non-Government Organization
Ms. Cathy Ledec	Friends of Huntley Meadows C/O Huntley Meadows Park 3701 Lockheed Blvd. Alexandria, Virginia 22306	Non-Government Organization
Ms. Karen Sheffield	Huntley Meadows Park Fairfax County Parks Authority	Local Government - Fairfax County

Name	Mailing Address	Type
	3701 Lockheed Boulevard Alexandria, Virginia 22306	
Ms. Martha Wingfield	The Virginia Conservation Network 409 East Main Street, Suite 201 Richmond, Virginia 23219	Non-Government Organization
Mr. Kevin Casalenuovo	Park Manager Pohick Bay Regional Park 6501 Pohick Bay Drive Lorton, Virginia 22079	Regional Agency
Mr. Peyton Robertson	Director, Cheseapeake Bay Program Office National Marine Fisheries Service 410 Severn Avenue, Suite 107-A Annapolis, MD 21403	Regional Agency
Mr. Greg Weiler	Refuge Manager Mason Neck National Wildlife Refuge 12638 Darby Brooke Court Woodbridge, Virginia 22192	Regional Agency
Mr. Kris Unger	Friends of Accotink Creek 127 Poplar Road Fredericksburg, Virginia 22406-5022	Non-Government Organization
Ms. Genevieve LaRouche	Field Supervisor, Annapolis Field Office U.S. Fish and Wildlife Service 177 Admiral Cochrane Drive Annapolis, Maryland 21401-7307	Federal Agency
Ms. Mary Josie Blanchard	Director U. S. Department of the Interior Office of Environmental Policy and Compliance 1849 C Street, NW, MS 2462 Washington, DC 20240	Federal Agency
Ms. Pat Montanio	National Oceanic Atmospheric Administration National Marine Fisheries Service Habitat Conservation Division 1315 East-West Highway SSMC3, 14th Floor F/HC Silver Spring, Maryland 20910	Federal Agency
Honorable Sharon Bulova	Chairman, Fairfax County Board of Supervisors Fairfax County Government Center 12000 Government Center Parkway, Suite 530 Fairfax, Virginia 22035-0071	Local Government - Fairfax County
Supervisor Daniel G. Storck	Fairfax County Board of Supervisors Mount Vernon Government Center 2511 Parkers Lane Alexandria, Virginia 22306-3273	Local Government - Fairfax County
Chairman Peter F. Murphy, Jr.	Fairfax County Planning Commission Government Center 12000 Government Center Parkway, Suite 330 Fairfax, Virginia 22035	Local Government - Fairfax County
Mr. Noel Kaplan	Fairfax County Department of Planning and Zoning 12055 Government Center Parkway, Suite 730 Fairfax, Virginia 22035	Local Government - Fairfax County

Name	Mailing Address	Type
Mr. Kirk W. Kincannon	Fairfax County Park Authority Planning and Development Division 12055 Government Center Parkway, Suite 421 Fairfax, Virginia 22035-1118	Local Government - Fairfax County
Ms. Laura McKay	Virginia Department of Environmental Quality Coastal Zone Management Program 629 East Main Street Richmond, Virginia 23219	State Agency
Ms. Barbara Rudnick	NEPA Team Leader Office of Environmental Programs (3EA30) U.S. Environmental Protection Agency Region 3 1650 Arch Street Philadelphia, PA 19106	Federal Agency
Ms. Katry Harris	Office of Federal Agency Programs Advisory Council on Historic Preservation 401 F Street NW, Suite 308 Washington, DC 20001-2637	Historical and Cultural Agencies and Properties
Mr. Carl Kikuchi	The Audubon Society of Northern Virginia 11100 Wildlife Venter Drive, Suite 100 Reston, Virginia 20190	Non-Government Organization
Mr. Marc Holma	Virginia Department of Historic Resources 2801 Kensington Ave. Richmond, Virginia 23221	State Agency
Mr. Troy M. Anderson	Conservation Planning Assistance Supervisor U. S. Fish and Wildlife Service Virginia Field Office 6669 Short Lane Gloucester, Virginia 23061-4410	Federal Agency
Mr. Leo Henry	2006 Mt. Hope Road Lewiston, NY 14092	Tribes
Mr. George Wickliffe	P.O. Box 746 Tahlequah, OK 74465	Tribes
Ms. William Harris	996 Avenue of the Nations Rock Hill, SC 29730	Tribes
Mr. Michell Hicks	Qualla Boundary P.O. Box 455 Cherokee, NC 28719	Tribes
Mr. Robert Gray	Pamunkey Indian Reservation 191 Lay Landing Road King William, VA 23086	Tribes
Mr. Stephen R Adkins	8200 Lott Cary Road Providence Forge, VA 23140	Tribes
Mr. Gene Pathfollower Adkins	2895 Mt Pleasant Road Providence Forge, VA 23140	Tribes
Mr. Frank Adams	P.O. Box 184 King William, VA 23086	Tribes
Mr. Dean Branham	PO Box 1136 Madison Heights, VA 24572	Tribes
Ms. Anne Richardson	5036 Indian Neck Rd St. Stephens Church VA 23148	Tribes
Mr. Ronald Lee Lockamy	1001 Pemborke Lane Suffolk, VA 23434	Tribes

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DEPARTMENT OF THE ARMY  
BALTIMORE DISTRICT, CORPS OF ENGINEERS  
2 HOPKINS PLAZA  
BALTIMORE, MD 21201

July 11, 2018

Ms. Lyn McKinney, Branch Manager  
Lorton Branch, Fairfax County Public Library  
9520 Richmond Highway  
Lorton, Virginia 22079

Dear Ms. McKinney,

Fort Belvoir has prepared a Draft Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA) of 1969, and regulations implementing the procedural provisions of the NEPA, 40 Code of Federal Regulations (CFR) 1500-1508, and Environmental Analysis of Army Actions, 32 CFR 651. The EA evaluates potential environmental, cultural, and socioeconomic effects associated with the implementation of the Fort Belvoir Integrated Natural Resource Management Plan (INRMP). Fort Belvoir requests that the above referenced EA be made available to the public for their review. The availability of the document to the public will be announced in the Washington Post on Thursday, July 12, 2018. The document is intended to be accessible to the public at the library, but it is not intended to be circulated. It is requested that the document remain available to the public from July 12 to August 13, 2018.

A copy of the Notice of Availability stating the draft EA is now available for review and comment is located in Appendix A of the document.

Thank you for your assistance in facilitating the public review and comment process. If you have any questions, please contact Mr. Michael Schuster at [michael.j.schuster@usace.army.mil](mailto:michael.j.schuster@usace.army.mil) or by telephone at 410-962-8160.

Sincerely,

MICHAEL J SCHUSTER  
Chief  
Installation Support Branch  
Planning Division

Encl

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DEPARTMENT OF THE ARMY  
BALTIMORE DISTRICT, CORPS OF ENGINEERS  
2 HOPKINS PLAZA  
BALTIMORE, MD 21201

July 11, 2018

Ms. Linda Schlekau, Branch Manager  
Sherwood Branch, Fairfax County Public Library  
2501 Sherwood Hall Ln  
Alexandria, VA 22306

Dear Ms. Schlekau,

Fort Belvoir has prepared a Draft Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA) of 1969, and regulations implementing the procedural provisions of the NEPA, 40 Code of Federal Regulations (CFR) 1500-1508, and Environmental Analysis of Army Actions, 32 CFR 651. The EA evaluates potential environmental, cultural, and socioeconomic effects associated with the implementation of the Fort Belvoir Integrated Natural Resource Management Plan (INRMP). Fort Belvoir requests that the above referenced EA be made available to the public for their review. The availability of the document to the public will be announced in the Washington Post on Thursday, July 12, 2018. The document is intended to be accessible to the public at the library, but it is not intended to be circulated. It is requested that the document remain available to the public from July 12 to August 13, 2018.

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Sincerely,

MICHAEL J SCHUSTER  
Chief  
Installation Support Branch  
Planning Division

Encl

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DEPARTMENT OF THE ARMY  
BALTIMORE DISTRICT, CORPS OF ENGINEERS  
2 HOPKINS PLAZA  
BALTIMORE, MD 21201

July 11, 2018

Ms. Barbara Brice, Branch Manager  
Kingstown Branch, Fairfax County Public Library  
6500 Landsdowne Centre  
Alexandria, VA 22315

Dear Ms. Brice,

Fort Belvoir has prepared a Draft Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA) of 1969, and regulations implementing the procedural provisions of the NEPA, 40 Code of Federal Regulations (CFR) 1500-1508, and Environmental Analysis of Army Actions, 32 CFR 651. The EA evaluates potential environmental, cultural, and socioeconomic effects associated with the implementation of the Fort Belvoir Integrated Natural Resource Management Plan (INRMP). Fort Belvoir requests that the above referenced EA be made available to the public for their review. The availability of the document to the public will be announced in the Washington Post on Thursday, July 12, 2018. The document is intended to be accessible to the public at the library, but it is not intended to be circulated. It is requested that the document remain available to the public from July 12 to August 13, 2018.

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Sincerely,

MICHAEL J SCHUSTER  
Chief  
Installation Support Branch  
Planning Division

Encl

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## *COMMONWEALTH of VIRGINIA*

### *DEPARTMENT OF ENVIRONMENTAL QUALITY*

*Street address:* 1111 East Main Street, Suite 1400, Richmond, VA 23219

*Mailing address:* P.O. Box 1105, Richmond, Virginia 23218

[www.deq.virginia.gov](http://www.deq.virginia.gov)

Matthew J. Strickler  
Secretary of Natural Resources

David K. Paylor  
Director

(804) 698-4000  
1-800-592-5482

August 9, 2018

Mr. Felix M. Mariani  
Fort Belvoir DPW Environmental Division  
Building 1442  
9430 Jackson Loop  
Fort Belvoir, VA 22060

RE: U.S. Department of the Army Environmental Assessment: U.S. Army Garrison Fort Belvoir Implementation of the 2018 Integrated Natural Resources Management Plan Fairfax County (DEQ 18-104).

Dear Mr. Mariani:

The Commonwealth of Virginia has completed its review of the draft environmental assessment (EA) for the above-referenced project. The Department of Environmental Quality (DEQ) is responsible for coordinating Virginia's review of federal environmental documents prepared pursuant to the National Environmental Policy Act (NEPA) and responding to appropriate federal officials on behalf of the Commonwealth. The following agencies joined in this review:

Department of Environmental Quality  
Department of Conservation and Recreation  
Department of Game and Inland Fisheries  
Department of Health

The Department of Historic Resources, Department of Forestry, Fairfax County and the Northern Virginia Regional Commission also were invited to comment.

### **PROJECT DESCRIPTION**

The U.S. Army Garrison Fort Belvoir submitted an EA related to the 2018 Integrated Natural Resources Management Plan (INRMP) for the facility in Fairfax County. The proposed action, or preferred alternative, is the implementation of the INRMP to serve

as the roadmap for Fort Belvoir's natural resources program for the years 2018 through 2032. The 2018 INRMP will be reviewed annually to maximize its usefulness to installation natural resources personnel. Natural resources management includes fish and wildlife management, threatened and endangered species preservation, post-wide water resources protection, vegetation management, wildland fire management, pest management, bird/wildlife aircraft strike hazard management, and outdoor recreation program enhancements. All management activities would be integrated and implemented in the context of the installation's mission support needs and regional setting.

## NEPA CONCLUSION

Provided activities are performed in accordance with the recommendations which follow in the Environmental Impacts and Mitigation section of this report, the proposal described in the EA is unlikely to have significant effects on ambient air quality, water quality, wetlands, important farmland, wildlife resources, forest resources, historic resources, and solid and hazardous wastes. It is unlikely to adversely affect species of animals, plants or insects listed by state agencies as rare, threatened, or endangered.

## ENVIRONMENTAL IMPACTS AND MITIGATION

**1. Wetlands and Water Quality.** The EA (page 3-7) states that impacts to groundwater and wetlands are not expected from implementation of the INRMP. Impacts to surface waters may occur during stream and shoreline restoration projects. Stream restoration projects will be reviewed as their scopes become more clearly defined to determine if additional NEPA analysis is required.

**1(a) Agency Jurisdiction.** The State Water Control Board promulgates Virginia's water regulations covering a variety of permits to include the Virginia Pollutant Discharge Elimination System Permit regulating point source discharges to surface waters, Virginia Pollution Abatement Permit regulating sewage sludge, storage and land application of biosolids, industrial wastes (sludge and wastewater), municipal wastewater, and animal wastes, the Surface and Groundwater Withdrawal Permit, and the Virginia Water Protection (VWP) Permit regulating impacts to streams, wetlands, and other surface waters. The VWP Permit is a state permit which governs wetlands, surface water, and surface water withdrawals and impoundments. It also serves as §401 certification of the federal Clean Water Act §404 permits for dredge and fill activities in waters of the U.S. The VWP Permit Program is under the Office of Wetlands and Stream Protection, within the DEQ Division of Water Permitting. In addition to central office staff that review and issue VWP permits for transportation and water withdrawal projects, the six DEQ regional offices perform permit application reviews and issue permits for the covered activities:

- Clean Water Act, §401;
- Section 404(b)(i) Guidelines Mitigation Memorandum of Agreement (2/90);
- State Water Control Law, Virginia Code section 62.1-44.15:20 *et seq.*; and
- State Water Control Regulations, 9VAC25-210-10.

**1(b) Agency Finding.** The DEQ Northern Regional Office (NRO) states that a VWP Permit from DEQ may be required should impacts to surface waters be necessary.

**1(c) Agency Requirements.** In general, DEQ recommends that stream and wetland impacts be avoided to the maximum extent practicable. To minimize unavoidable impacts to wetlands and waterways, DEQ recommends the following practices:

- Operate machinery and construction vehicles outside of stream-beds and wetlands; use synthetic mats when in-stream work is unavoidable.
- Preserve the top 12 inches of material removed from wetlands for use as wetland seed and root-stock in the excavated area.
- Design erosion and sedimentation controls in accordance with the most current edition of the *Virginia Erosion and Sediment Control Handbook*. These controls should be in place prior to clearing and grading, and maintained in good working order to minimize impacts to state waters. The controls should remain in place until the area is stabilized.
- Place heavy equipment, located in temporarily impacted wetland areas, on mats, geotextile fabric, or use other suitable measures to minimize soil disturbance, to the maximum extent practicable.
- Restore all temporarily disturbed wetland areas to pre-construction conditions and plant or seed with appropriate wetlands vegetation in accordance with the cover type (emergent, scrub-shrub or forested). The applicant should take all appropriate measures to promote revegetation of these areas. Stabilization and restoration efforts should occur immediately after the temporary disturbance of each wetland area instead of waiting until the entire project has been completed.
- Place all materials which are temporarily stockpiled in wetlands, designated for use for the immediate stabilization of wetlands, on mats or geotextile fabric in order to prevent entry in state waters. These materials should be managed in a manner that prevents leachates from entering state waters and must be entirely removed within thirty days following completion of that construction activity. The disturbed areas should be returned to their original contours, stabilized within thirty days following removal of the stockpile, and restored to the original vegetated state.
- Clearly flag or mark all non-impacted surface waters within the project or right-of-way limits that are within 50 feet of any clearing, grading or filling activities for the life of the construction activity within that area. The project proponent should notify all contractors that these marked areas are surface waters where no

activities are to occur.

- Employ measures to prevent spills of fuels or lubricants into state waters.

**1(d) Requirement.** If impacts are proposed to surface waters, including wetlands, a VWP Permit may be required.

**2. Chesapeake Bay Preservation Areas.** The EA (page 3-6) states that the Army delineates lands analogous to Resource Protection Areas (RPA) on the installation. Fort Belvoir also places a 35-foot buffer around all intermittent streams. Impacts to surface waters may occur during stream and shoreline restoration projects (page 3-7).

**2(a) Agency Jurisdiction.** The DEQ Office of Local Government Programs administers the Chesapeake Bay Preservation Act (Virginia Code §62.1-44.15:67 *et seq.*) and Chesapeake Bay Preservation Area Designation and Management Regulations (9VAC25-830-10 *et seq.*). Each Tidewater locality must adopt a program based on the Chesapeake Bay Preservation Act and the Chesapeake Bay Preservation Area Designation and Management Regulations. The Act and regulations recognize local government responsibility for land use decisions and are designed to establish a framework for compliance without dictating precisely what local programs must look like. Local governments have flexibility to develop water quality preservation programs that reflect unique local characteristics and embody other community goals. Such flexibility also facilitates innovative and creative approaches in achieving program objectives. The regulations address nonpoint source pollution by identifying and protecting certain lands called Chesapeake Bay Preservation Areas. The regulations use a resource-based approach that recognizes differences between various land forms and treats them differently.

**2(b) Chesapeake Bay Preservation Areas.** In Fairfax County, the areas protected by the Chesapeake Bay Preservation Act, as locally implemented, require conformance with performance criteria. These areas include RPAs and Resource Management Areas (RMAs) as designated by the local government. RPAs include tidal wetlands, certain non-tidal wetlands and tidal shores. RPAs also include a 100-foot vegetated buffer area located adjacent to and landward of these features and along both sides of any water body with perennial flow. RMAs, which require less stringent performance criteria, include those areas of the county not included in the RPAs.

**2(c) Requirements.** Federal actions on installations located within Tidewater Virginia are required to be consistent with the performance criteria of the Regulations on lands analogous to locally designated RPAs and RMAs, as provided in 9VAC25-830-130 and 140 of the Regulations, including the requirement to minimize land disturbance (including access and staging areas), retain existing vegetation and minimize impervious cover as well as including compliance with the requirements of the *Virginia Erosion and Sediment Control Handbook*, and stormwater management criteria



consistent with water quality protection provisions of the Virginia Stormwater Management Regulations. For land disturbance over 2,500 square feet, future projects must comply with the requirements of the *Virginia Erosion and Sediment Control Handbook*.

**3. Erosion and Sediment Control and Stormwater Management.** According to the EA (page 3-7), for all stream and shoreline restoration projects greater than 2,500 square feet, appropriate erosion and stormwater plans would be developed.

**3(a) Agency Jurisdiction.** The DEQ Office of Stormwater Management (OSM) administers the following laws and regulations governing construction activities:

- Virginia Erosion and Sediment Control Law (VESCL) (§ 62.1-44.15:51 *et seq.*) and Regulations (VESCL&R) (9VAC25-840);
- Virginia Stormwater Management Act (VSMA) (§ 62.1-44.15:24 *et seq.*);
- Virginia Stormwater Management Program (VSMP) regulation (9VAC25-870); and
- 2014 General Virginia Pollutant Discharge Elimination System (VPDES) Permit for Discharges of Stormwater from Construction Activities (9VAC25-880).

In addition, DEQ is responsible for the VSMP General Permit for Stormwater Discharges from Construction Activities related to Municipal Separate Storm Sewer Systems (MS4s) and construction activities for the control of stormwater discharges from MS4s and land disturbing activities under the Virginia Stormwater Management Program (9VAC25-890-40).

**3(b) Requirements.** General guidance on regulatory requirements is below. These requirements may apply to future land-disturbing activities associated with implementation of the INRMP.

### **3(b) Requirements.**

**3(b)(i) Erosion and Sediment Control and Stormwater Management Plans.** The applicant and its authorized agents conducting regulated land-disturbing activities on private and public lands in the state must comply with *VESCL&R* and *VSWML&R*, including coverage under the general permit for stormwater discharge from construction activities, and other applicable federal nonpoint source pollution mandates (e.g. Clean Water Act-Section 313). Clearing and grading activities, installation of staging areas, parking lots, roads, buildings, utilities, borrow areas, soil stockpiles, and related land-disturbing activities that result in the total land disturbance of equal to or greater than 2,500 square feet on lands analogous to Chesapeake Bay Preservation Areas would be regulated by *VESCL&R*. Accordingly, the applicant must prepare and implement an erosion and sediment control (ESC) plan to ensure compliance with state law and

regulations. The ESC plan is submitted to the DEQ regional office that serves the area where the project is located for review for compliance. The applicant is ultimately responsible for achieving project compliance through oversight of on-site contractors, regular field inspection, prompt action against non-compliant sites, and other mechanisms consistent with agency policy (Reference: VESCL 62.1-44.15 et seq.).

**3(b)(ii) General Permit for Stormwater Discharges from Construction Activities (VAR10).** The operator or owner of a construction project involving land-disturbing activities equal to or greater than one acre is required to register for coverage under the General Permit for Discharges of Stormwater from Construction Activities and develop a project-specific stormwater pollution prevention plan (SWPPP). The SWPPP must be prepared prior to submission of the registration statement for coverage under the general permit and the SWPPP must address water quality and quantity in accordance with the *VSMP Permit Regulations*. General information and registration forms for the General Permit are available on DEQ's website at <http://www.deq.virginia.gov/Programs/Water/StormwaterManagement/VSMPPermits/ConstructionGeneralPermit.aspx> (Reference: VSWML 62.1-44.15 et seq.; *VSMP Permit Regulations* 9VAC 25-870-10 et seq.).

**4. Air Quality.** The EA (page 4-1) states that Fort Belvoir complies with air quality requirements and regulations. Emissions related to the implementation of the INRMP, specifically from vehicles and machinery used for cutting and thinning trees and stream restoration projects, would be temporary and only occur during project implementation. The estimated emissions are very low, and therefore, no impacts to air quality are expected.

**4(a) Agency Jurisdiction.** The DEQ Air Division, on behalf of the State Air Pollution Control Board, is responsible for developing regulations that implement Virginia's Air Pollution Control Law (Virginia Code §10.1-1300 et seq.). DEQ is charged with carrying out mandates of the state law and related regulations as well as Virginia's federal obligations under the Clean Air Act as amended in 1990. The objective is to protect and enhance public health and quality of life through control and mitigation of air pollution. The division ensures the safety and quality of air in Virginia by monitoring and analyzing air quality data, regulating sources of air pollution, and working with local, state and federal agencies to plan and implement strategies to protect Virginia's air quality. The appropriate DEQ regional office is directly responsible for the issuance of necessary permits to construct and operate all stationary sources in the region as well as monitoring emissions from these sources for compliance. As a part of this mandate, environmental impact reviews (EIRs) of projects to be undertaken in the state are also reviewed. In the case of certain projects, additional evaluation and demonstration must be made under the general conformity provisions of state and federal law.



The Air Division regulates emissions of air pollutants from industries and facilities and implements programs designed to ensure that Virginia meets national air quality standards. The most common regulations associated with construction projects are:

- Open burning: 9VAC5-130 *et seq.*
- Fugitive dust control: 9VAC5-50-60 *et seq.*
- Permits for fuel-burning equipment: 9VAC5-80-1100 *et seq.*

**4(b) Ozone Non-Attainment Area.** According to the DEQ Air Division, Fairfax County is located in an ozone non-attainment area and an emission control area for volatile organic compounds (VOCs) and oxides of nitrogen (NO<sub>x</sub>), which are contributors to ozone pollution.

#### **4(c) Requirements.**

**4(c)(i) Fugitive Dust.** During future land-disturbing activities associated with implementing the INRMP, fugitive dust must be kept to a minimum by using control methods outlined in 9VAC5-50-60 *et seq.* of the regulations for the Control and Abatement of Air Pollution. These precautions include, but are not limited to, the following:

- Use, where possible, of water or suitable chemicals for dust control during the proposed demolition and construction operations and from material stockpiles;
- Installation and use of hoods, fans and fabric filters to enclose and vent the handling of dusty materials;
- Covering of open equipment for conveying materials; and
- Prompt removal of spilled or tracked dirt or other materials from paved streets and removal of dried sediments resulting from soil erosion.

**4(c)(ii) Open Burning.** If future project activities associated with implementing the INRMP include the burning of vegetative debris or construction material, this activity must meet the requirements under 9VAC5-130 *et seq.* of the regulations for open burning, and it may require a permit. The regulations provide for, but do not require, the local adoption of a model ordinance concerning open burning. Contact officials with the locality to determine what local requirements, if any, exist. Any open burning of vegetative debris must be performed in accordance with the open-burning regulation (<http://www.deq.virginia.gov/Programs/Air/AirQualityPlans/OpenBurning.aspx>) and coordinated with the local fire official to ensure that all local ordinances are met.

**4(d) Agency Recommendation.** Future projects should be planned to restrict the emissions of VOCs and NO<sub>x</sub>.

**5. Solid and Hazardous Wastes.** According to the EA (page 4-2), implementing the plan would not generate hazardous waste.

**5(a) Agency Jurisdiction.** On behalf of the Virginia Waste Management Board, the DEQ Division of Land Protection and Revitalization is responsible for carrying out the mandates of the Virginia Waste Management Act (Virginia Code §10.1-1400 *et seq.*), as well as meeting Virginia's federal obligations under the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response Compensation Liability Act (CERCLA), commonly known as Superfund. The DEQ Division of Land Protection and Revitalization also administers those laws and regulations on behalf of the State Water Control Board governing Petroleum Storage Tanks (Virginia Code §62.1-44.34:8 *et seq.*), including Aboveground Storage Tanks (9VAC25-91 *et seq.*) and Underground Storage Tanks (9VAC25-580 *et seq.* and 9VAC25-580-370 *et seq.*), also known as Virginia Tank Regulations, and § 62.1-44.34:14 *et seq.* which covers oil spills. Virginia:

- Virginia Waste Management Act, Virginia Code § 10.1-1400 *et seq.*
- Virginia Solid Waste Management Regulations, 9VAC20-81
  - (9VAC20-81-620 applies to asbestos-containing materials)
- Virginia Hazardous Waste Management Regulations, 9VAC20-60
  - (9VAC20-60-261 applies to lead-based paints)
- Virginia Regulations for the Transportation of Hazardous Materials, 9VAC20-110.

Federal:

- Resource Conservation and Recovery Act (RCRA), 42 U.S. Code sections 6901 *et seq.*
- U.S. Department of Transportation Rules for Transportation of Hazardous Materials, 49 Code of Federal Regulations, Part 107
- Applicable rules contained in Title 40, Code of Federal Regulations.

**5(b) Agency Recommendations.** As projects are identified, DLPR staff recommends a review of its data files to determine if there are any waste sites located in close proximity to a project site(s). Site searches would include the following categories: CERCLIS, RCRA/Hazardous Waste, Solid Waste, Voluntary Remediation Program (VRP) sites, Formerly Used Defense Sites (FUDS), and Petroleum Release sites.

The following websites may be helpful in locating additional information as projects are identified:

- <https://www3.epa.gov/enviro/>
- <https://rcrainfopreprod.epa.gov/rcrainfoweb/action/main-menu/view>
- <https://www.epa.gov/superfund>

- <http://www.deq.virginia.gov/ConnectWithDEQ/VEGIS.aspx>

In general, DEQ encourages all projects and facilities to implement pollution prevention principles, including:

- the reduction, reuse and recycling of all solid wastes generated; and
- the minimization and proper handling of generated hazardous wastes.

**5(c) Requirements.** Any soil/sediment that is suspected of contamination or wastes that are generated during future activities must be tested and disposed of in accordance with applicable federal, state, and local laws and regulations.

**6. Natural Heritage Resources.** The EA (page 3-11) states that the implementation of the INRMP is expected to have a minor long-term positive impact on vegetation.

**6(a) Agency Jurisdiction.**

**6(a)(i) The Virginia Department of Conservation and Recreation's (DCR) Division of Natural Heritage (DNH):** DNH's mission is conserving Virginia's biodiversity through inventory, protection and stewardship. The Virginia Natural Area Preserves Act (Virginia Code §10.1-209 through 217), authorized DCR to maintain a statewide database for conservation planning and project review, protect land for the conservation of biodiversity, and to protect and ecologically manage the natural heritage resources of Virginia (the habitats of rare, threatened and endangered species, significant natural communities, geologic sites, and other natural features).

**6(a)(ii) The Virginia Department of Agriculture and Consumer Services (VDACS):** The Endangered Plant and Insect Species Act of 1979 (Virginia Code Chapter 39 §3.1-1020 through 1030) authorizes VDACS to conserve, protect and manage endangered and threatened species of plants and insects. Under a Memorandum of Agreement established between VDACS and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species.

**6(b) Agency Findings – Natural Heritage Resources.** DCR DNH supports the INRMP in its progressive approach to the wildlife, plant, and ecological resources at Fort Belvoir using an ecological focus, which is more holistic than an Endangered/Threatened Species only approach.

**6(c) Agency Recommendations.** DCR DNH concurs with the conclusions in the EA for the Fort Belvoir INRMP with the following recommendations:

- Include additional information on exotic animals found on the installation and management actions related to them. There are several exotic animals documented at Fort Belvoir including the giant Chinese snails, Asian clams, goldfish, snakeheads and crayfish with potential to impact other native species.
- Correct typographic errors throughout the INRMP document and adding Natural Heritage Global Rarity Ranks (G Ranks) for species in Table 8-2.
- For any changes in habitat or threats to *Stygobromus phreaticus*, add the Virginia Department of Game and Fisheries (DGIF) and DCR DNH as consultation partners in addition to the United States Fish and Wildlife Service (FWS).

Contact the DCR DNH and resubmit project information if the scope of the project changes and/or six months has passed before it is utilized.

**7. Wildlife Resources.** The EA (page 3-11) states that the implementation of the INRMP is expected to have a minor long-term positive impact on fish and wildlife.

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

**7(b) Agency Findings.** DGIF states that it has been working with Ft. Belvoir staff to review and update the INRMP for the installation, per the Sikes Act. DGIF is comfortable with the final product. The DGIF director is agreeable to signing the plan.

**8. Historic and Archaeological Resources.** The EA (page 4-1) states that cultural resources have not been evaluated. The need for Section 106 will be analyzed on a project-by-project basis (page 4-2).

**8(a) Agency Jurisdiction.** The Virginia Department of Historic Resources (DHR) conducts reviews of both federal and state projects to determine their effect on historic properties. Under the federal process, DHR is the State Historic Preservation Office, and ensures that federal undertakings – including licenses, permits, or funding – comply with Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulation at 36 CFR Part 800. Section 106 requires federal agencies to consider the effects of federal projects on properties that are listed or

eligible for listing on the National Register of Historic Places. For state projects or activities on state lands, DHR is afforded an opportunity to review and comment on (1) the demolition of state property; (2) major state projects requiring an EIR; (3) archaeological investigations on state-controlled land; (4) projects that involve a landmark listed in the Virginia Landmarks Register; (5) the sale or lease of surplus state property; (6) exploration and recovery of underwater historic properties; and (7) excavation or removal of archaeological or historic features from caves. See DHR's website for more information about applicable state and federal laws and how to submit an application for review: <http://www.dhr.virginia.gov/StateStewardship/Index.htm>.

**8(b) Requirement.** Fort Belvoir should consult directly with DHR, as necessary, pursuant to Section 106 of the National Historic Preservation Act (as amended) and its implementing regulations codified at 36 CFR Part 800, which require federal agencies to consider the effects of their undertakings on historic properties.

**9. Public Water Sources.** The EA (page 4-2) states that implementation of the INRMP would not result in the need for any upgrades in utilities that provide service to Fort Belvoir.

**9(a) Agency Jurisdiction.** The Virginia Department of Health (VDH) Office of Drinking Water (ODW) reviews projects for the potential to impact public drinking water sources (groundwater wells, springs and surface water intakes). VDH administers both federal and state laws governing waterworks operation.

**9(b) Agency Findings.** The VDH ODW states that the following public groundwater wells are located within a 1-mile radius of the facility:

PWS ID Number	City/County	System Name	Facility Name
6059641	FAIRFAX CO	POHICK BAY - COMFORT STATION #3	COMFORT ST 3
6059635	FAIRFAX CO	POHICK BAY - POOL	SWIM POOL WELL
6059642	FAIRFAX CO	POHICK BAY - COMFORT STATION #2	COMFORT ST 2
6059643	FAIRFAX CO	POHICK BAY - COMFORT STATION #1	COMFORT ST #1
6059535	FAIRFAX CO	GUNSTON HALL	WELL 1

The Fairfax County Water Authority's Occoquan Reservoir Intake (PWS ID Number 6059501) is located within a 5-mile radius of the project site. However, the project is not within the watershed of any public surface water intakes.



**9(c) Agency Recommendations.** Plan to implement best management practices, including erosion and sedimentation controls as well as spill prevention controls and countermeasures, during future and-disturbing activities. Properly manage materials on site and during transport to prevent impacts to nearby surface waters.

**10. Pollution Prevention.** DEQ advocates that principles of pollution prevention and sustainability be used in all construction projects as well as in facility operations. Effective siting, planning, and on-site Best Management Practices (BMPs) will help to ensure that environmental impacts are minimized. However, pollution prevention and sustainability techniques also include decisions related to construction materials, design, and operational procedures that will facilitate the reduction of wastes at the source.

**10(a) Recommendations.** We have several pollution prevention recommendations that may be helpful for future projects:

- Consider development of an effective Environmental Management System (EMS). An effective EMS will ensure that the the facility is committed to complying with environmental regulations, reducing risk, minimizing environmental impacts, setting environmental goals, and achieving improvements in its environmental performance. DEQ offers EMS development assistance and recognizes facilities with effective Environmental Management Systems through its Virginia Environmental Excellence Program (VEEP). VEEP provides recognition, annual permit fee discounts, and the possibility for alternative compliance methods.
- Consider environmental attributes when purchasing materials. For example, the extent of recycled material content, toxicity level, and amount of packaging should be considered and can be specified in purchasing contracts.
- Consider energy efficiency when choosing materials and products, like insulation, fixtures, and HVAC systems.
- Consider contractors' commitment to the environment when choosing contractors. Specifications regarding raw materials and construction practices can be included in contract documents and requests for proposals.
- Choose sustainable materials and practices for building construction and design.
- Integrate pollution prevention techniques into the facility maintenance and operation, to include inventory control for centralized storage of hazardous materials. Maintenance facilities should have sufficient and suitable space to allow for effective inventory control and preventive maintenance.

DEQ's Office of Pollution Prevention provides information and technical assistance relating to pollution prevention techniques and EMS. If interested, please contact DEQ (Meghann Quinn at 804-698-4021).

**11. Pesticides and Herbicides.** In general, when pesticides or herbicides must be used, their use should be strictly in accordance with manufacturers' recommendations. In addition, DEQ recommends that the responsible agent use the least toxic pesticides or herbicides effective in controlling the target species. For more information on pesticide or herbicide use, please contact VDACS (804-371-6560).

## **REGULATORY AND COORDINATION NEEDS**

**1. Water Quality and Wetlands.** DEQ regulates wetlands and water quality through implementation of the Virginia Water Protection Program (Virginia Code § 62.1-44.15 *et seq.*; 9VAC25-210 *et seq.*). If future activities would occur in or along any streams (perennial, intermittent, or ephemeral), open water or wetlands, Fort Belvoir should contact DEQ NRO (Trisha Beasley at [Trisha.Beasley@deq.virginia.gov](mailto:Trisha.Beasley@deq.virginia.gov)) to determine the need for any permits prior to commencing work that could impact surface waters or wetlands. A Joint Permit Application (JPA) may be submitted to VMRC (Tony Watkinson at [Tony.Watkinson@mrc.virginia.gov](mailto:Tony.Watkinson@mrc.virginia.gov)).

**2. Chesapeake Bay Preservation Areas.** Projects that implement the INRMP should be consistent with the Chesapeake Bay Preservation Act (Virginia Code §§ 10.1-2100 through 10.1-2114) and Chesapeake Bay Preservation Area Designation and Management Regulations (Regulations) (Virginia Code 9VAC25-830-10 *et seq.*) as locally implemented. Federal actions on installations located within Tidewater Virginia are required to be consistent with the performance criteria of the Regulations on lands analogous to locally designated RPAs and RMAs, as provided in 9VAC25-830-130 and 140 of the Regulations. Contact DEQ OLGP (Daniel Moore at [Daniel.Moore@deq.virginia.gov](mailto:Daniel.Moore@deq.virginia.gov) or 804-698-4520) for additional information as necessary.

**3. Erosion and Sediment Control and Stormwater Management.** Future projects should be planned in compliance with Virginia Erosion and Sediment Control Law (Virginia Code §62.1-44.15 *et seq.*) and *Regulations* (9VAC25-840-30 *et seq.*) and *Stormwater Management Law* (Virginia Code 62.1-44.15 *et seq.*) and *Regulations* (9VAC25-870-54 *et seq.*).

**4. General Permit for Stormwater Discharges from Construction Activities (VAR10).** The operator or owner of a construction activity involving land disturbance of equal to or greater than 1 acre should plan to register for coverage under the General Permit for Discharges of Stormwater from Construction Activities and develop a project specific stormwater pollution prevention plan (SWPPP). Specific questions regarding

the Stormwater Management Program requirements should be directed to DEQ (Holly Sepety at 804-698-4039) (Reference: VSWML §62.1-44.15 *et seq.*).

**5. Air Quality.** Future projects that implement the INRMP may be subject to air regulations administered by DEQ. The following sections of Virginia Administrative Code are applicable:

- 9 VAC 5-50-60 *et seq.* governing fugitive dust emissions
- 9 VAC 5-130 *et seq.* for open burning

Coordinate with DEQ NRO (James LaFratta at 703-583-3928) prior to implementing future projects if the use of fuel-burning equipment is proposed.

**6. Solid and Hazardous Wastes.** Contact DEQ NRO (Richard Doucette at Richard.Doucette@deq.virginia.gov) for additional information on waste management. Contact DEQ DLPR (Katy Dacey at Katy.Dacey@deq.virginia.gov) for assistance with database searches.

**7. Natural Heritage Resources.** Contact DCR DNH (804-371-2708) regarding its recommendations as necessary. Contact the DCR DNH (804-371-2708) and re-submit project information and a map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

**8. Wildlife Resources.** Contact DGIF (Amy Ewing at Amy.Ewing@dgif.virginia.gov) for additional information about its comments if necessary.

**9. Historic Resources.** Fort Belvoir or its agents should consult directly as necessary with DHR (Roger Kirchen at Roger.Kirchen@dhr.virginia.gov, as necessary, pursuant to Section 106 of the National Historic Preservation Act (as amended) and its implementing regulations codified at 36 CFR Part 800, which require federal agencies to consider the effects of their undertakings on historic properties.

**10. Public Water Supply.** Contact VDH ODW (Susan Douglas at Susan.Douglas@vdh.virginia.gov) for additional information about its comments and recommendations if necessary.

**11. Federal Consistency Determination.** Fort Belvoir must submit a federal consistency determination (FCD) pursuant to the Coastal Zone Management Act (CZMA) of 1972, as amended (16 USCA, CZMA § 307, § 1456(c)(3)(A)) and its implementing federal consistency regulations (15 CFR Part 930, subpart C) for future projects affecting the enforceable policies of the Virginia Coastal Zone Management Program. Coordinate directly with the DEQ Office of Environmental Impact Review for the submittal of FCDs. Information on document submission is available at



<http://www.deq.virginia.gov/Programs/EnvironmentalImpactReview/DocumentSubmissions.aspx>. Information on FCDs is available at <http://www.deq.virginia.gov/Programs/EnvironmentalImpactReview/FederalConsistencyReviews.aspx>.

Thank you for the opportunity to comment on this draft EA. If you have questions, please do not hesitate to call me at (804) 698-4204 or Julia Wellman at (804) 698-4326.

Sincerely,



Bettina Rayfield, Manager  
Environmental Impact Review and Long Range  
Priorities Program

Enclosures

cc: Amy Ewing, DGIF  
Robbie Rhur, DCR  
Roger Kirchen, DHR  
Arlene Warren, VDH  
Greg Evans, DOF  
Felix M. Mariani, Fort Belvoir  
Bob Lazaro, Northern Virginia Regional Commission  
Denise James, Fairfax County

**DEPARTMENT OF ENVIRONMENTAL QUALITY  
DIVISION OF AIR PROGRAM COORDINATION**

**ENVIRONMENTAL REVIEW COMMENTS APPLICABLE TO AIR QUALITY**

TO: Julia H. Wellman

DEQ - OEIR PROJECT NUMBER: **DEQ #18-104F**

PROJECT TYPE:     ☐ STATE EA / EIR ☒ **FEDERAL EA / EIS**   ☐ SCC  
                         ☐ CONSISTENCY CERTIFICATION

PROJECT TITLE: **Implementation of the 2018 Integrated Natural Resources Management Plan**

PROJECT SPONSOR: **U.S. Department of the Army/Fort Belvoir**

PROJECT LOCATION:     **X OZONE NON ATTAINMENT  
                                 AND EMISSION CONTROL AREA FOR NOX & VOC**

REGULATORY REQUIREMENTS MAY BE APPLICABLE TO:     ☒ **CONSTRUCTION**  
   ☐ **OPERATION**

**STATE AIR POLLUTION CONTROL BOARD REGULATIONS THAT MAY APPLY:**

1. ☐ 9 VAC 5-40-5200 C & 9 VAC 5-40-5220 E – STAGE I
2. ☐ 9 VAC 5-45-760 et seq. – Asphalt Paving operations
3. ☒ **9 VAC 5-130 et seq. – Open Burning**
4. ☒ **9 VAC 5-50-60 et seq. Fugitive Dust Emissions**
5. ☐ 9 VAC 5-50-130 et seq. - Odorous Emissions; Applicable to \_\_\_\_\_
6. ☐ 9 VAC 5-60-300 et seq. – Standards of Performance for Toxic Pollutants
7. ☐ 9 VAC 5-50-400 Subpart \_\_\_\_\_, Standards of Performance for New Stationary Sources, designates standards of performance for the \_\_\_\_\_
8. ☐ 9 VAC 5-80-1100 et seq. of the regulations – Permits for Stationary Sources
9. ☐ 9 VAC 5-80-1605 et seq. Of the regulations – Major or Modified Sources located in PSD areas. This rule may be applicable to the \_\_\_\_\_
10. ☐ 9 VAC 5-80-2000 et seq. of the regulations – New and modified sources located in non-attainment areas
11. ☐ 9 VAC 5-80-800 et seq. Of the regulations – State Operating Permits. This rule may be applicable to \_\_\_\_\_

**COMMENTS SPECIFIC TO THE PROJECT:**

**All precautions are necessary to restrict the emissions of volatile organic compounds (VOC) and oxides of nitrogen (NOx) during any construction activities.**



**(Kotur S. Narasimhan)  
Office of Air Data Analysis**

**DATE: July 24, 2018**

Matthew J. Strickler  
*Secretary of Natural Resources*

Clyde E. Cristman  
*Director*



Rochelle Altholz  
*Deputy Director of  
Administration and Finance*

Russell W. Baxter  
*Deputy Director of  
Dam Safety & Floodplain  
Management and Soil & Water  
Conservation*

Thomas L. Smith  
*Deputy Director of Operations*

**COMMONWEALTH of VIRGINIA**  
**DEPARTMENT OF CONSERVATION AND RECREATION**

**MEMORANDUM**

DATE: July 31, 2018

TO: Julia Wellman, DEQ

FROM: Roberta Rhur, Environmental Impact Review Coordinator

SUBJECT: DEQ 18-104F, Fort Belvoir 2018 Integrated Natural Resources Management Plan Implementation

**Division of Natural Heritage**

The Department of Conservation and Recreation's Division of Natural Heritage's (DCR-DNH) mission is conserving Virginia's biodiversity through inventory, protection, and stewardship. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

Based on DCR-DNH's review of Environmental Assessment (EA) for the Fort Belvoir 2018 Integrated Natural Resources Management Plan (INRMP), DCR-DNH offers the following comments:

- DCR-DNH supports the INRMP in its progressive approach to the wildlife, plant, and ecological resources at Fort Belvoir using an ecological focus, which is more holistic than an Endangered/Threatened Species only approach.
- DCR-DNH concurs with the conclusions in the EA for the Fort Belvoir INRMP with the following recommendations:
  - DCR-DNH recommends the INRMP include additional information on exotic animals found on the installation and management actions related to them. There are several exotic animals documented at Fort Belvoir including the giant Chinese snails, Asian clams, goldfish, snakeheads and crayfish with potential to impact other native species.
  - DCR-DNH recommends correcting typos throughout the INRMP document and adding Natural Heritage Global Rarity Ranks (G Ranks) for species in Table 8-2.
  - For any changes in habitat or threats to *Stygobromus phreaticus*, DCR-DNH recommends adding the Virginia Department of Game and Fisheries (DGIF) and DCR-DNH as consultation partners in addition to the United States Fish and Wildlife Service (USFWS).

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR-DNH, DCR-DNH represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species.

New and updated information is continually added to Biotics. Please re-submit project information and map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from <http://vafwis.org/fwis/> or contact Ernie Aschenbach at 804-367-2733 or [Ernie.Aschenbach@dgif.virginia.gov](mailto:Ernie.Aschenbach@dgif.virginia.gov).

Thank you for the opportunity to comment on the EA for the Fort Belvoir 2018 Integrated Natural Resources Management Plan.



Wellman, Julia &lt;julia.wellman@deq.virginia.gov&gt;

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**ESSLog# 38755\_18-104F\_FtBelvoirINRMP\_DGIF\_AME20180727**

1 message

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**Amy Ewing** <amy.ewing@dgif.virginia.gov>  
To: Julia Wellman <julia.wellman@deq.virginia.gov>

Fri, Jul 27, 2018 at 3:20 PM

Julia,

We have been working with Ft. Belvoir staff this Summer to review and update the INRMP for the installation, per the Sikes Act. We are comfortable with the final product and our Director is agreeable to signing the plan, once we receive the final signature sheet.

Thank you.

Amy

**Amy Ewing***Environmental Services Biologist**Manager, Fish and Wildlife Information Services***P** [804.367.2211](tel:804.367.2211)**A** 7870 Villa Park Drive, P.O. Box 90778, Henrico, VA 23228-0778**[www.dgif.virginia.gov](http://www.dgif.virginia.gov)****CONSERVE. CONNECT. PROTECT.**



## **MEMORANDUM**

**TO:** Julia Wellman, DEQ/EIR Environmental Program Planner

**FROM:** Katy Dacey, Division of Land Protection & Revitalization Review Coordinator

**DATE:** July 30, 2018

**COPIES:** Sanjay Thirunagari, Division of Land Protection & Revitalization Review Manager; file

**SUBJECT:** Environmental Impact Review: EIR Project No. 18-104F Implementation of the 2018 Integrated Natural Resources Management Plan, Fairfax County, VA

The Division of Land Protection & Revitalization (DLPR) has completed its review of the May 2018 EIR for Implementation of the 2018 Integrated Natural Resources Management Plan located at Fort Belvoir in Fort Belvoir, Virginia 22060

**Project Scope:** managing the Fort Belvoir Natural Resource Program by planning and implementation of conservation programs

DLPR staff has the following comments concerning the waste issues associated with such project(s):

No particular project(s) within the submittal pertain to any type of construction. Without specific construction to a particular project site(s) A GIS database search could not be completed by DLPR staff to determine whether any waste sites might impact a project site(s). As project(s) are identified, DLPR staff recommends a review of its data files to determine if there are any waste sites located in close proximity to a project site(s). Site searches would include the following categories: CERCLIS, RCRA/Hazardous Waste, Solid Waste, Voluntary Remediation Program (VRP) sites, Formerly Used Defense Sites (FUDS), and Petroleum Release sites.

The following websites would prove helpful in locating additional information as projects are identified:

<https://www3.epa.gov/enviro/>

<https://rcrainfopreprod.epa.gov/rcrainfoweb/action/main-menu/view>

<https://www.epa.gov/superfund>

<http://www.deq.virginia.gov/ConnectWithDEQ/VEGIS.aspx>

## **GENERAL COMMENTS**

**Soil, Sediment, Groundwater, and Waste Management**

Any soil, sediment or groundwater that is suspected of contamination or wastes that are generated must be tested and disposed of in accordance with applicable Federal, State, and local laws and regulations. Some of the applicable state laws and regulations are: Virginia Waste Management Act, Code of Virginia Section 10.1-1400 *et seq.*; Virginia Hazardous Waste Management Regulations (VHWMR) (9VAC 20-60); Virginia Solid Waste Management Regulations (VSWMR) (9VAC 20-81); Virginia Regulations for the Transportation of Hazardous Materials (9VAC 20-110). Some of the applicable Federal laws and regulations are: the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. Section 6901 *et seq.*, and the applicable regulations contained in Title 40 of the Code of Federal Regulations; and the U.S. Department of Transportation Rules for Transportation of Hazardous Materials, 49 CFR Part 107.

#### **Asbestos and/or Lead-based Paint**

All structures being demolished/renovated/removed should be checked for asbestos-containing materials (ACM) and lead-based paint (LBP) prior to demolition. If ACM or LBP are found, in addition to the federal waste-related regulations mentioned above, State regulations 9VAC 20-81-620 for ACM and 9VAC 20-60-261 for LBP must be followed.

#### **Pollution Prevention – Reuse - Recycling**

Please note that DEQ encourages all construction projects and facilities to implement pollution prevention principles, including the reduction, reuse, and recycling of all solid wastes generated. All generation of hazardous wastes should be minimized and handled appropriately.

If you have any questions or need further information, please contact Katy Dacey at (804) 698-4274.





Wellman, Julia &lt;julia.wellman@deq.virginia.gov&gt;

**DEQ #18-104F -- Ft. Belvoir Implementation of the 2018 Integrated Natural Resources Management Plan -- NRO comments**

1 message

**Holland, Benjamin** <benjamin.holland@deq.virginia.gov>  
To: Julia Wellman <Julia.Wellman@deq.virginia.gov>  
Cc: "Miller, Mark" <mark.miller@deq.virginia.gov>

Wed, Aug 1, 2018 at 12:25 PM

Northern Regional Office has no specific comments regarding the *Draft Environmental Assessment for US Department of Army/Fort Belvoir (Fairfax County) Implementation of the 2018 Integrated Natural Resources Management Plan (DEQ #18-104F)*.

However, DEQ recommends following the guidance related to each media below:

**Land Protection Division** – The project manager is reminded that if any solid or hazardous waste is generated/encountered during construction, the project manager would follow applicable federal, state, and local regulations for their disposal.

**Air Compliance/Permitting** - The project manager is reminded that during the construction phases that occur with this project; the project is subject to the Fugitive Dust/Fugitive Emissions Rule 9 VAC 5-50-60 through 9 VAC 5-50-120. In addition, should any open burning or use of special incineration devices be employed in the disposal of land clearing debris during demolition and construction, the operation would be subject to the Open Burning Regulation 9 VAC 5-130-10 through 9 VAC 5-130-60 and 9 VAC 5-130-100.

**Virginia Water Protection Permit (VWPP) Program** – The project manager is reminded that a VWP permit from DEQ may be required should impacts to surface waters be necessary. DEQ VWP staff recommends that the avoidance and minimization of surface water impacts to the maximum extent practicable as well as coordination with the US Army Corps of Engineers. Upon receipt of a Joint Permit Application for the proposed surface water impacts, DEQ VWP Permit staff will review the proposed project in accordance with the VWP permit program regulations and current VWP permit program guidance.

**Erosion and Sediment Control and Storm Water Management:** DEQ has regulatory authority for the Virginia Pollutant Discharge Elimination System (VPDES) programs related to municipal separate storm sewer systems (MS4s) and construction activities. Erosion and sediment control measures are addressed in local ordinances and State regulations. Additional information is available at <http://www.deq.virginia.gov/Programs/Water/StormwaterManagement.aspx>. Non-point source pollution resulting from this project should be minimized by using effective erosion and sediment control practices and structures. Consideration should also be given to using permeable paving for parking areas and walkways where appropriate, and denuded areas should be promptly revegetated following construction work. If the total land disturbance exceeds 10,000 square feet, an erosion and sediment control plan will be required. Some localities also require an E&S plan for disturbances less than 10,000 square feet. A stormwater management plan may also be required. For any land disturbing activities equal to one acre or more, you are required to apply for coverage under the VPDES General Permit for Discharges of Storm Water from Construction Activities. The Virginia Stormwater Management Permit Authority may be DEQ or the locality.

**Benjamin D. Holland, MPH**  
DEQ Regional Enforcement Specialist

VA Department of Environmental Quality

8/1/2018

Commonwealth of Virginia Mail - DEQ #18-104F — Ft. Belvoir Implementation of the 2018 Integrated Natural Resources Management Pla...

Northern Regional Office  
13901 Crown Court  
Woodbridge, VA 22193

Phone: (703) 583-3812  
Email: [benjamin.holland@deq.virginia.gov](mailto:benjamin.holland@deq.virginia.gov)  
Website: [www.deq.virginia.gov](http://www.deq.virginia.gov)



Wellman, Julia &lt;julia.wellman@deq.virginia.gov&gt;

**Re: EXPEDITED REVIEW NEW PROJECT ARMY 2018 INRMP 18-104F**

1 message

Warren, Arlene <arlene.warren@vdh.virginia.gov>  
To: Julia Wellman <julia.wellman@deq.virginia.gov>

Thu, Jul 26, 2018 at 11:43 AM

**Project Name: Implementation of the 2018 Integrated Natural Resources Management Plan**  
**Project #: 18-104 F**  
**UPC #: N/A**  
**Location: Fairfax County**

VDH – Office of Drinking Water has reviewed the above project. Below are our comments as they relate to proximity to **public drinking water sources** (groundwater wells, springs and surface water intakes). Potential impacts to public water distribution systems or sanitary sewage collection systems **must be verified by the local utility.**

The following public groundwater wells are located within a 1-mile radius of the project site:

PWS ID Number	City/County	System Name	Facility Name
6059641	FAIRFAX CO	POHICK BAY - COMFORT STATION #3	COMFORT ST 3
6059635	FAIRFAX CO	POHICK BAY - POOL	SWIM POOL WELL
6059642	FAIRFAX CO	POHICK BAY - COMFORT STATION #2	COMFORT ST 2
6059643	FAIRFAX CO	POHICK BAY - COMFORT STATION #1	COMFORT ST #1
6059535	FAIRFAX CO	GUNSTON HALL	WELL 1

The following surface water intakes are located within a 5-mile radius of the project site:

PWS ID Number	System Name	Facility Name
6059501	FAIRFAX CO WATER AUTHORITY	OCCOQUAN RESERVIOR INTAKE

The project is not within the watershed of any public surface water intakes.

Best Management Practices should be employed, including Erosion & Sedimentation Controls and Spill Prevention Controls & Countermeasures on the project site.

Materials should be managed while on site and during transport to prevent impacts to nearby surface water.

*The Virginia Department of Health – Office of Drinking Water appreciates the opportunity to provide comments. If you have any questions, please let me know.*

Best Regards,

Arlene Fields Warren

GIS Program Support Technician

Office of Drinking Water

**Virginia Department of Health**

109 Governor Street

Richmond, VA 23219

(804) 864-7781

On Fri, Jul 20, 2018 at 3:00 PM, Fulcher, Valerie <valerie.fulcher@deq.virginia.gov> wrote:

**Good afternoon - this is a new OEIR review request/project:**

**Document Type: Draft Environmental Assessment**

**Project Sponsor: U.S. Department of the Army/Fort Belvoir**

**Project Title: Implementation of the 2018 Integrated Natural Resources Management Plan**

**Location: Fairfax County**

**Project Number: DEQ #18-104F**

**The document is available at [http://www.belvoir.army.mil/environmental/Fort%20Belvoir%20Final%20INRMP%20EA%20and%20INRMP%20FOR%20POSTING%20ON%20WEBPAGE\\_07022018.pdf](http://www.belvoir.army.mil/environmental/Fort%20Belvoir%20Final%20INRMP%20EA%20and%20INRMP%20FOR%20POSTING%20ON%20WEBPAGE_07022018.pdf)**

**The due date for comments is AUGUST 1, 2018. You can send your comments either directly to JULIA WELLMAN by email ([Julia.Wellman@deq.virginia.gov](mailto:Julia.Wellman@deq.virginia.gov)), or you can send your comments by regular interagency/U.S. mail to the Department of Environmental Quality, Office of Environmental Impact Review, 1111 East Main St., Richmond, VA 23219 (please note new street address).**

**NOTE: This is an expedited review due to the deadline set by the federal agency.**

**If you cannot meet the deadline, please notify the project coordinator prior to the comment due date. Arrangements may be made to extend the deadline for comments if possible. An agency will be considered to have no concerns if comments are not received (or contact is made) within the review period. However, it is important that agencies consistently participate in accordance with Virginia Code Section 10.1-1192.**

**REVIEW INSTRUCTIONS:**

- A. Please review the document carefully. If the proposal has been previously reviewed (e.g. as a draft EIS or a Part 1 EIR), please consider whether your earlier comments have been adequately addressed.**
- B. Prepare your agency's comments in a form which would be acceptable for responding directly to a project proponent agency (agency stationary or email) and include the project number on all correspondence.**

**If you have any questions, please email Julia.**

**Thanks!**

**Valerie**

**Valerie A. Fulcher, CAP, OM, Environmental Program Specialist**

**Department of Environmental Quality**

**Environmental Enhancement - Office of Environmental Impact Review**

**1111 East Main Street (new street address effective 12/27/17)**

**Richmond, VA 23219**

**804/698-4330**

**804/698-4319 (Fax)**

**email: [Valerie.Fulcher@deq.virginia.gov](mailto:Valerie.Fulcher@deq.virginia.gov)**

**<http://www.deq.virginia.gov/Programs/EnvironmentalImpactReview.aspx>**



# COMMONWEALTH of VIRGINIA

## DEPARTMENT OF ENVIRONMENTAL QUALITY

Street address: 1111 East Main Street, Suite 1400, Richmond, VA 23219

Mailing address: P.O. Box 1105, Richmond, Virginia 23218

[www.deq.virginia.gov](http://www.deq.virginia.gov)

Matthew J. Strickler  
Secretary of Natural Resources

David K. Paylor  
Director

(804) 698-4000  
1-800-592-5482

## MEMORANDUM

**TO:** Julia Wellman, DEQ Environmental Program Planner

**FROM:** Daniel Moore, DEQ Principal Environmental Planner

**DATE:** August 7, 2018

**SUBJECT:** DEQ #18-104F: US Army, Ft. Belvoir Integrated Natural Resources Management Plan, Fairfax County

We have reviewed the Environmental Assessment (EA) application for the proposed Integrated Natural Resources Management Plan at Fort Belvoir in Fairfax County and offer the following comments regarding consistency with the provisions of the *Chesapeake Bay Preservation Area Designation and Management Regulations* (Regulations):

In Fairfax County, the areas protected by the Chesapeake Bay Preservation Act, as locally implemented, require conformance with performance criteria. These areas include Resource Protection Areas (RPAs) and Resource Management Areas (RMAs) as designated by the local government. RPAs include tidal wetlands, certain non-tidal wetlands and tidal shores. RPAs also include a 100-foot vegetated buffer area located adjacent to and landward of these features and along both sides of any water body with perennial flow. RMAs, which require less stringent performance criteria, include those areas of the County not included in the RPAs.

Under the Federal Consistency Regulations of the *Coastal Zone Management Act of 1972*, federal actions in Virginia must be conducted in a manner "consistent to the maximum extent practicable" with the enforceable policies of the Virginia Coastal Zone Management Program. Those enforceable policies are administered through the Chesapeake Bay Preservation Act and Regulations.

Federal actions on installations located within Tidewater Virginia are required to be consistent with the performance criteria of the Regulations on lands analogous to locally designated RPAs and RMAs, as provided in §9VAC25-830-130 and 140 of the Regulations, including the requirement to minimize land disturbance (including access and staging areas), retain existing

vegetation and minimize impervious cover as well as including compliance with the requirements of the *Virginia Erosion and Sediment Control Handbook*, and stormwater management criteria consistent with water quality protection provisions of the *Virginia Stormwater Management Regulations*.” For land disturbance over 2,500 square feet, the project must comply with the requirements of the *Virginia Erosion and Sediment Control Handbook*.

Provided adherence to the above requirements, the proposed activity would be consistent with the *Chesapeake Bay Preservation Act* and the Regulations.



## USARMY Ft Belvoir IMCOM Atlantic Mailbox ENRD

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**From:** Theodore, Nora <theodore.nora@epa.gov>  
**Sent:** Friday, August 10, 2018 1:32 PM  
**To:** USARMY Ft Belvoir IMCOM Atlantic Mailbox ENRD  
**Cc:** Rudnick, Barbara  
**Subject:** [Non-DoD Source] Ft. Belvoir INRMP EA comments

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.

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Dear Mr. Loop,

EPA has received and reviewed the Draft Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) to evaluate potential environmental impacts associated with the implementation of the 2018 Integrated Natural Resources Management Plan (INRMP) for U.S. Army Garrison Fort Belvoir, Virginia. EPA understands and appreciates the purpose and need of the proposed work. We have reviewed the EA in accordance with the National Environmental Policy Act (NEPA) of 1969, Section 309 of the Clean Air Act and the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR 1500-1508). Based on our review, we have the following comments:

Several of the projects in the INRMP are activities that may potentially impact the environment and would need to be evaluated for the appropriate level of NEPA documentation. EPA recommends including additional information about this process (such as anticipated timing and type of NEPA analysis) and would appreciate receiving updates as additional NEPA documentation is prepared particularly for wetland, stream, green infrastructure, and living shoreline mitigation and restoration activities. The project may wish to consider any opportunities to plant species attractive to pollinators. We suggest that evaluations for projects include a narrative describing aquatic resources impacted and functional replacement to address hydrology, sources and direction of flow; an assessment of expected aquatic resource functions based on the HGM type, ecological community, and surrounding land-use; the vegetative communities in the impacted and proposed restoration, restoration success criteria, such as percent canopy cover, understory and other components such as woody debris and snags, monitoring of invasive species.

For this or future projects, please consider the following: to reduce runoff volume and improve water quality, EPA recommends where possible the incorporation of Low Impact Development (LID) design features. Technical guidance in implementing green infrastructure (GI) practices and LID can be found at: Caution-<https://19january2017snapshot.epa.gov/sites/production/files/2015-09/documents/eisa-438.pdf> < Caution-<https://19january2017snapshot.epa.gov/sites/production/files/2015-09/documents/eisa-438.pdf> > and Caution-[www.epa.gov/greeninfrastructure](http://www.epa.gov/greeninfrastructure) < Caution-<http://www.epa.gov/greeninfrastructure> > . We suggest LID options be considered for design of features such as parking, paving, and landscaping. Other information can be found at Caution-[www.epa.gov/nps/lid](http://www.epa.gov/nps/lid) < Caution-<http://www.epa.gov/nps/lid> > ; U.S. EPA's Smart Growth Website: Caution-

[www.epa.gov/smartgrowth](http://www.epa.gov/smartgrowth) < Caution-<http://www.epa.gov/smartgrowth> > ; and the International Stormwater BMP Database:Caution-<http://www.bmpdatabase.org> < Caution-<http://www.bmpdatabase.org> >

In Section 4.4, Hazardous Wastes and Materials, the EA describes that the proposed action would not generate hazardous waste. However, whether in this or subsequent documents, EPA recommends including evaluation and discussion of contingency planning for potential contamination that may be encountered as a result of implementing projects associated with the proposed action. It is also important to consider any effect a project may have on contaminant remediation that may be in place. Lastly, EPA suggests that potential beneficial impacts on human health be mentioned.

We recommend that Ft Belvoir continue to work closely with Federal, State, and local stakeholders throughout the implementation of this Plan and any adaptive management decisions. In addition, Ft Belvoir should coordinate closely with the U.S. Army Corps of Engineers and EPA on any Clean Water Act Section 404 permit matters that may arise from the proposed impacts to waters of the United States. We would be pleased to discuss our comments at your convenience. Please let me know if you have any questions. We look forward to working with you on this proposed work.

Sincerely,

Nora Theodore

NEPA Reviewer

Office of Environmental Programs

Environmental Assessment and Innovation Division

US EPA, Region III

1650 Arch Street (3EA30)

Philadelphia, PA 19103

215-814-2728

[theodore.nora@epa.gov](mailto:theodore.nora@epa.gov) < Caution-mailto:theodore.nora@epa.gov >



# County of Fairfax, Virginia

To protect and enrich the quality of life for the people, neighborhoods and diverse communities of Fairfax County

August 10, 2018

Mr. Felix M. Mariani  
Fort Belvoir DPW Environmental Division  
Building 1442  
9430 Jackson Loop  
Fort Belvoir, VA 22060

Dear Mr. Mariani:

Thank you for notifying Fairfax County staff of the availability of an Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for Implementation of the 2018 Integrated Natural Resources Management Plan for Fort Belvoir. We have prepared these comments in collaboration with the Department of Public Works and Environmental Services (DPWES), Fairfax County Department of Transportation, and the Fairfax County Park Authority staff. Please note that these comments have not been endorsed by the Fairfax County Board of Supervisors.

Fort Belvoir developed its first comprehensive Integrated Natural Resources Management Plan (INRMP) in 2001, and that document has informed the post's natural resource management efforts since that time. An updated INRMP has recently been completed, and the EA and FONSI are intended to facilitate the natural resource management efforts necessary to implement the INRMP. The INRMP provides a comprehensive update to the earlier plan and supports a holistic, ecosystem-based approach to natural resources management, continuing Fort Belvoir's long-established approach. An alternative that has been eliminated from consideration would have replaced this comprehensive approach with an approach that would limit management efforts to those required by a statutory or regulatory rule. The No Action alternative would continue the current approach but would base it on the guidance provided in the 2001 INRMP. As noted in the EA, conditions on the post have changed since that time, as have related installation planning documents and natural resource-related regulations and policies. We therefore support the proposed action and the FONSI. We further thank Fort Belvoir for its long-held commitments to the stewardship of its natural resources and for the integration of its natural resource management efforts into its broader planning framework. Both the 2001 and 2018 INRMPs reflect the dedication of considerable resources and efforts to identify, protect and enhance the post's considerable natural capital.

Within this supportive context, we have the following comments:



- Page 3-6 of the EA notes that, while Fort Belvoir does not use the county's maps of Resource Protection Areas (established by the Chesapeake Bay Preservation Ordinance), it does delineate RPAs on the installation. In addition, Fort Belvoir establishes a 35-foot buffer area around all intermittent streams. Fort Belvoir should be encouraged to apply wider buffer areas along intermittent streams consistent with stream buffer guidance established in the county's Environmental Quality Corridor policy (see the Fairfax County Comprehensive Plan, Policy Plan volume, Environment section Objective 9--<https://www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/comprehensiveplan/planhistoricpolicy/2017/environment/3-14-2017.pdf>).
- We concur with the conclusion that no significant adverse noise impacts should be anticipated as a result of implementation of the INRMP and that this issue should therefore be excluded from evaluation in the EA. We note, however, that the description of noise requirements in the Fairfax County Code, as presented on page 4-3 of the EA, reflects the previous version of the county's Noise Ordinance rather than the revised Noise Ordinance as adopted on November 17, 2015 (see [https://www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/zoning%20ordinance/noise%20amendment/29-15-108\\_1.pdf](https://www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/zoning%20ordinance/noise%20amendment/29-15-108_1.pdf)). Note that the ordinance was revised comprehensively, with changes relating to specific maximum noise levels (both continuous and impulsive), construction noise and time limits on the use of power lawn equipment near residences, among other things. We encourage Fort Belvoir to review the revised ordinance and ensure that activities on the installation will be consistent with it.
- One of the proposed actions that is identified is the review and revision of existing written policy and guidance relating to vegetation resources, and Fort Belvoir's Tree Removal and Protection Policy Memorandum is identified as an example. This policy seeks to achieve a no net loss of tree cover due to development on the post; a 2:1 replacement requirement applies for the removal of trees that are at least four inches in diameter at breast height. We support and thank Fort Belvoir for its aggressive tree replacement policy; if this policy is reviewed in the future, though, we would encourage consideration of a tree canopy replacement approach that can consider the removal of smaller trees as well.
- Section 4.3 of the document notes that cultural resources impacts were not evaluated in the EA, as "all projects relating to the implementation of the INRMP would be avoided in areas of known cultural resources at Fort Belvoir." The EA further notes that the need for further evaluation of individual projects pursuant to Section 106 of the National Historic Preservation Act of 1966 would be analyzed on a project by project basis. We support this approach and the recognition of a need to consider potential impacts to cultural resources at the individual project review stage. We encourage Fort Belvoir to coordinate with the county's Department of Planning and Zoning and/or Fairfax County Park Authority as appropriate during such reviews.

Mr. Felix M. Mariani  
August 10, 2018  
Page 3

We again thank Fort Belvoir for all it is doing in support of ecological resource management and enhancement and again offer our support for these efforts. We would welcome opportunities to collaborate with Fort Belvoir on natural resource management issues of mutual interest, including but not limited to wildlife management, watershed management/project implementation, invasive plant management and forest pest management.

If you have any questions about our comments, please contact Noel Kaplan at [Noel.Kaplan@fairfaxcounty.gov](mailto:Noel.Kaplan@fairfaxcounty.gov) or at 703-324-1369.

Sincerely,



Fred R. Selden, Director  
Department of Planning and Zoning

FRS:NHK

cc: Fairfax County Board of Supervisors

Bryan J. Hill, County Executive

Robert A. Stalzer, Deputy County Executive

Kirk Kincannon, Director, Fairfax County Park Authority

James W. Patteson, Director, Department of Public Works and Environmental Services

John Stokely, Manager, Natural Resource Protection Branch, FCPA

Shannon Curtis, Chief, Watershed Planning and Assessment Branch, DPWES

Ryan J. Stewart, Senior Planner, FCPA

Noel H. Kaplan, Senior Environmental Planner, DPZ

Ms. Julia Wellman, Environmental Impact Review Coordinator, Virginia Department of  
Environmental Quality, Office of Environmental Impact Review



#	<i>Agency</i>	<i>Agency Comment</i>	<i>Response / Updates to EA</i>
1	EPA	<p>Several of the projects in the INRMP are activities that may potentially impact the environment and would need to be evaluated for the appropriate level of NEPA documentation. EPA recommends including additional information about this process (such as anticipated timing and type of NEPA analysis) and would appreciate receiving updates as additional NEPA documentation is prepared particularly for wetland, stream, green infrastructure, and living shoreline mitigation and restoration activities. The project may wish to consider any opportunities to plant species attractive to pollinators. We suggest that evaluations for projects include a narrative describing aquatic resources impacted and functional replacement to address hydrology, sources and direction of flow; an assessment of expected aquatic resource functions based on the HGM type, ecological community, and surrounding land-use; the vegetative communities in the impacted and proposed restoration, restoration success criteria, such as percent canopy cover, understory and other components such as woody debris and snags, monitoring of invasive species.</p>	<p>Comment noted. As specified in Section 3.3.4.1, stream restoration projects will be evaluated on a case-by-case basis to determine the appropriate level of NEPA when their details of scope become available. Anticipated timing is dependent on factors such as availability of funding and overall severity of stream conditions which are not fully known at this time. In accordance with 32 CFR 651.14, any required NEPA analysis will be integrated early in the planning process and shall be completed prior to any decision. Fort Belvoir will consider evaluation of EPA's suggested resource areas in future NEPA analysis.</p>
2	EPA	<p>For this or future projects, please consider the following: to reduce runoff volume and improve water quality, EPA recommends where possible the incorporation of Low Impact Development (LID) design features. Technical guidance in implementing green infrastructure (GI) practices and LID can be found at: <a href="https://19january2017snapshot.epa.gov/sites/production/files/2015-09/documents/eisa-43.pdf">https://19january2017snapshot.epa.gov/sites/production/files/2015-09/documents/eisa-43.pdf</a> and <a href="http://www.epa.gov/greeninfrastructure">www.epa.gov/greeninfrastructure</a> &lt; <a href="http://www.epa.gov/greeninfrastructure">http://www.epa.gov/greeninfrastructure</a> &gt;. We suggest LID options be considered for design of features such as parking, paving, and landscaping. Other information can be found at <a href="http://www.epa.gov/nps/lid">www.epa.gov/nps/lid</a> &gt;; U.S. EPA's Smart Growth Website: <a href="http://www.epa.gov/smartgrowth">http://www.epa.gov/smartgrowth</a> &gt;; and the International Stormwater BMP Database: <a href="http://www.bmpdatabase.org">http://www.bmpdatabase.org</a> &lt; <a href="http://www.bmpdatabase.org">http://www.bmpdatabase.org</a> &gt;</p>	<p>Noted. No updates made.</p>

3	EPA	<p>In Section 4.4, Hazardous Wastes and Materials, the EA describes that the proposed action would not generate hazardous waste. However, whether in this or subsequent documents, EPA recommends including evaluation and discussion of contingency planning for potential contamination that may be encountered as a result of implementing projects associated with the proposed action. It is also important to consider any effect a project may have on contaminant remediation that may be in place. Lastly, EPA suggests that potential beneficial impacts on human health be mentioned.</p>	<p>Section 4.4 was updated to include Fort Belvoir's contingency plan, which is to follow the spill plan, which includes notification of the IRP (Installation Restoration Program) as well as mention that projects that include contaminant remediation efforts could have a benefit to human health.</p>
4	EPA	<p>We recommend that Ft Belvoir continue to work closely with Federal, State, and local stakeholders throughout the implementation of this Plan and any adaptive management decisions. In addition, Ft Belvoir should coordinate closely with the U.S. Army Corps of Engineers and EPA on any Clean Water Act Section 404 permit matters that may arise from the proposed impacts to waters of the United States.</p>	<p>Noted. No updates made.</p>
5	Fairfax County, VA	<p>Page 3-6 of the EA notes that, while Fort Belvoir does not use the county's maps of Resource Protection Areas (established by the Chesapeake Bay Preservation Ordinance), it does delineate RPAs on the installation. In addition, Fort Belvoir establishes a 35-foot buffer area around all intermittent streams. Fort Belvoir should be encouraged to apply wider buffer areas along intermittent streams consistent with stream buffer guidance established in the county's Environmental Quality Corridor policy (see the Fairfax County Comprehensive Plan, Policy Plan volume, Environment section Objective 9--  <a href="https://www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/comprehensiveplan/planhistoricpolicy/2017/environment/3%2014-2017.pdf">https://www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/comprehensiveplan/planhistoricpolicy/2017/environment/3 14-2017.pdf</a>).</p>	<p>Noted. Wider buffer areas are taken into consideration during the planning process and employed where practicable.</p>



6	Fairfax County, VA	<p>We concur with the conclusion that no significant adverse noise impacts should be anticipated as a result of implementation of the INRMP and that this issue should therefore be excluded from evaluation in the EA. We note, however, that the description of noise requirements in the Fairfax County Code, as presented on page 4-3 of the EA, reflects the previous version of the county's Noise Ordinance rather than the revised Noise Ordinance as adopted on November 17, 2015 (see <a href="https://www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/zoning%20ordinance/noise%20amendment/29-15-108_1.pdf">https://www.fairfaxcounty.gov/planning-zoning/sites/planning-zoning/files/assets/documents/zoning%20ordinance/noise%20amendment/29-15-108_1.pdf</a>). Note that the ordinance was revised comprehensively, with changes relating to specific maximum noise levels (both continuous and impulsive), construction noise and time limits on the use of power lawn equipment near residences, among other things. We encourage Fort Belvoir to review the revised ordinance and ensure that activities on the installation will be consistent with it.</p>	Noted. The INRMP EA was updated to include the revised noise policy.
7	Fairfax County, VA	<p>One of the proposed actions that is identified is the review and revision of existing written policy and guidance relating to vegetation resources, and Fort Belvoir's Tree Removal and Protection Policy Memorandum is identified as an example. This policy seeks to achieve a no net loss of tree cover due to development on the post; a 2:1 replacement requirement applies for the removal of trees that are at least four inches in diameter at breast height. We support and thank Fort Belvoir for its aggressive tree replacement policy; if this policy is reviewed in the future, though, we would encourage consideration of a tree canopy replacement approach that can consider the removal of smaller trees as well.</p>	Noted. No updates made.
8	Fairfax County, VA	<p>Section 4.3 of the document notes that cultural resources impacts were not evaluated in the EA, as 'all projects relating to the implementation of the INRMP would be avoided in areas of known cultural resources at Fort Belvoir.' The EA further notes that the need for further evaluation of individual projects pursuant to Section 106 of the National Historic Preservation Act of 1966 would be analyzed on a project by project basis. We support this approach and the recognition of a need to consider potential impacts to cultural resources at the individual project review stage. We encourage Fort Belvoir to coordinate with the county's Department of Planning and Zoning and/or Fairfax County Park Authority as appropriate during such reviews.</p>	Noted. No updates made.

9	<p>Virginia DEQ</p> <p>In general, DEQ recommends that stream and wetland impacts be avoided to the maximum extent practicable. To minimize unavoidable impacts to wetlands and waterways, DEQ recommends the following practices: Operate machinery and construction vehicles outside of stream-beds and wetlands; use synthetic mats when in-stream work is unavoidable.</p> <p>Preserve the top 12 inches of material removed from wetlands for use as wetland seed and root-stock in the excavated area. Design erosion and sedimentation controls in accordance with the most current edition of the Virginia Erosion and Sediment Control Handbook. These controls should be in place prior to clearing and grading, and maintained in good working order to minimize impacts to state waters. The controls should remain in place until the area is stabilized. Place heavy equipment, located in temporarily impacted wetland areas, on mats, geotextile fabric, or use other suitable measures to minimize soil disturbance, to the maximum extent practicable. Restore all temporarily disturbed wetland areas to pre-construction conditions and plant or seed with appropriate wetlands vegetation in accordance with the cover type (emergent, scrub-shrub or forested). The applicant should take all appropriate measures to promote revegetation of these areas. Stabilization and restoration efforts should occur immediately after the temporary disturbance of each wetland area instead of waiting until the entire project has been completed. Place all materials which are temporarily stockpiled in wetlands, designated for use for the immediate stabilization of wetlands, on mats or geotextile fabric in order to prevent entry in state waters. These materials should be managed in a manner that prevents leachates from entering state waters and must be entirely removed within thirty days following completion of that construction activity. The disturbed areas should be returned to their original contours, stabilized within thirty days following removal of the stockpile, and restored to the original vegetated state. Clearly flag or mark all non-impacted surface waters within the project or right-of-way limits that are within 50 feet of any clearing, grading or filling activities for the life of the construction activity within that area. The project proponent should notify all contractors that these marked areas are surface waters where no activities are to occur. Employ measures to prevent spills of fuels or lubricants into state waters. DEQ regulates wetlands and water quality through implementation of the Virginia Water Protection Program (Virginia Code § 62.1-44.15 et seq.; 9VAC25-210 et seq.).</p>	Noted. No updates made.
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		<p>If future activities would occur in or along any streams (perennial, intermittent, or ephemeral), open water or wetlands, Fort Belvoir should contact DEQ NRO (Trisha Beasley at <a href="mailto:Trisha.Beasley@deq.virginia.gov">Trisha.Beasley@deq.virginia.gov</a>) to determine the need for any permits prior to commencing work that could impact surface waters or wetlands. A Joint Permit Application (JPA) may be submitted to VMRC (Tony Watkinson at <a href="mailto:Tony.Watkinson@mrc.virginia.gov">Tony.Watkinson@mrc.virginia.gov</a>)</p>	
10	Virginia DEQ	<p>Federal actions on installations located within Tidewater Virginia are required to be consistent with the performance criteria of the Regulations on lands analogous to locally designated RPAs and RMAs, as provided in 9VAC25-830-130 and 140 of the Regulations, including the requirement to minimize land disturbance (including access and staging areas), retain existing vegetation and minimize impervious cover as well as including compliance with the requirements of the Virginia Erosion and Sediment Control Handbook, and stormwater management criteria consistent with water quality protection provisions of the Virginia Stormwater Management Regulations. For land disturbance over 2,500 square feet, future projects must comply with the requirements of the Virginia Erosion and Sediment Control Handbook. Projects that implement the INRMP should be consistent with the Chesapeake Bay Preservation Act (Virginia Code §§ 10.1-2100 through 10.1-2114) and Chesapeake Bay Preservation Area Designation and Management Regulations (Regulations) (Virginia Code 9VAC25-830-10 et seq.) as locally implemented. Federal actions on installations located within Tidewater Virginia are required to be consistent with the performance criteria of the Regulations on lands analogous to locally designated RPAs and RMAs, as provided in 9VAC25-830-130 and 140 of the Regulations. Contact DEQ OLG (Daniel Moore at <a href="mailto:Daniel.Moore@deq.virginia.gov">Daniel.Moore@deq.virginia.gov</a> or 804-698-4520) for additional information as necessary.</p>	<p>Noted. No updates made.</p>

11	Virginia DEQ	<p>General guidance on regulatory requirements is below. These requirements may apply to future land-disturbing activities associated with implementation of the INRMP: Erosion and Sediment Control and Stormwater Management Plans. The applicant and its authorized agents conducting regulated land-disturbing activities on private and public lands in the state must comply with VESCL&amp;R and VSWML&amp;R, including coverage under the general permit for stormwater discharge from construction activities, and other applicable federal nonpoint source pollution mandates (e.g. Clean Water Act-Section 313). Clearing and grading activities, installation of staging areas, parking lots, roads, buildings, utilities, borrow areas, soil stockpiles, and related land- disturbing activities that result in the total land disturbance of equal to or greater than 2,500 square feet on lands analogous to Chesapeake Bay Preservation Areas would be regulated by VESCL&amp;R. Accordingly, the applicant must prepare and implement an erosion and sediment control (ESC) plan to ensure compliance with state law and regulations. The ESC plan is submitted to the DEQ regional office that serves the area where the project is located for review for compliance. The applicant is ultimately responsible for achieving project compliance through oversight for on-site contractors, regular field inspection, prompt action against non-compliant sites, and other mechanisms consistent with agency policy (Reference: VESCL 62.1-44.15 et seq.). General Permit for Stormwater Discharges from Construction Activities (VAR10). The operator or owner of a construction project involving land-disturbing activities equal to or greater than one acre is required to register for coverage under the General Permit for Discharges of Stormwater from Construction Activities and develop a project-specific stormwater pollution prevention plan (SWPPP). The SWPPP must be prepared prior to submission of the registration statement for coverage under the general permit and the SWPPP must address water quality and quantity in accordance with the VSMP Permit Regulations. General information and registration forms for the General Permit are available on DEQ's website at <a href="http://www.deq.virginia.gov/Programs/Water/StormwaterManagementWSMPPPermits/ConstructionGeneralPermit.aspx">http://www.deq.virginia.gov/Programs/Water/StormwaterManagementWSMPPPermits/ConstructionGeneralPermit.aspx</a> (Reference: VSWML 62.1-44.15 et seq.; VSMP Permit Regulations 9VAC 25-870-10 et seq.).</p> <p>Future projects should be planned in compliance with Virginia Erosion and Sediment Control Law (Virginia Code §62.1-44. 15 et seq.) and Regulations (9VAC25-840-30 et seq.) and Stormwater Management Law (Virginia Code 62.1-44.15 et seq.) and Regulations (9VAC25-870-54 et seq.).</p>	Noted. No updates made.
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12	Virginia DEQ	<p>Fugitive Dust. During future land-disturbing activities associated with implementing the INRMP, fugitive dust must be kept to a minimum by using control methods outlined in 9VAC5-50-60 et seq. of the regulations for the Control and Abatement of Air Pollution. These precautions include, but are not limited to, the following: Use, where possible, of water or suitable chemicals for dust control during the proposed demolition and construction operations and from material stockpiles; Installation and use of hoods, fans and fabric filters to enclose and vent the handling of dusty materials; Covering of open equipment for conveying materials; and Prompt removal of spilled or tracked dirt or other materials from paved streets and removal of dried sediments resulting from soil erosion.</p> <p>Open Burning. If future project activities associated with implementing the INRMP include the burning of vegetative debris or construction material, this activity must meet the requirements under 9VAC5-130 et seq. of the regulations for open burning, and it may require a permit. The regulations provide for, but do not require, the local adoption of a model ordinance concerning open burning. Contact officials with the locality to determine what local requirements, if any, exist. Any open burning of vegetative debris must be performed in accordance with the open-burning regulation (<a href="http://www.deq.virginia.gov/Programs/Air/AirQualityPlans/OpenBurning.aspx">http://www.deq.virginia.gov/Programs/Air/AirQualityPlans/OpenBurning.aspx</a>) and coordinated with the local fire official to ensure that all local ordinances are met. Future projects should be planned to restrict the emissions of VOCs and NOx. Future projects that implement the INRMP may be subject to air regulations administered by DEQ. The following sections of Virginia Administrative Code are applicable:</p> <p>9 VAC 5-50-60 et seq. governing fugitive dust emissions</p> <p>9 VAC 5-130 et seq. for open burning</p> <p>Coordinate with DEQ NRO (James Lafratta at 703-583-3928) prior to implementing future projects if the use of fuel-burning equipment is proposed.</p>	Noted. No updates made.
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13	Virginia DEQ	<p>As projects are identified, DLPR staff recommends a review of its data files to determine if there are any waste sites located in close proximity to a project site(s). Site searches would include the following categories: CERCLIS, RCRA/Hazardous Waste, Solid Waste, Voluntary Remediation Program (VRP) sites, Formerly Used Defense Sites (FUDS), and Petroleum Release sites. The following websites may be helpful in locating additional information as projects are identified: <a href="https://www3.epa.gov/enviro/https://rcrainfopreprod.epa.gov/rcrainfoweb/action/main-menu/viewhttps://www.epa.gov/superfund">https://www3.epa.gov/enviro/https://rcrainfopreprod.epa.gov/rcrainfoweb/action/main-menu/viewhttps://www.epa.gov/superfund</a>, <a href="http://www.deq.virginia.gov/ConnectWithOEQ/VEGIS.aspx">http://www.deq.virginia.gov/ConnectWithOEQ/VEGIS.aspx</a>. In general, DEQ encourages all projects and facilities to implement pollution prevention principles, including: the reduction, reuse and recycling of all solid wastes generated; and the minimization and proper handling of generated hazardous wastes. Any soil/sediment that is suspected of contamination or wastes that are generated during future activities must be tested and disposed of in accordance with applicable federal, state, and local laws and regulations. Contact DEQ NRO (Richard Doucette at <a href="mailto:Richard.Doucette@deq.virginia.gov">Richard.Doucette@deq.virginia.gov</a>) for additional information on waste management. Contact DEQ DLPR (Katy Dacey at <a href="mailto:Katy.Dacey@deq.virginia.gov">Katy.Dacey@deq.virginia.gov</a>) for assistance with database searches.</p>	Noted. No updates made.
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14	Virginia DEQ	<p>OCR DNH concurs with the conclusions in the EA for the Fort Belvoir INRMP with the following recommendations: Include additional information on exotic animals found on the installation and management actions related to them. There are several exotic animals documented at Fort Belvoir including the giant Chinese snails, Asian clams, goldfish, snakeheads and crayfish with potential to impact other native species. Correct typographic errors throughout the INRMP document and adding Natural Heritage Global Rarity Ranks (G Ranks) for species in Table 8-2. For any changes in habitat or threats to <i>Stygobromus phreaticus</i>, add the Virginia of Department of Game and Fisheries (DGIF) and DCR DNH as consultation partners in addition to the United States Fish and Wildlife Service (FWS). Contact the DCR DNH and resubmit project information if the scope of the project changes and/or six months has passed before it is utilized. Contact OCR DNH (804-371-2708) regarding its recommendations as necessary. Contact the DCR DNH (804-371-2708) and re-submit project information and a map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.</p>	<p>Exotic animals that are periodically discovered on Fort Belvoir are typically domestic pets which are handled by the Pest Management Program. Exotic animals that are considered wild and invasive are uncommon on Fort Belvoir. No management plan exists for those species that have been documented in waters surrounding Fort Belvoir such as fish, mollusks, and crustaceans. However, future actions include baseline inventory surveys for SAV, mollusks, and anadromous fish based upon funding and personnel availability. The current INRMP does provide information and management regarding the northern snakehead which has been found at Mulligan Pond. All other species will be dealt with on a case-by-case basis in coordination with VDGIF if necessary.</p>
15	Virginia DEQ	<p>DGIF states that it has been working with Ft. Belvoir staff to review and update the INRMP for the installation, per the Sikes Act. DGIF is comfortable with the final product. The DGIF director is agreeable to signing the plan. Contact DGIF (Amy Ewing at Amy.Ewing@dgif.virginia.gov) for additional information about its comments if necessary.</p>	<p>Noted. No updates made.</p>



16	Virginia DEQ	<p>Fort Belvoir should consult directly with DHR, as necessary, pursuant to Section 106 of the National Historic Preservation Act (as amended) and its implementing regulations codified at 36 CFR Part 800, which require federal agencies to consider the effects of their undertakings on historic properties. Fort Belvoir or its agents should consult directly as necessary with DHR (Roger Kirchen at Roger.Kirchen@dhr.virginia.gov, as necessary, pursuant to Section 106 of the National Historic Preservation Act (as amended) and its implementing regulations codified at 36 CFR Part 800, which require federal agencies to consider the effects of their undertakings on historic properties.</p>	Noted. No updates made.
17	Virginia DEQ	<p>Plan to implement best management practices, including erosion and sedimentation controls as well as spill prevention controls and countermeasures, during future and-disturbing activities. Properly manage materials on site and during transport to prevent impacts to nearby surface waters. Contact VDH ODW (Susan Douglas at Susan.Douglas@vdh.virginia.gov) for additional information about its comments and recommendations if necessary.</p>	Noted. No updates made.

18	Virginia DEQ	<p>We have several pollution prevention recommendations that may be helpful for future projects: Consider development of an effective Environmental Management System (EMS). An effective EMS will ensure that the facility is committed to complying with environmental regulations, reducing risk, minimizing environmental impacts, setting environmental goals, and achieving improvements in its environmental performance. DEQ offers EMS development assistance and recognizes facilities with effective Environmental Management Systems through its Virginia Environmental Excellence Program (VEEP). VEEP provides recognition, annual permit fee discounts, and the possibility for alternative compliance methods. Consider environmental attributes when purchasing materials. For example, the extent of recycled material content, toxicity level, and amount of packaging should be considered and can be specified in purchasing contracts. Consider energy efficiency when choosing materials and products, like insulation, fixtures, and HVAC systems. Consider contractors' commitment to the environment when choosing contractors. Specifications regarding raw materials and construction practices can be included in contract documents and requests for proposals. Choose sustainable materials and practices for building construction and design. Integrate pollution prevention techniques into the facility maintenance and operation, to include inventory control for centralized storage of hazardous materials. Maintenance facilities should have sufficient and suitable space to allow for effective inventory control and preventive maintenance. DEQ's Office of Pollution Prevention provides information and technical assistance relating to pollution prevention techniques and EMS. If interested, please contact DEQ (Meghan Quinn at 804-698-4021).</p>	Noted. No updates made.
19	Virginia DEQ	<p>In general, when pesticides or herbicides must be used, their use should be strictly in accordance with manufacturers' recommendations. In addition, DEQ recommends that the responsible agent use the least toxic pesticides or herbicides effective in controlling the target species. For more information on pesticide or herbicide use, please contact VDACS (804-371-6560).</p>	Noted. No updates made.

20	Virginia DEQ	<p>Fort Belvoir must submit a federal consistency determination (FCD) pursuant to the Coastal Zone Management Act (CZMA) of 1972, as amended (16 USCA, CZMA § 307, § 1456(c)(3)(A)) and its implementing federal consistency regulations (15 CFR Part 930, subpart C) for future projects affecting the enforceable policies of the Virginia Coastal Zone Management Program. Coordinate directly with the DEQ Office of Environmental Impact Review for the submittal of FCDs. Information on document submission is available at <a href="http://www.deq.virginia.gov/Programs/EnvironmentalImpactReview/DocumentsSubmissions.aspx">http://www.deq.virginia.gov/Programs/EnvironmentalImpactReview/DocumentsSubmissions.aspx</a>. Information on FCDs is available at <a href="http://www.deq.virginia.gov/Programs/EnvironmentalImpactReview/FederalConsistencyReviews.aspx">http://www.deq.virginia.gov/Programs/EnvironmentalImpactReview/FederalConsistencyReviews.aspx</a>.</p>	Noted. No updates made.
21	Virginia DEQ- Division of Air Program Coordination	All precautions are necessary to restrict the emissions of volatile organic compounds (VOC) and oxides of nitrogen (NOx) during any construction activities.	Noted. No updates made.
22	Virginia Department of Conservation and Recreation	DCR-DNH supports the IN RMP in its progressive approach to the wildlife, plant, and ecological resources at Fort Belvoir using an ecological focus, which is more holistic than an Endangered/Threatened Species only approach.	Noted. No updates made.

23	Virginia Department of Conservation and Recreation	DCR-DNH concurs with the conclusions in the EA for the Fort Belvoir INRMP with the following recommendations:-DCR-D NH recommends the INRMP include additional information on exotic animals found on the installation and management actions related to them. There are several exotic animals documented at Fort Belvoir including the giant Chinese snails, Asian clams, goldfish, snakeheads and crayfish with potential to impact other native species.-DCR-DNH recommends correcting typos throughout the INRMP document and adding Natural Heritage Global Rarity Ranks (G Ranks) for species in Table 8-2.-For any changes in habitat or threats to <i>Stygobromus phreaticus</i> , DCR-DNH recommends adding the Virginia of Department of Game and Inland Fisheries (DGIF) and DCR-DNH as consultation partners in addition to the United States Fish and Wildlife Service (USFWS).	See comment 13 Comment noted. Natural Resources branch will revisit the addition of the global ranks in the annual review of the INRMP. VDGIF and DCR-DNH are included as consultation partners for all species under Goal number 1 of the INRMP.
24	Amy Ewing, VA Department of Game and Inland Fisheries	Amy states in an email to Julia Wellman at VA DEQ:  Julia,  We have been working with Ft. Belvoir staff this Summer to review and update the INRMP for the installation, per the Sikes Act. We are comfortable with the final product and our Director is agreeable to signing the plan, once we receive the final signature sheet.  Thank you. Amy	Noted. No updates made.
25	VA DEQ, Division of Land Protection and Revitalization	No particular project(s) within the submittal pertain to any type of construction. Without specific construction to a particular project site(s) A GIS database search could not be completed by DLPR staff to determine whether any waste sites might impact a project site(s). As project(s) are identified, DLPR staff recommends a review of its data files to determine if there are any waste sites located in close proximity to a project site(s). Site searches would include the following categories: CERCLIS, RCRA/Hazardous Waste, Solid Waste, Voluntary Remediation Program (VRP) sites, Formerly Used Defense Sites (FUDS), and Petroleum Release sites.	Noted. No updates made.

26	VA DEQ, Division of Land Protection and Revitalization	Any soil, sediment or groundwater that is suspected of contamination or wastes that are generated must be tested and disposed of in accordance with applicable Federal, State, and local laws and regulations. Some of the applicable state laws and regulations are: Virginia Waste Management Act, Code of Virginia Section 10.1-1400 et seq.; Virginia Hazardous Waste Management Regulations (VHWMR) (9VAC 20- 60); Virginia Solid Waste Management Regulations (VSWMR) (9VAC 20-81); Virginia Regulations for the Transportation of Hazardous Materials (9VAC 20-110). Some of the applicable Federal laws and regulations are: the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. Section 6901 et seq., and the applicable regulations contained in Title 40 of the Code of Federal Regulations ; and the U.S. Department of Transportation Rules for Transportation of Hazardous Materials, 49 CFR Part 107.	Noted. No updates made.
27	VA DEQ, Division of Land Protection and Revitalization	All structures being demolished/renovated/removed should be checked for asbestos-containing materials (ACM) and lead-based paint (LBP) prior to demolition. If ACM or LBP are found, in addition to the federal waste-related regulations mentioned above, State regulations 9VAC 20-81-620 for ACM and 9VAC 20-60-261 for LBP must be followed.	Noted. No updates made.
28	VA DEQ, Division of Land Protection and Revitalization	Please note that DEQ encourages all construction projects and facilities to implement pollution prevention principles, including the reduction, reuse, and recycling of all solid wastes generated. All generation of hazardous wastes should be minimized and handled appropriately.	Noted. No updates made.

29	<p>Virginia DEQ, Northern Regional Office</p> <p>Northern Regional Office has no specific comments regarding the Draft Environmental Assessment for US Department of Army/Fort Belvoir (Fairfax County) Implementation of the 2018 Integrated Natural Resources Management Plan (DEQ #18-104F). However, DEQ recommends following the guidance related to each media below:</p> <p><u>Land Protection Division</u> - The project manager is reminded that if any solid or hazardous waste is generated/encountered during construction, the project manager would follow applicable federal, state, and local regulations for their disposal.</p> <p><u>Air Compliance/Permitting</u> - The project manager is reminded that during the construction phases that occur with this project; the project is subject to the Fugitive Dust/Fugitive Emissions Rule 9 VAC 5-50-60 through 9 VAC 5-50-120. In addition, should any open burning or use of special incineration devices be employed in the disposal of land clearing debris during demolition and construction, the operation would be subject to the Open Burning Regulation 9 VAC 5-130-10 through 9 VAC 5-130-60 and 9 VAC 5-130-100.</p> <p><u>Virginia Water Protection Permit</u> - The project manager is reminded that a VWP permit from DEQ may be required should impacts to surface waters be necessary. DEQ VWP staff recommends that the avoidance and minimization of surface water impacts to the maximum extent practicable as well as coordination with the US Army Corps of Engineers. Upon receipt of a Joint Permit Application for the proposed surface water impacts, DEQ VWP Permit staff will review the proposed project in accordance with the VWP permit program regulations and current VWP permit program guidance.</p> <p><u>Erosion and Sediment Control and Storm Water Management</u>: DEQ has regulatory authority for the Virginia Pollutant Discharge Elimination System (VPDES) programs related to municipal separate storm sewer systems (MS4s) and construction activities. Erosion and sediment control measures are addressed in local ordinances and State regulations. Additional information is available at <a href="http://www.deq.virginia.gov/Programs/Water/StormwaterManagement.aspx">http://www.deq.virginia.gov/Programs/Water/StormwaterManagement.aspx</a>. Non-point source pollution resulting from this project should be minimized by using effective erosion and sediment control practices and structures. Consideration should also be given to using permeable paving for parking areas and walkways where appropriate, and denuded areas should be promptly revegetated following construction work. If the total land disturbance exceeds 10,000 square feet, an erosion and sediment control plan will be required. Some localities also require an E&amp;S plan for disturbances less than 10,000 square feet.</p>	Noted. No updates made.
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		A stormwater management plan may also be required. For any land disturbing activities equal to one acre or more, you are required to apply for coverage under the VPDES General Permit for Discharges of Storm Water from Construction Activities. The Virginia Stormwater Management Permit Authority may be DEQ or the locality.																															
30	Virginia Department of Health, Office of Drinking Water	<p>VDH - Office of Drinking Water has reviewed the above project. Below are our comments as they relate to proximity to public drinking water sources (groundwater wells, springs and surface water Intakes). Potential impacts to public water distribution systems or sanitary sewage collection systems must be verified by the local utility. The project is not within the watershed of any public surface water intakes. Best Management Practices should be employed, including Erosion &amp; Sedimentation Controls and Spill Prevention Controls &amp; Countermeasures on the project site. Materials should be managed while on site and during transport to prevent impacts to nearby surface water.</p> <p>The following public groundwater wells are located within a 1-mile radius of the project site:</p> <table><tr><th>PWS ID Number</th><th>City/County</th><th>System Name</th><th>Facility Name</th></tr><tr><td>6059641</td><td>FAIRFAX CO</td><td>POHICK BAY - COMFORT STATION</td><td>COMFORT ST 3</td></tr><tr><td>6059635</td><td>FAIRFAX CO</td><td>POHICK BAY - POOL</td><td>SWIM POOL WELL</td></tr><tr><td>6059642</td><td>FAIRFAX CO</td><td>POHICK BAY - COMFORT STATION</td><td>COMFORT ST 2</td></tr><tr><td>6059643</td><td>FAIRFAX CO</td><td>POHICK BAY - COMFORT STATION</td><td>COMFORT ST#1</td></tr><tr><td>6059535</td><td>FAIRFAX CO</td><td>GUNSTON HALL</td><td>WELL 1</td></tr></table> <p>The following surface water intakes are located within a 5-mile radius of the project site:</p> <table><tr><th>PWS ID Number</th><th>System Name</th><th>Facility Name</th></tr><tr><td>6059501</td><td>FAIRFAX CO WATER</td><td>OCCOQUAN RESERVIOR INTAKE</td></tr></table>	PWS ID Number	City/County	System Name	Facility Name	6059641	FAIRFAX CO	POHICK BAY - COMFORT STATION	COMFORT ST 3	6059635	FAIRFAX CO	POHICK BAY - POOL	SWIM POOL WELL	6059642	FAIRFAX CO	POHICK BAY - COMFORT STATION	COMFORT ST 2	6059643	FAIRFAX CO	POHICK BAY - COMFORT STATION	COMFORT ST#1	6059535	FAIRFAX CO	GUNSTON HALL	WELL 1	PWS ID Number	System Name	Facility Name	6059501	FAIRFAX CO WATER	OCCOQUAN RESERVIOR INTAKE	Noted. No updates made.
PWS ID Number	City/County	System Name	Facility Name																														
6059641	FAIRFAX CO	POHICK BAY - COMFORT STATION	COMFORT ST 3																														
6059635	FAIRFAX CO	POHICK BAY - POOL	SWIM POOL WELL																														
6059642	FAIRFAX CO	POHICK BAY - COMFORT STATION	COMFORT ST 2																														
6059643	FAIRFAX CO	POHICK BAY - COMFORT STATION	COMFORT ST#1																														
6059535	FAIRFAX CO	GUNSTON HALL	WELL 1																														
PWS ID Number	System Name	Facility Name																															
6059501	FAIRFAX CO WATER	OCCOQUAN RESERVIOR INTAKE																															



31	Daniel Moore, DEQ Principal Environmental Planner	<p>In Fairfax County, the areas protected by the Chesapeake Bay Preservation Act, as locally implemented, require conformance with performance criteria. These areas include Resource Protection Areas (RPAs) and Resource Management Areas (RMAs) as designated by the local government. RPAs include tidal wetlands, certain non-tidal wetlands and tidal shores. RPAs also include a 100-foot vegetated buffer area located adjacent to and landward of these features and along both sides of any water body with perennial flow. RMAs, which require less stringent performance criteria, include those areas of the County not included in the RPAs. Under the Federal Consistency Regulations of the Coastal Zone Management Act of 1972, federal actions in Virginia must be conducted in a manner "consistent to the maximum extent practicable" with the enforceable policies of the Virginia Coastal Zone Management Program. Those enforceable policies are administered through the Chesapeake Bay Preservation Act and Regulations. Federal actions on installations located within Tidewater Virginia are required to be consistent with the performance criteria of the Regulations on lands analogous to locally designated RPAs and RMAs, as provided in §9VAC25-830-130 and 140 of the Regulations , including the requirement to minimize land disturbance (including access and staging areas) retain existing vegetation and minimize impervious cover as well as including compliance with the requirements of the Virginia Erosion and Sediment Control Handbook, and stormwater management criteria consistent with water quality protection provisions of the Virginia Stormwater Management Regulations." For land disturbance over 2,500 square feet, the project must comply with the requirements of the Virginia Erosion and Sediment Control Handbook. Provided adherence to the above requirements, the proposed activity would be consistent with the Chesapeake Bay Preservation Act and the Regulations.</p>	Noted. No updates made.
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## **C. Acronyms**

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<b>ABWR</b>	Accotink Bay Wildlife Refuge
<b>AQCR</b>	Air Quality Control Regions
<b>AR</b>	Army Regulation
<b>ARPA</b>	Archaeological Resources Protection Act
<b>BRAC</b>	Base Realignment and Closure
<b>CBPA</b>	Chesapeake Bay Preservation Act
<b>CAA</b>	Clean Air Act
<b>CEQ</b>	Council of Environmental Quality
<b>CFR</b>	Code of Federal Regulations
<b>CWA</b>	Clean Water Act
<b>CZMP</b>	Coastal Zone Management Program
<b>DA</b>	Department of the Army
<b>dB</b>	decibels
<b>DAAF</b>	Davison Army Airfield
<b>DOD</b>	Department of Defense
<b>EA</b>	Environmental Assessment
<b>EMS</b>	Environmental Management System
<b>ESA</b>	Endangered Species Act
<b>ESC</b>	erosion and sediment control
<b>FBNA</b>	Fort Belvoir North Area
<b>FNSI</b>	Finding of No Significant Impact
<b>FWC</b>	Forest and Wildlife Corridor
<b>ICRMP</b>	Integrated Cultural Resources Management Plan
<b>IMCOM</b>	U.S. Army Installation Management Command
<b>INRMP</b>	Integrated Natural Resources Management Plan
<b>JMAWR</b>	Jackson Miles Abbott Wetland Refuge
<b>MDW</b>	Military District of Washington
<b>MLRA</b>	major land resource areas
<b>NAAQS</b>	National Ambient Air Quality Standards
<b>NAGPRA</b>	Native American Graves Protection and Repatriation Act
<b>NEPA</b>	National Environmental Policy Act
<b>NHPA</b>	National Historic Preservation Act
<b>NMUSA</b>	National Museum of the U.S. Army
<b>NRCS</b>	Natural Resource Conservation Service
<b>NRHP</b>	National Register of Historic Places
<b>RMA</b>	Resource Management Areas
<b>RPA</b>	Resource Protection Areas
<b>RPMP</b>	Real Property Master Plan
<b>SAIA</b>	Sikes Act Improvement Act
<b>SHPO</b>	State Historic Preservation Office
<b>TMDL</b>	Total Maximum Daily Load
<b>USACE</b>	U.S. Army Corps of Engineers
<b>USAG</b>	U.S. Army Garrison
<b>USEPA</b>	U.S. Environmental Protection Agency
<b>USFWS</b>	U.S. Fish and Wildlife Service

<b>VADEQ</b>	Virginia Department of Environmental Quality
<b>VDGIF</b>	Virginia Department of Game and Inland Fisheries
<b>VPDES</b>	Virginia Pollution Discharge Elimination System

## **D. Annual and Planned Projects**

Reasonable alternatives for the proposed action are constrained by environmental laws and regulations, DoD and DA policies, the nature and extent of existing natural resources, and the specific purpose and need at Fort Belvoir. A wide variety of natural resource-related projects and initiatives are planned. The projects include ongoing initiatives that have been implemented in previous years, as well as newly proposed initiatives. The tables below include annual and planned project tasks, and projected work descriptions. Relevant INRMP initiatives will be rolled into the installation Environmental Management System (EMS) Tasks and Measures.



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## 1.1. Annual Projects and Actions

Tables a through e refer to projects and actions that are completed by the installation staff and contractors on an annual basis.

### *Water Resources Projects and Actions*

<b>Table a: Water Resources Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Maintain water resources information in installation documents and databases	Maintain and update baseline information. Include in RPMPs, Small Area Plans, real property records, etc. as appropriate. Review, verify and update information in the GIS. Field verify wetland and RPA PLS boundaries, as needed.
Perform year-round surveillance of water resources	Review existing conditions in the field. Address wetlands, streams and ponds. Include fish and benthic communities. Evaluate presence and effect of stressors (e.g., invasive plants, excessive stormwater flows, ground disturbance) and propose action, as appropriate. Select representative sample to survey each year.
Review ongoing and proposed installation actions for potential to impact water resources	Assess water resources in planning actions (e.g., real property master planning, small area planning, stationing, real estate actions, privatization, siting, etc.); NEPA evaluations and mitigations; engineering planset development and review; environmental permitting; environmental restorations; military testing and training; operations and maintenance; excavation and demolition permitting; work order review; and all other installation project and activity review processes. Advise on strategies to avoid/minimize impact, and on regulatory compliance requirements, as appropriate.
Identify possible projects/actions to conserve/enhance water resources	Identify opportunities for stream restoration, riparian buffer restoration/enhancement, wetland restoration/enhancement, aquatic habitat, etc.

<b>Table a: Water Resources Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Identify and conserve ecologically significant water resources	Continue to consider ecologically significant water resources as resources warranting special conservation efforts and designation as “Special Natural Areas” under DoDI 4715.03. Maintain existing Special Natural Area boundaries. Designate new Special Natural Areas where there is a legal requirement to do so.
Evaluate water resources in support of military mission	Perform localized/activity-specific water resources studies/monitoring/evaluations in support of ongoing or proposed mission activities. Identify and provide advice regarding regulatory compliance requirements, as well as for resource conservation.
Incorporate conservation projects/actions into operations and maintenance	Identify and incorporate water resource conservation initiatives into operations and maintenance work (e.g., re-planting/enhancing native vegetation in disturbed riparian/shoreline areas; clearing debris from culverts, etc.)
Identify and manage regulatory compliance actions	Develop and submit wetland permit applications. Monitor for permit compliance. Maintain records. Coordinate with regulatory agencies (e.g., USACE, VDEQ, VMRC), and prepare and submit reports as required. Advise, prepare corrective action plans, and report to regulatory agencies on permitted and unpermitted actions where corrective actions are required. Identify and recommend impact mitigation, and monitor and report to regulatory agencies on mitigation implementation.
Coordinate with regulatory and stewardship agencies and entities	Maintain regular professional coordination with regulatory agencies (e.g., USACE, VDEQ, VMRC) and stewardship agencies (e.g., DCR-NHP, Chesapeake Bay Program Office, Northern Virginia Soil and Water Conservation District). Include discussion of partnerships and cooperation on regional stewardship initiatives, as appropriate.
Prepare and maintain policies and guidance documents	Review and revise existing written policy and guidance documents on water resources (e.g., wetland permit process guidance for Fort Belvoir). Evaluate the need for additional Fort Belvoir-specific policy and guidance documents on wetlands, streams, riparian areas, etc. Prepare policy memorandum on riparian buffers.
Support emergency situations	Provide technical assistance to emergency situations, such as fuel spills, that could threaten water resources.

<b>Table a: Water Resources Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Support regulatory compliance and enforcement	Perform compliance inspections to address federal and state laws and regulations, as applicable to Fort Belvoir, and DoD, DA and Fort Belvoir policies on water resources. Enforce federal and state water resources laws and regulations, applicable to Fort Belvoir, as well as DoD, DA and Fort Belvoir water resources policies.
Evaluate water resources conditions	Perform an annual survey of a representative sample of installation water resources (including streams, wetlands, ponds and riparian areas) to evaluate the effectiveness/success of management actions (including mitigations and corrective actions).
Provide education and training on water resources	Identify and provide opportunities for specialized training in water resources management/conservation for garrison, partner, tenant, and contractor staff, as appropriate.
Publish educational information on water resources	Write and publish articles for the Fort Belvoir website, Fort Belvoir newspaper (Belvoir Eagle), DoD Chesapeake Bay program publications, etc., as appropriate. Continue to respond to requests for information from on-post and off-post entities, as appropriate.
Provide technical information on water resources	Respond to requests from on-post and off-post entities, as appropriate. Manage water resources information to be accessible to installation natural resources managers, and other personnel, as appropriate.
Support public outreach	Participate in educational and service events/projects, as appropriate.

*Vegetation Annual Projects and Actions*

<b>Table b: Vegetation Management Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Maintain vegetation resource	Maintain and update baseline information. Include in RPMPs, small area plans, real property records, etc., as appropriate. Review, verify and update information in the GIS. Field verify vegetation communities, forest inventories, etc., as needed.

<b>Table b: Vegetation Management Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
information in installation documents and databases	
Perform year-round surveillance of vegetation conditions (developed and undeveloped installation areas)	Review existing conditions in the field. Address vegetation communities, forest, urban forest, etc. Evaluate presence and effect of stressors (e.g., invasive vegetation, forest pests, disease, land disturbance, etc.) and propose action, as appropriate.
Review ongoing and proposed installation actions for potential to impact vegetation resources	Assess vegetation resources in planning actions (e.g., real property master planning, small area planning, stationing, real estate actions, privatization, siting, etc.); NEPA evaluations and mitigations; engineering planset development and review; environmental permitting; environmental restorations; military testing and training; operations and maintenance; excavation and demolition permitting; work order review; and, all other installation project and activity review processes. Advise on strategies to avoid/minimize impact, and on regulatory compliance requirements, as appropriate.
Identify possible projects/actions to conserve/enhance vegetation resources	Identify opportunities for replanting/reforestation (e.g., disturbed areas in FWC, riparian areas, shoreline, etc.). Incorporate into annual funding requests, annual work plans, mitigation planning, etc., as practicable.
Identify and conserve areas of ecologically significant	Continue to consider ecologically significant vegetation resources as resources warranting special conservation efforts and designation as “Special Natural Areas” under DoDI 4715.03. Maintain existing Special Natural Area boundaries. Designate new Special Natural Areas where there is a legal requirement to do so.

<b>Table b: Vegetation Management Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
vegetation resources	
Evaluate vegetation resources in support of military mission	Perform localized/activity-specific vegetation studies/monitoring/evaluations in support of ongoing or proposed mission activities. Identify and provide advice regarding regulatory compliance requirements, as well as for resource conservation.
Incorporate conservation projects/actions into operations and maintenance	Identify and incorporate projects into operations and maintenance work (e.g., replanting/enhancing vegetation in FWC, in riparian areas, and along shoreline, etc.), using conservation landscaping practices, controlling invasive vegetation, etc.)
Identify and manage regulatory compliance (nutrient management)	Develop and implement Nutrient Management Plans where required (e.g., golf course). Monitor for plan implementation. Keep records. Submit reports to the regulatory agency, as required.
Coordinate with regulatory and stewardship agencies and entities	Maintain regular professional coordination with regulatory agencies (e.g., DCR) and stewardship agencies. Include discussion of partnerships/cooperation on regional stewardship initiatives, as appropriate.
Prepare and maintain policies and guidance on vegetation resources	Review and revise existing written policy and guidance (e.g., <i>Fort Belvoir Tree Removal and Protection Policy</i> Memorandum, recommended seed mixes, recommended planting list, etc.) Evaluate the need for any additional Fort Belvoir-specific policy or guidance documents.



<b>Table b: Vegetation Management Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Support emergency situations	Provide technical assistance to emergency situations, such as wildland fire, that could threaten vegetation resources.
Support regulatory enforcement	Perform compliance inspections to address federal and state laws and regulations, as applicable to Fort Belvoir, and DoD, DA and Fort Belvoir policies on vegetation management. Enforce federal and state laws and regulations, as applicable to Fort Belvoir, as well as DoD, DA and Fort Belvoir policies on vegetation management.
Evaluate vegetation conditions	Perform an annual survey of a representative sample of installation area (including urban landscapes, riparian areas and undeveloped areas) to evaluate the effectiveness/success of management and mitigation and corrective actions.
Implement the integrated pest management program	Implement the Fort Belvoir integrated pest management program (e.g., invasive vegetation control, forest pest control, etc.). Maintain and implement the Integrated Pest Management Plan, and associated policy and guidance documents.
Provide education and training on vegetation resources	Identify and provide opportunities for specialized training for garrison, partner, tenant, and contractor staff, as appropriate.
Publish educational information on vegetation resources	Write and publish articles on the Fort Belvoir website, Fort Belvoir newspaper (Belvoir Eagle), DoD Chesapeake Bay program publications, etc., as appropriate.
Provide technical information on vegetation resources	Respond to requests from on-post and off-post entities, as appropriate. Manage vegetation information to be accessible to installation natural resource managers, and to other personnel, as appropriate.
Support public outreach	Participate in educational and service events/projects, as appropriate.



<b>Table b: Vegetation Management Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Prepare and oversee execution of annual tree care work plans	Continue to execute hazard tree surveys to identify and prioritize removal of trees that pose potential threats to people, property or operations. Monitor urban trees for condition, and identify and prioritize work. Address pruning needs, as well mulching, cabling, root treatment, etc. Develop and oversee implementation of annual tree planting plans, including planting follow-up actions such as surveys of planting survival, tree tube/tree stake removals, etc.).
Provide technical guidance to landscape design and maintenance	Provide guidance (e.g., recommended plant species, planting designs, etc.) for, and review of, landscape plans.
Provide technical guidance to mowing	Provide guidance on mowing strategies/locations. Identify locations where mowing is unnecessary and can be reduced. Incorporate wildlife considerations into mowing strategies in semi-improved installation areas.
Provide guidance to pest control	Inspect vegetation for pests and advise on treatment. Monitor effectiveness of treatment.
Control invasive vegetation	Survey/monitor areas for presence/effect of invasive vegetation, and advise on control. Monitor effectiveness of control.
Replace trees lost to construction, in accordance with Fort Belvoir Tree Removal and Protection Policy memorandum	Mitigate for trees lost to construction, by re-planting trees at a 2:1 basis, or where not possible, following the alternative mitigation strategies specified in the Fort Belvoir Tree Removal and Protection Policy memorandum.

### *Fish and Wildlife Annual Projects and Actions*

<b>Table c: Fish &amp; Wildlife Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Maintain fish and wildlife information in installation documents and databases	Maintain and update baseline information. Include in RPMPs, small area plans, real property records, etc., as appropriate. Review, verify and update information in the GIS. Field verify fish and wildlife information (e.g., habitat, restoration/enhancement projects, mitigation projects, etc.), as needed.
Perform year-round surveillance of fish and wildlife conditions	Review existing conditions in the field. Evaluate presence and effect of stressors (e.g., invasive vegetation, land disturbance, impediments to fish passage, deer browse, etc.) and propose action, as appropriate.
Review on-going and proposed installation actions for potential to impact fish and wildlife	Assess vegetation resources for habitat value in planning actions (e.g., real property master planning, small area planning, stationing, real estate actions, privatization, siting, etc.); NEPA evaluations and mitigations; engineering planset development and review; environmental permitting; environmental restorations; military testing and training; operations and maintenance; excavation and demolition permitting; work order review; and, all other installation project and activity review processes. Advise on strategies to avoid/minimize impact, and on regulatory compliance requirements, as appropriate.
Identify possible projects/actions to conserve/enhance fish and wildlife resources	Identify opportunities for improving fish and wildlife habitat (e.g., replanting disturbed areas in FWC, selective clear cutting or mowing semi-improved grounds to manipulate habitats, etc.). Incorporate conservation strategies into installation operations and maintenance activities (e.g., reduced and seasonal restrictions on mowing, using wildlife seed mixes in replanting disturbed areas, eliminating excess impervious area, etc.).
Identify and conserve habitat for fish and wildlife of high conservation priority	Continue to consider ecologically significant fish and wildlife resources as resources warranting special conservation efforts and designation as “Special Natural Areas” under DoDI 4715.03. Maintain existing Special Natural Area boundaries. Designate new Special Natural Areas where there is a legal requirement to do so.

<b>Table c: Fish &amp; Wildlife Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Identify and conserve habitat for bald eagles	Include bald eagle nesting, roosting, and foraging habitat in the designated “shoreline buffer” and “nest buffer” management areas on post. Manage these areas to avoid impacting habitat, or eagles.
Identify and correct hazards to wildlife	Identify situations that pose potential hazard to wildlife (e.g., electrocution hazards, fences, windows, lighting, etc.) and advise on actions to eliminate/reduce the hazard. Address existing as well as proposed facilities.
Identify and correct impediments to fish passage	Identify fish passage blockages (e.g., excessive sedimentation at culverts) and advise on actions to eliminate/reduce the impediment.
Identify and manage regulatory compliance	Maintain VDGIF permits (Scientific Collector, Salvage, Display). Inform and enforce hunting and fishing regulations. Advise on actions for compliance with Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, etc.
Coordinate with regulatory and stewardship agencies and entities	Maintain regular professional coordination with regulatory agencies (e.g., USFWS, VDGIF) and stewardship agencies (e.g., (DCR-NHP). Include discussion of partnerships and cooperation on regional stewardship initiatives, as appropriate.
Prepare and maintain policy and guidance documents	Review and revise existing written policy and guidance documents (e.g., <i>Watercraft Recreation, Hunting and Fishing Policy; Conservation of Migratory Birds Policy</i> , etc.). Evaluate the need for additional Fort Belvoir-specific policies on fish and wildlife.
Evaluate fish and wildlife resources in support of mission	Perform localized/activity-specific evaluations in support of ongoing or proposed mission activities. Identify and provide advice regarding regulatory compliance requirements, as well as for resource conservation.
Support emergency situations	Provide technical assistance to emergency situations, such as injured wildlife.
Support bird/wildlife hazard	Maintain the DAAF WHMP. Perform assigned functions as a member of Wildlife Working Group.

<b>Table c: Fish &amp; Wildlife Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
management at DAAF	
Support the integrated pest management program	Support the integrated pest management program, particularly the components pertaining to problematic wildlife and feral pets.
Evaluate/advice on situations of wildlife conflict with mission/installation operations	Survey, evaluate and advise on situations where wildlife pose a risk to mission/facilities (e.g., beaver blockages of culverts).
Support regulatory enforcement	Perform compliance inspections to address federal and state fish and wildlife laws applicable to Fort Belvoir, and DoD, DA and Fort Belvoir policies on fish and wildlife. Support enforcement of federal and state fish and wildlife laws and regulations applicable to Fort Belvoir, as well as DoD, DA and Fort Belvoir policies.
Evaluate fish and wildlife resources	Perform an annual survey of a representative sample of habitat areas to evaluate the effectiveness/success of management and mitigation and corrective actions.
Provide education and training on fish and wildlife	Identify and provide opportunities for specialized training for garrison, partner, tenant, and contractor staff, as appropriate.
Publish educational information on fish and wildlife	Prepare and publish articles on the Fort Belvoir website, newspaper (Belvoir Eagle), DoD natural resources management program publications, as appropriate.
Provide technical information on fish and wildlife	Respond to requests from on-post and off-post entities, as appropriate. Manage fish and wildlife information to be accessible to installation natural resource managers, and other personnel, as applicable.
Provide for public access to fish and wildlife resources	Identify and support opportunities for public access, consistent with military mission (e.g., hunting, fishing, viewing wildlife, etc.). Evaluate and advise on requests from the public for access.

<b>Table c: Fish &amp; Wildlife Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Participate in DoD and DA regional conservation programs	Participate in DoD and DA regional programs (e.g., PIF, PARC, Chesapeake Bay Program, etc.), as applicable to Fort Belvoir
Maintain wildlife crossing structures	Monitor condition and wildlife use of wildlife crossing structures. Perform annual maintenance. Identify any needed repairs/modifications. Identify locations where new wildlife crossing structures may benefit wildlife conservation and installation operations.
Perform bird surveys	Perform annual surveys for land and shorebirds.
Perform deer surveys	Perform annual deer spotlight survey (late summer – early fall). Identify and perform other deer surveys (e.g., browse, herd health, etc.), as needed.
Perform bald eagle surveys	Perform annual bald eagle nest survey, as well as year-round surveillance of nest site conditions. Monitor eagle activity, year-round, addressing foraging, loafing and roosting activity, in addition to nesting.
Maintain nest structure program	Assess, and maintain as appropriate, the blue bird and wood duck nest box program, and the osprey nest platform program. Assess opportunities for additional nest structure programs.
Provide hunting programs	Provide a hunting program. Manage the deer component of the hunting program to reduce and stabilize the deer population.
Provide access to fishing	Provide access to installation shoreline and ponds for fishing, as appropriate. Maintain fishing piers. Maintain Mulligan Pond as fish habitat.
Participate in DMAP	Participate in VDGIF DMAP. Submit required information to VDGIF.
Maintain iSportsman	Maintain the iSportsman system annually, and update software as new technology becomes available.

*Endangered Threatened and Rare Species Annual Projects and Actions*



<b>Table d: Endangered Threatened and Rare Species Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Maintain endangered, threatened, rare species and rare ecological communities information in installation documents and databases	Maintain and update baseline information in installation documents and databases, as appropriate (recognizing the need for protecting the locations of endangered, threatened and rare species). Review, verify, and update information in the GIS. Field verify, as needed.
Perform year-round surveillance of endangered, threatened species, and their habitats	Monitor known listed threatened and endangered species in the field..
Perform year-round surveillance of rare ecological communities	Review existing conditions in the field. Evaluate presence and effect of stressors (e.g., invasive plants, stormwater flows, sedimentation, etc.) and propose action, action as appropriate. Select representative sample to survey each year.
Review ongoing and proposed installation actions for potential to impact threatened, endangered, or rare species, or rare ecological communities	Assess threatened, endangered and rare species, and rare ecological communities in planning actions (e.g., real property master planning, small area planning, stationing, real estate actions, privatization, siting, etc.); NEPA evaluations and mitigations; engineering planset development and review; environmental permitting; environmental restorations; military testing and training; operations and maintenance; excavation and demolition permitting; work order review; and, all other installation project and activity review processes. Advise on strategies to avoid impact, and on regulatory compliance requirements where there is a potential for impact.
Incorporate endangered/threatened species protection requirements into operations	Incorporate endangered/threatened species protection requirements (e.g., those pertaining to Northern Long-eared Bat) into installation practices.

<b>Table d: Endangered Threatened and Rare Species Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Conserve endangered, threatened and rare species habitats, and rare ecological communities	Continue to consider threatened and endangered species and their habitat as resources warranting special conservation efforts and designation as “Special Natural Areas” under DoDI 4715.03. Maintain existing Special Natural Area boundaries. Designate new Special Natural Areas where there is a legal requirement to do so.
Identify and manage regulatory compliance	Utilize the NEPA process to insure compliance with federal and state law
Coordinate with regulatory and stewardship agencies	Maintain regular professional coordination with regulatory agencies (e.g., USFWS, VDGIF) and with stewardship agencies (e.g., DCR-NHP), as appropriate.
Prepare and maintain policies and guidance documents	Review and revise existing written policy and guidance (i.e., <i>Memorandum of Instruction - Northern Long-eared Bat Protection on Fort Belvoir</i> ). Evaluate the need for any additional Fort Belvoir-specific policy or guidance documents.
Support emergency situations	Provide technical assistance to emergency situations (e.g., trapped bat), under the direct supervision of an installation Special Agent with conservation law enforcement authority under a Memorandum of Agreement between U.S. Department of the Interior and Fort Belvoir.
Support regulatory enforcement	Enforce federal and state laws and regulations as applicable to Fort Belvoir, as well as DoD, DA and Fort Belvoir policies. (Enforcement is done by an installation Special Agent with conservation law enforcement authority under a Memorandum of Agreement between U.S. Department of the Interior and Fort Belvoir.)
Perform Invasive Species Removal	Identify locations where invasive species could impact rare, threatened and endangered species, or rare plant communities, and advise on actions to remove the invasive vegetation.
Provide endangered species awareness training	Provide training to garrison, partner, tenant, and contractor staff, as appropriate. Write and publish articles.
Perform installation-wide acoustic	Monitor installation bat population and their use of landscape.



<b>Table d: Endangered Threatened and Rare Species Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
monitoring and mist netting of bats	
Perform winter/spring aquatic wood turtle surveys	Perform visual encounter surveys in aquatic habitat.
Perform summer terrestrial wood turtle surveys	Perform visual encounter surveys in terrestrial habitat.
Perform spotted turtle surveys	Perform population surveys and habitat usage surveys to identify significant resources.
Perform amphipod ( <i>Stygobromus</i> spp.) surveys	Monitor current populations and seep conditions. Survey additional areas to identify additional species and populations.
Perform acoustic and mist netting surveys of bat migratory patterns	Survey bat populations during important migratory periods - spring, winter and fall
Perform small whorled pogonia survey	Perform annual monitoring of known occurrence of small whorled pogonia.
Perform installation-wide rare species surveys	Survey to locate new (i.e., not previously documented on-site, or newly listed) rare species, and to monitor populations of species known on site.
Perform installation-wide endangered and threatened species surveys	Survey to locate potential presence of new (i.e., not previously documented on-site, or newly listed) endangered and threatened species, and to monitor populations of species known on site.
Perform installation-wide surveys for	Survey to identify new (i.e., not previously documented on-site, or newly listed) National Listing Workplan species, and to monitor current populations and habitat conditions

<b>Table d: Endangered Threatened and Rare Species Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
National Listing Workplan species	
Perform freshwater mussel surveys	Monitor known mussel beds and survey aquatic areas to identify new beds and species.
Perform pollinator surveys	Develop and implement installation-wide survey to identify rare, threatened, and endangered pollinators.

*Special Natural Areas Annual Projects and Actions*

<b>Table e: Special Natural Areas Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Identify and conserve areas of significant natural resources, in accordance with DoDI 4715.03	Continue to consider ecologically significant natural resources as resources warranting special conservation efforts and designation as “Special Natural Areas” under DoDI 4715.03. Maintain existing Special Natural Area boundaries. Designate new Special Natural Areas where there is a legal requirement to do so.
Maintain Special Natural Area (SNA) boundaries in installation documents and databases	Review, verify, publish existing SNA boundaries in RPMP, Small Area Plans, real property records, etc. Review, verify depict SNA boundaries in GIS.
Maintain signage and markers for SNA boundaries in the field	Review, install, and maintain SNA signage and markers, including boundary markers.

<b>Table e: Special Natural Areas Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Monitor conditions in SNAs	Review existing SNA boundaries, overall natural resource conditions, and ongoing management actions, for effectiveness at conserving natural resources, without net loss of military training. Evaluate presence and effect of stressors, and propose action as appropriate. This includes fish and wildlife surveys done in conjunction with the Fish and Wildlife program. Such surveys include wildlife movement and effectiveness of existing wildlife crossing structures.
Review ongoing and proposed installation actions for potential impact to SNAs	Assess SNAs in planning actions (e.g., real property master planning, small area planning, stationing, real estate actions, privatization, siting, etc.); NEPA evaluations and mitigations; engineering planset development and review; environmental permitting; environmental restorations; military testing and training; operations and maintenance; excavation and demolition permitting; work order review; and, all other installation project and activity review processes. Advise on strategies to avoid/minimize impact, and on regulatory compliance requirements, as appropriate.
Identify possible projects/actions to preserve/enhance natural resources within SNAs	Cross-walk with the water resources, vegetation, fish and wildlife, and endangered/threatened/rare species programs to address needs, and potential projects and actions within the SNAs. Incorporate results into annual funding requests, annual work plans, mitigation planning, etc.
Monitor use of SNAs	Obtain information on access and use of SNAs through such means as trail cameras, user surveys, use/access permits, etc. to evaluate type, magnitude, and effect of access and use
Maintain policies for access and use of SNAs	Review and revise existing policies regarding access to and use of SNAs. Include policies in such installation documents as Trail Pamphlets and Installation Policy Memos. Evaluate need for additional Fort Belvoir-specific policies, and prepare as necessary.
Review requests for non-routine access and use of SNAs	Review and respond to access and use requests. Balance public access with mission and resource conservation. Monitor for effect of such use on resource, and modify use policy as necessary.

<b>Table e: Special Natural Areas Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Maintain existing hiking trail systems	Develop and execute annual maintenance plan for existing trails, access points and signage, including directional and interpretive signs.
Maintain existing fishing structures and wildlife viewing structures	Develop and execute annual maintenance plan for existing fishing structures and wildlife viewing structures
Maintain existing outdoor conservation education displays	Develop and execute annual maintenance plan for existing conservation education displays
Maintain ABWR Environmental Education Center	Develop and execute annual maintenance plan for the ABWR Environmental Education Center building, and the conservation education displays and materials interior to the building
Operate ABWR Environmental Education Center	Hold natural resources conservation education programs and events
Host natural resources conservation and service events	Design and host such events as nature hikes, outdoor classrooms, celebrations/commemorations (e.g., Earth Day), volunteer service (e.g., shoreline clean ups, National Public Lads Day), as appropriate. Make available to the public, consistent with operations and security conditions
Support volunteer projects	Provide technical guidance (regarding natural resources conservation) and support such volunteer projects as Boy Scouts service and medal projects, Virginia Bluebird Society bluebird nest box program, etc., as appropriate. Investigate having a Qualified Volunteer Program to support natural resources stewardship. Investigate partnerships with outside organizations, such as universities.
Publish educational	Write and publish articles for Fort Belvoir website, newspaper (Belvoir Eagle), DoD Chesapeake Bay program publications, etc., as appropriate.

<b>Table e: Special Natural Areas Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
information on natural resources and natural resources conservation	
Provide technical information on Fort Belvoir's designated Special Natural Areas	Respond to requests from on-post and off-post entities, as appropriate. Maintain/manage installation Special Natural Areas information to be accessible to installation natural resource managers, and other personnel, as appropriate.
Provide technical information on natural resources and natural resources conservation	Respond to requests for technical information and presentations (e.g., Environmental Career Day at local school) from on-post and off-post entities, as appropriate.
Maintain Natural Resources Management coordination on a regional level	Coordinate with managers of off-post natural areas within the region. Include discussion of partnerships/cooperation on regional stewardship initiatives, as appropriate.

## 1.2. Planned Projects

Tables f through j refer to future projects that are scheduled or in planning phases to be implemented in corresponding fiscal years. These projects are personnel, resource, and funding dependent and may vary or be implemented in earlier or later fiscal years as resources are available or become available.

*Water Resources Planned Projects*

<b>Table f: Water Resource Management Projects Planned</b>		
<b>Implementation Years</b>	<b>Task</b>	<b>Projected Work</b>
FY20, FY25, FY30	Update watershed PLS	Survey and revise watershed and subwatershed data, including – boundaries, land use and cover (e.g., % impervious, % forested, etc.), stream channel conditions. Update GIS.
FY20, FY25, FY30	Update wetland PLS	Update wetland data, including planning level wetland boundaries, wetland type, locations of permitted work, and locations of mitigation sites. Update GIS.
FY20, FY25, FY30	Update RPA PLS	Perform installation-wide stream perennially determinations to identify RPAs. Complete approximately 1/3 of installation streams on 2-year cycle. Include locations of shoreline stabilization projects, riparian reforestation/replanting projects, and any other mitigation projects in the RPA. Update GIS.
FY20, FY30	Inventory marine systems	Perform baseline inventory of marine systems along the installation's shoreline. Address SAV, mollusks, anadromous fish, benthics, water quality, etc.
FY21, FY31	Forecast future changes to wetlands and near-shore conditions	Develop forecast trends and models utilizing baseline data. Include a threat assessment to ecologically valuable ecosystems from potential sea level and climate changes.
FY19, annual updates thereafter	Bring the wetland permit database on-line	Bring the wetland permit database on-line, integrating it with the GIS. Database includes wetland permit records in a searchable electronic format.
FY19, annual updates thereafter	Develop and implement a water resources database	Create a database that stores and organizes water resources information, including wetland, stream shoreline, macroinvertebrate, shellfish, mitigation sites, etc. Database should enable year-to-year



<b>Table f: Water Resource Management Projects Planned</b>		
<b>Implementation Years</b>	<b>Task</b>	<b>Projected Work</b>
		comparisons of data, easy retrieval of information. Include mitigation sites.
FY19	Protect riparian buffers	Create a comprehensive Fort Belvoir riparian buffer policy. Include both regulatory driven RPAs, as well as buffers along waterways that are outside the RPA.
FY20, annual monitoring thereafter	Monitor high-rarity ranked wetland communities	Develop and implement a program to monitor conditions within the high-rarity ranked wetland communities.
FY18, FY19, FY20, FY21, FY22, FY23	Restore streams	Plan, design, construct and monitor stream restoration projects, in accordance with the RPMP.
FY21, FY23	Restore shoreline areas	Plan, design, construct and monitor shoreline restoration projects.

*Vegetation Planned Projects*

<b>Table g: Vegetation Management Projects Planned</b>		
<b>Implementation years</b>	<b>Task</b>	<b>Projected Work</b>
FY20, FY30	Update plant communities PLS	Survey and revise the plant communities data. Update GIS.
FY20, FY30	Update ecological communities PLS	Survey and revise ecological communities data. Update GIS.
FY20, FY25	Update Natural Heritage inventory	Survey and revise natural heritage inventory, with emphasis on Accotink Creek Conservation Corridor in FBNA. Update GIS datalayer.



<b>Table g: Vegetation Management Projects Planned</b>		
<b>Implementation years</b>	<b>Task</b>	<b>Projected Work</b>
FY20, FY30	Update floristic inventory	Survey and revise floristic inventory.
FY20, annual updates thereafter	Prepare comprehensive invasive vegetation control plan	Survey and map existing areas of invasive vegetation. Prepare a comprehensive management plan to control existing invasive vegetation and to reduce risk of new introductions. Update GIS datalayer.
FY19, FY29	Complete forest (timber) inventory	Perform a forest (timber) inventory of the portion of the installation that was not inventoried in 2016. Follow same protocol as in 2016. Update GIS.
FY21, annual updates thereafter	Develop and implement vegetation resources database	Create a database that stores and organizes vegetation resources data (e.g., ecological communities, reforestation sites, etc.) to enable year-to-year comparative evaluation, and that supports forecasting of potential future conditions. Include mitigation project sites.
FY19, FY20, FY21	Control multi-acres areas of invasive vegetation	Treat multi-acre sites of invasive vegetation (e.g., Phragmites, kudzu, wisteria, princess tree/tree of heaven).
FY18, FY19, FY20, FY21, FY22, FY23, FY24, FY25	Perform timber stand improvements	Perform timber stand improvements at several multi-acre sites in the southwest training area and FBNA to support wildlife habitat enhancement.
FY18, FY19, FY20, FY21, FY22, FY23	Restore streams	Plan, design, construct and monitor stream restoration projects, in accordance with the RPMP.
FY21, FY23	Restore shoreline areas	Plan, design, construct and monitor shoreline restoration projects.

<b>Table g: Vegetation Management Projects Planned</b>		
<b>Implementation years</b>	<b>Task</b>	<b>Projected Work</b>
FY18, annual thereafter	Maintain and enhance forest cover in FWC	Replant, or allow regeneration to occur in, previously disturbed locations within FWC.

*Fish and Wildlife Planned Projects*

<b>Table h: Fish and Wildlife Management Projects Planned</b>		
<b>Implementation Years</b>	<b>Task</b>	<b>Projected Work</b>
FY18, FY23, FY28	Update herpetofauna PLS	Survey and revise reptile and amphibian PLS. Update GIS.
FY18	Perform habitat improvement in W-5	Perform timber stand improvement.
FY18, FY20, FY22, FY24, FY26, FY28, FY30, FY32	Perform habitat improvement at multiple locations in southwest training area	Perform pine thinning to enhance habitats and evaluate past pine thinning projects for selective thinning.
FY19, FY24	Update fish PLS	Survey fish populations in installation waterways and ponds, and assess habitat conditions.
FY19, FY29	Update small mammal inventory (part of wildlife PLS)	Survey and revise the small mammal inventory. Update GIS datalayer.
FY18	Modify chimneys to enhance chimney swift habitat	Remove unapproved chimney caps, and repoint chimneys as needed, to improve access and conditions for chimney swifts.

<b>Table h: Fish and Wildlife Management Projects Planned</b>		
<b>Implementation Years</b>	<b>Task</b>	<b>Projected Work</b>
FY19, FY29	Perform aquatic survey of Mulligan Pond	Field survey for fish, benthics, reptiles and amphibians, etc. Prepare management recommendations to conserve/enhance resource conditions, and improve recreation value. Update GIS.
FY19, FY24	Perform insect and pollinator inventory and abundance survey	Survey for pollinators. Enter into GIS database.
FY19	Update bird checklist	Update the bird checklist to reflect the most-recent bird survey data.
FY20, FY25, FY30	Perform habitat enhancement in T-9	Thin and cut trees to maintain T-9 early successional habitat (an existing habitat project).
FY20, FY25, FY30	Perform fish and aquatic insect inventory and abundance surveys	Perform stream health surveys in multiple small streams throughout the installation.
FY22, FY27, FY32	Perform habitat enhancement at FBNA	Thin and cut trees to maintain early successional habitat at an existing habitat project.
FY22, FY27, FY32	Update wildlife crossing condition and use assessment	Survey and monitor existing wildlife crossings following the protocol used in the 2016 monitoring project. Include crossing structures that are constructed after the 2016 project.
FY20, FY30	Perform habitat enhancement of Mulligan Pond	Develop and execute projects to enhance fish and their habitat at Mulligan Pond.
FY19, annual updates thereafter	Develop and implement a fish and wildlife database	Create a database to store fish and wildlife data, and that enables year-to-year comparative evaluations. Include habitat enhancement and mitigation project sites.

*Endangered, Threatened, and Rare Species Planned Projects*

<b>Table i: Endangered, Threatened, and Rare Species Planned Projects</b>		
<b>Implementation Years</b>	<b>Task</b>	<b>Projected Work</b>
FY19	Update rare species PLS	Survey and revise the rare species PLS. Update GIS datalayer.
FY19	Update endangered and threatened species PLS	Survey and revise the endangered and threatened species PLS. Update GIS datalayer.
FY19, annual updates thereafter	Develop and implement an endangered, threatened, and rare species database	Create a database to store endangered, threatened and rare species data that enables year-to-year comparative evaluations. Include data associated with Endangered Species Act Section 7 consultations and data required to be reported to the regulatory agencies (e.g., USFWS, VDGIF).

*Special Natural Areas Planned Projects*

<b>Table j: Special Natural Areas Management Projects Planned</b>		
<b>Implementation Years</b>	<b>Task</b>	<b>Projected Work</b>
FY18, FY20, FY22, FY24, FY26, FY28, FY30, FY32	Issue Trail Pamphlets	Revise ABWR Trail Pamphlet. Develop trail pamphlets for JMAWR and T-17 Refuge.
FY19, FY24, FY29	Issue Species Checklists	Revise Fort Belvoir Bird Checklist. Develop and publish species checklists for plants, wildlife.
FY19, FY27	Provide Outdoor Education Displays	Design replacement outdoor education displays for ABWR, JMAWR and T-17 Refuge.
FY20, FY28	Provide Outdoor Education Displays	Purchase and install replacement outdoor displays for ABWR, JMAWR and T-17 Refuge.
FY 20	Provide Outdoor Education Displays	Investigate development and use of educational applications for cell phones and other mobile devices.
FY20	Provide Indoor Education Displays and Materials	Design indoor education displays for ABWR Environmental Education Center.
FY21	Provide Indoor Education Displays and Materials	Purchase and install indoor education displays for ABWR Environmental Education Center facility.
FY18, FY28	Maintain ABWR Environmental Education Center	Execute repairs and improvements to ABWR Environmental Education Center.
FY20, FY25	Provide Nature Trails in Refuges	Execute major trail and associated facilities renovation in ABWR, JMAWR and T-17 Refuge.
TBD	Provide Fishing Piers and Wildlife Viewing Structures	Execute major renovations to existing fishing piers and wildlife viewing structures at JMAWR and along Gunston Cove.

<b>Table j: Special Natural Areas Management Projects Planned</b>		
<b>Implementation Years</b>	<b>Task</b>	<b>Projected Work</b>
FY19, FY29	Maintain SNA Designations	Incorporate SNA area designations in next update to Fort Belvoir RPMP.
FY19	Assess Conservation Needs and Prepare Management Plan	Assess the conservation needs of the newest Special Natural Areas (i.e., T-17 Refuge and Accotink Creek Conservation Area), and prepare area-specific conservation strategies.
FY19	Develop and Maintain Database	Develop and maintain a database for the Special Natural Areas
FY19, and annual thereafter	Identify and Perform Resource Protection/Enhancement Projects	Identify and perform projects to protect/enhance resources of conservation emphasis within the Special Natural Areas. (These projects may be addressed Water Resources, Vegetation, Fish and Wildlife, and Threatened/Endangered Species.)
FY20, FY25, FY30	Survey Migratory Fish	Survey for presence, passage of migratory fish within/through ABWR, JMAWR and Accotink Creek Conservation Corridor
FY20, FY23, FY26, FY29	Monitor Ecological Condition of Special Natural Areas	Perform wildlife movement surveys within FWC, including surveys of use of wildlife crossing structures.



## **E. Fort Belvoir Integrated Natural Resources Management Plan**



INRMP

# **FORT BELVOIR INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**

U.S. Army Garrison Fort  
Belvoir, Virginia

Directorate of Public Works—  
Environmental Division

August 2018

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***Fort Belvoir  
Integrated Natural Resources  
Management Plan***

U.S. Army Garrison Fort Belvoir, Virginia

Directorate of Public Works—Environmental Division

August 2018

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***Integrated Natural Resources  
Management Plan  
U.S. Army Garrison Fort Belvoir  
Fort Belvoir, Virginia***

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**Approval**

This Integrated Natural Resource Management Plan meets the requirements of the Sikes Act (16 USC 670a et seq.), as amended in the Sikes Act Improvement Act of 1997 and the Department of Defense Instruction (DoDI) 4715.03 Natural Resources Conservation Program. This document was prepared and reviewed in coordination with the Department of Interior, acting through the U.S. Fish and Wildlife Service, and the Virginia Department of Game and Inland Fisheries.

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Field Supervisor

Virginia Ecological Services U.S. Fish & Wildlife Service

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***Integrated Natural Resources  
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U.S. Army Garrison Fort Belvoir  
Fort Belvoir, Virginia***

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U.S. Army Garrison Fort Belvoir  
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**Integrated Natural Resources Management Plan**  
**U.S. Army Garrison Fort Belvoir**  
**Fort Belvoir, Virginia**

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## **1.0 FORT BELVOIR INRMP EXECUTIVE SUMMARY**

This Integrated Natural Resources Management Plan (INRMP) will serve as a tool for current and future Fort Belvoir staff to successfully manage natural resources, in conjunction with military training and other diverse activities on the installation. This INRMP contains a list of recommended projects that if funded and implemented, will minimize mission workarounds, help meet military objectives, and support the goals of the Fort Belvoir Natural Resources Program.

The mission of Fort Belvoir's Natural Resources Management Program is to manage natural resources as an integral part of the military mission, using sound ecological principles to ensure biodiversity conservation is achieved while sustaining the economic and aesthetic value of the land, and to guarantee continued access to installation land, air and water resources realistic military training and testing. This INRMP will help provide the guidance necessary to ensure installation compliance with natural resources laws and regulations, as well as public access and customer service support to base operations, tenants, military personnel and their families; the research and education community; and the general public.

Within the metropolitan Washington D.C. area, Fort Belvoir represents a significant tract of native vegetation in terms of size, diversity, and position relative to the location of off-post tracts of native vegetation. Fort Belvoir has therefore recognized the ecological importance of on-post natural habitats by designating the three installation refuges, the two installation conservation corridors, and wetlands and steep-sloped areas as environmentally constrained areas. These large areas of native vegetation provide a contiguous band of wildlife habitat through the installation, and connect with wildlife habitat areas outside the installation.

Given the size of Fort Belvoir, its diverse set of mission requirements and unique abundance of natural resources, successfully implementing this INRMP requires a combination of government staff persons, contract labor, and partners (including volunteers). The Fort Belvoir Environmental Division Chief is responsible for enforcing compliance with the INRMP. All requirements and subsequent recommended projects set forth in this INRMP are subject to the availability of appropriations and the requirements of the Anti-Deficiency Act (31 USC Section 1341). No obligation undertaken by Fort Belvoir under the terms of this INRMP will require or be interpreted to require a commitment to expend funds not obligated for a particular purpose. This INRMP maintains the management philosophy, as well as the program management goals, objectives and strategies from the previous INRMP (U.S. Army, 2001), because there have not been major changes to the installation's natural resources management program from 2001 to 2018.

Fort Belvoir's natural resources management program is fully integrated among all natural resources disciplines. Consequently, implementation of management actions is not necessarily discipline-specific. However, to facilitate the presentation of the natural resources management program in this INRMP, the program is defined and described in terms of five major disciplines: Water Resources; Vegetation; Fish and Wildlife; Threatened and Endangered Species; and Special Natural Areas. For each discipline, the INRMP describes baseline conditions and presents related management policies, objectives, management actions to date, and recommended future management activities. The INRMP further outlines strategies and the need for funding to implement recommended projects in support of the Fort Belvoir mission and long term management of installation natural resources.

There are several legal authorities that require military installations to have an INRMP. Specifically, under the Sikes Act (16 USC 670a et seq., as amended), the U.S. Department of Defense (DoD), with the assistance of the United States Fish and Wildlife Service (USFWS) and the respective state fish and wildlife agency, is responsible for carrying out programs and implementing management strategies to conserve and protect biological resources on its lands. Because military lands and waters are often protected from human access and impact, they contain some of our nation's most significant remaining large tracts of land with valuable natural resources.

This INRMP describes how Fort Belvoir will implement provisions of the Sikes Act, as well as other DoD, Army, federal and applicable state regulations. The Sikes Act also requires coordination with the USFWS and the Virginia Department of Game and Inland Fisheries (VDGIF) to obtain their signatory approval of this plan. Army Regulation 200-1 and Department of Defense Instruction (DODI) 4715.03 require installations to review their INRMPs annually and revise them as necessary. Reviews of the INRMP for operation and effect are to be undertaken no less often than every 5 years. Fort Belvoir will invite USFWS and VDGIF to participate in the annual reviews, and to review and re-sign the INRMP every 5 years. The results of the annual reviews will be incorporated into the INRMP as updates. This INRMP will take effect upon signature of the Fort Belvoir Garrison Commander.

This INRMP presents a package that will (1) comply with all applicable natural resources statutes, regulations, policies, and directives; (2) conserve and enhance Fort Belvoir's natural resources; (3) support the military mission; (4) provide for balanced public access to and use of installation natural resources, consistent with conservation objectives; and (5) promote and enhance the installation's relationship with the public. This plan will not resolve all existing and/or future environmental issues or conflicts. It does, however, attempt to minimize these issues and conflicts by providing a basis for natural resources-related decision-making.

## **2.0 INRMP OVERVIEW**

The preparation of this Integrated Natural Resources Management Plan (INRMP) involved the review and analysis of natural resource management practices in place since the 2001 INRMP, current and anticipated natural resources regulatory requirements and policies, ongoing programs, and the current conditions of the existing resources. The review process included coordinating with key personnel from Fort Belvoir and other Army entities, as well as from federal and state agencies such as the US Fish and Wildlife Service (USFWS) and the Virginia Department of Game and Inland Fisheries (VDGIF); collecting existing environmental documentation; and conducting field reconnaissance of the installation.

### **2.1 PURPOSE, SCOPE AND AUTHORITY OF THE INRMP**

The U.S. Department of Defense (DoD), with the assistance of the USFWS, is responsible under the Sikes Act (16 USC 670a et seq., as amended) for carrying out programs and implementing management strategies to conserve and protect biological resources on its lands. Because military lands and waters often are protected from human access and impact, they contain some of our nation's most significant remaining large tracts of land with valuable natural resources. Congress established the Sikes Act in 1960 to manage these lands for wildlife conservation and human access. The Sikes Act amendment of 1997 broadened the scope of installation natural resources management programs to include the requirement to develop and implement mutually agreed upon INRMPs through voluntary cooperative agreements among the DoD installation, USFWS, and the respective state fish and wildlife agencies.

Department of Defense Instruction (DoDI) 4715.03, Natural Resources Conservation Program, dated 18 March 2011, identifies the DoD policies and procedures concerning natural resources management and INRMP reviews, public comment, and endangered species consultation. Key requirements are as follows:

- INRMPs are required to be jointly reviewed by the USFWS, state wildlife agency, and military proponent as to operation and effect on a regular basis.
- Minor updates and continued implementation of an existing INRMP do not require an opportunity for public comment. Major revisions to an INRMP do require an opportunity for public review.

Department of Defense Manual (DODM) 4515.03, Integrated Natural Resources Management Plan (INRMP) Implementation Manual, dated 25 November 2013, provides the procedures to prepare, review, update, and implement INRMPs in compliance with the Sikes Act.

The Army's commitment to natural resources management is emphasized in Army Regulation (AR) 200-1 (Environmental Protection and Enhancement), which requires that INRMPs be developed and maintained for all Army installations with significant natural resources.

INRMPs are planning documents that outline how each military installation with significant natural resources will manage these resources. They integrate military mission requirements, environmental and master planning activities, cultural resources protection requirements, and outdoor recreation to ensure both military operations and natural resources conservation are included and consistent with stewardship and legal requirements. Two of the major program goals of AR 200-1 are to “integrate environmental stewardship and compliance responsibilities with operational requirements to help achieve sustainable ranges and training areas” and to “develop, initiate, and maintain forward-looking programs for the conservation, utilization, and rehabilitation of natural resources on Army lands” (HQDA, 2007).

Title 32 of the Code of Federal Regulations (CFR) Part 651, Environmental Analysis of Army Actions, “sets forth policy, responsibilities, and procedures for integrating environmental considerations into Army planning and decision making” (67 Federal Register [FR] 15290, March 29, 2002). In particular, 32 CFR 651.12, *Integration with Army Planning*, states that “The Army goal to integrate environmental reviews concurrently with other Army planning and decision making actions avoids delays in mission accomplishments. To achieve this goal, proponents should provide complete environmental documents for early inclusion with any recommendation or report to decision makers (Master Plan, Natural Resources Management Plan, Remedial Investigation, FS [Feasibility Study], etc.). The same documents will be forwarded to planners, designers, and/or implementers so that recommendations and mitigations on which the decision was based may be carried out.”

The National Environmental Policy Act (NEPA) was created to ensure federal agencies consider the environmental impacts of their actions and decisions using a systematic interdisciplinary approach to environmental planning and evaluation of projects. Although NEPA is not an authority in the requirement for and development of this INRMP, the NEPA process for environmental review and documentation is followed in implementation of the INRMP.

This INRMP reflects Fort Belvoir’s commitment to conserve, protect, and enhance the natural resources necessary to provide sustainable military training for soldiers.

In accordance with DoDI 4715.03 and AR 200-1, this INRMP is based on the principles of ecosystem management. It addresses how natural resources on Fort Belvoir will be managed to allow for multipurpose uses of, and public access to, those resources, and for conservation of those resources, while ensuring no net loss in the capability of an installation to support its military mission.

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

## **2.2 FORT BELVOIR'S NATURAL RESOURCES MANAGEMENT PROGRAM PHILOSOPHY**

Fort Belvoir has developed and implemented an ecosystem-based natural resources management program that emphasizes biodiversity conservation. Fort Belvoir's vision for the natural resources management program is to manage natural resources using sound ecological principles in an appropriate landscape context (e.g., local, regional, and national), to support the military mission, and to continue to provide opportunities for future generations to access and use the installation's natural resources, consistent with resource conservation, and with mission and operational security requirements. Natural resources management emphasis is on maintaining the existing level of biodiversity.

It is the mission of Fort Belvoir's natural resources management program to manage natural resources as an integral part of Fort Belvoir's military mission. As such, this INRMP addresses compliance with natural resources laws and regulations; providing customer service support to base operations, tenants, military personnel and their families; and providing for public access and opportunities for the research and education community.

The goals, objectives and strategies contained in this INRMP were developed in accordance with Fort Belvoir's natural resources management philosophy and mission. Most of the management actions are continuations of existing actions established under the 2001 INRMP. Management will continue to prioritize conserving and enhancing natural resources, while providing balance among the multiple legitimate uses and users of these resources. Continued support of military training and testing will take primacy.

Conservation emphasis will be on those resources with recognized conservation priority, such as federal endangered or threatened species, and will be in accordance with established DoD and Department of Army (DA) natural



resources management policies, and DoD and DA commitments to natural resource stewardship programs, such as the Chesapeake Bay Program (CBP) and the Partners in Flight (PIF) Program. All of the installation's natural resources management actions will be in accordance with applicable federal, state, local, DoD, DA, and Fort Belvoir regulatory requirements and policy. The installation's natural resource management strategies also take into account (as stewardship considerations and not regulatory requirements) natural heritage data and resource management recommendations from the Virginia Department of Conservation and Recreation, Division of Natural Heritage (DCR-DNH), the state agency responsible for inventory, database maintenance, and protection and management of Virginia's natural heritage resources (i.e., the habitats of rare, threatened, or endangered plant and animal species, rare or state significant communities, and other natural features).

This INRMP continues the management philosophy, as well as the program management goals, objectives and strategies from the 2001 INRMP (U.S. Army, 2001). As such, there has not been major change to the installation's natural resources management program between the 2001 INRMP and this INRMP.

## **2.3 RESPONSIBLE PARTIES**

Fort Belvoir's structure is composed of 15 garrison offices and directorates that report to the Garrison Commander (Richard, 2017). Additionally, Fort Belvoir hosts approximately 150 tenant agencies. Garrison organizations and other parties that may participate in implementing this INRMP are listed in Tables 2-1 through 2-4.

Table 2-1: Installation Organizations		
Organization Name	Description	INRMP Responsibilities
Garrison Commander	The Garrison Commander is responsible for the overall management of Fort Belvoir's lands, facilities, and operations.	<ul style="list-style-type: none"> <li>Ensures Fort Belvoir has funding, staff, and other resources necessary to manage installation's natural resources</li> <li>Establishes and enforces policies involving fish and wildlife and other natural resources management within Fort Belvoir</li> <li>Ensures the INRMP is implemented</li> <li>Ensures land utilization is planned to avoid or minimize adverse effects on environmental quality and to provide for sustained accomplishment of the mission.</li> </ul>
Directorate of Public Works (DPW)	DPW is the lead organization to implement this INRMP. The Environmental Division is the lead division for INRMP; the other divisions within the DPW have broad responsibilities for facilities siting, construction, operations and maintenance, and for overseeing private partners.	<ul style="list-style-type: none"> <li><b>Conservation Branch:</b> responsible for and manages natural and cultural resources on Fort Belvoir. Natural resources management programs include fish and wildlife; rare, threatened and endangered species; vegetation; forestry; water resources; wetlands; and integrated pest management. Also responsible for managing public access to natural resources on post.</li> <li><b>Environmental Compliance Branch:</b> responsible for and manages solid waste and recycling; hazardous waste and materials; medical waste; underground and above ground storage tanks; pollution prevention; drinking water and waste water; industrial stormwater and Municipal Separate Storm Sewer Systems (MS4) stormwater; Total Maximum Daily Load (TMDL); spill response; asbestos; mold; lead-based paint; air quality; Emergency Planning and Community Right-to-Know Act (EPCRA); and National Environmental Policy Act (NEPA).</li> <li><b>Restoration Branch:</b> responsible for and manages all processes and provisions of the Defense Environmental Restoration Program (DERP) and Defense Environmental Restoration Account (DERA). Manages historical contamination from munitions through the Military Munitions Response Program (MMRP) and historical contamination not related to munitions through the Installation Restoration Program (IRP) in accordance with the Comprehensive</li> </ul>

Table 2-1: Installation Organizations		
Organization Name	Description	INRMP Responsibilities
		<p>Environmental Response, Compensation, and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA).</p> <ul style="list-style-type: none"> <li>• <b>Facility Planning Division:</b> maintains and keeps track of all real property on the installation; updates the Real Property Master Plan (RPMP); tracks space management and utilization; and updates the Installation Status Report (ISR) for infrastructure. Provides Geographic Information System (GIS) services to the installation.</li> <li>• <b>Engineering Division:</b> provides quality control over contract work actions, and prepares independent government cost estimates for operations and maintenance-related projects; provides technical engineering and design consulting services; and manages construction.</li> <li>• <b>Housing Division:</b> responsible for managing the installation's family housing and troop billeting.</li> <li>• <b>Business Operations and Integration Division (BOID):</b> oversees the Work Management of all projects and service orders that are performed within DPW or via the Real Property Maintenance Contract. Performs Financial and Project Management within the General Financial Enterprise Business System (GFEBS) and Collaborative Projects. Builds the Annual Work Plan, Spend Plans, and Resource Plan. Pays the utility bills; reviews and updates Interagency Support Agreements (ISAs); orders supplies; tracks training requirements; is responsible for all personnel actions, security background checks and clearances, time and attendance, strategic planning, and cost analysis; certifies Government Purchase Cards; tracks all taskers; dispatches General Services Administration (GSA) vehicles; and produces reports for Higher Headquarters.</li> </ul>

Table 2-1: Installation Organizations		
Organization Name	Description	INRMP Responsibilities
		<ul style="list-style-type: none"> <li><b>Operations and Maintenance Division (O&amp;M):</b> operates and maintains Fort Belvoir's real property, utilities infrastructure, and grounds; administers the Real Property Maintenance Contract; performs quality control over contract work actions; and, prepares independent government cost estimates for operations and maintenance-related projects.</li> </ul>
Directorate of Emergency Services (DES)	DES provides continuous and professional law enforcement, access control, and fire and emergency services to Fort Belvoir and other designated areas of responsibility, in order to maintain the safety and security of soldiers, family members, and civilians who live and work on Fort Belvoir.	<ul style="list-style-type: none"> <li>Law Enforcement Division: enforces all hunting and fishing laws, as well as other natural and cultural resources laws.</li> <li>Fire Protection and Prevention Division: responsible for preventing and suppressing fires on the installation</li> </ul>
Directorate of Family, Morale, Welfare, and Recreation (DFMWR)	DFMWR is responsible for developing and operating outdoor recreation programs.	<ul style="list-style-type: none"> <li><b>Outdoor Recreation:</b> coordinates recreational activities with DPW to ensure safety and compliance issues are addressed, and with Directorate of Plans, Training, Mobilization, and Security (DPTMS) to ensure that recreational activities do not occur in the same vicinity as training activities.</li> <li>Responsible for the administrative portion of the installation's hunting program.</li> <li>Coordinates with DES regarding regulatory issues/law enforcement and emergency response.</li> </ul>
Directorate of Plans, Training, Mobilization, and Security (DPTMS)	DPTMS has control over installation troop projects, operations, and support.	<ul style="list-style-type: none"> <li>Reviews all non-training uses of training lands (e.g., biological surveys, recreational activities, hunting, etc.).</li> <li>Implements emergency, contingency, and operational plans.</li> </ul>

Table 2-1: Installation Organizations		
Organization Name	Description	INRMP Responsibilities
Staff Judge Advocate (SJA)	SJA delivers principled, responsive counsel and mission-focused legal services to the Garrison Command and staff; to soldiers, families, civilians, and retirees; and to designated partner organizations.	<ul style="list-style-type: none"> <li>Provides advice about the statutory and policy framework in which the INRMP is implemented.</li> <li>Ensures that all violations of federal, Commonwealth of Virginia, and local fish and wildlife regulations are investigated and prosecuted as appropriate.</li> <li>Involved in enforcement actions; legal interpretation; development of cooperative agreements, Memoranda of Understanding (MOUs), and compliance agreements; compliance with applicable environmental and natural resource management laws and regulations, and review authority on actions.</li> </ul>
Other Installation Organizations	Implementation of this INRMP requires participation from other installation organizations usually in a support capacity.	<ul style="list-style-type: none"> <li>These include, but are not limited to, Mission and Installations Contracting Command (MICC), Directorate of Human Resources (DHR), Civilian Personnel Advisory Center (CPAC), and commanders of major subordinate organizations, tenant units, and activities</li> </ul>
Directorate of Resource Management (DRM)	DRM handles all financial and personnel resourcing for the installation	<ul style="list-style-type: none"> <li>Develops and executes plans, programs, and budgets to obtain the manpower and financial resources needed to accomplish Fort Belvoir's mission.</li> </ul>
Public Affairs Office (PAO)	Formulates and implements all command information to the public	<ul style="list-style-type: none"> <li>Responsible for providing timely and accurate information about the INRMP and related activities to installation personnel and to the public.</li> </ul>
Fort Belvoir Community Hospital	Within the Army's Medical Department (AMEDD), Fort Belvoir's Community Hospital is the central facility of a comprehensive health care system serving military families residing in Northern Virginia	<ul style="list-style-type: none"> <li>Health services include the hospital's Department of Public Health, which oversees issues such as environmental health and epidemiology, including monitoring tick and mosquito populations for vector-borne diseases.</li> </ul>

Table 2-1: Installation Organizations		
Organization Name	Description	INRMP Responsibilities
McNellis Veterinary Clinic	A clinic that treats animals within Fort Belvoir	<ul style="list-style-type: none"> <li>Provides drugs and reviews dosages for tranquilizing and treating problem or injured animals.</li> <li>Provides treatment for sick or injured wildlife as appropriate.</li> </ul>
Criminal Investigation Division (CID)	Investigates criminal activity throughout Fort Belvoir	<ul style="list-style-type: none"> <li>Responsible for investigating offenses and enforcing the Clean Water Act.</li> </ul>
Other Tenant Organizations	Implementation of this INRMP requires assistance from/coordination with tenant organizations	<ul style="list-style-type: none"> <li>Responsible for ensuring that their operations and activities are consistent with natural resources management policies of this INRMP.</li> <li>Coordinates with DPW-Environmental Division on natural resources issues.</li> </ul>



Table 2-2: Other Defense and Federal Organizations		
Organization Name	Description	INRMP Responsibilities
Assistant Chief of Staff for Installation Management (ACSIM)	ACSIM provides policy guidance and program management on all matters relating to overall management and resourcing of Army installations worldwide	<ul style="list-style-type: none"> <li>Assures the availability of efficient, effective base services and facilities.</li> <li>Approves installation regulations that are based on Army regulations, the installation Real Property Master Plan, biological assessments, and environmental impact statements.</li> </ul>
Installation Management Command (IMCOM)	IMCOM handles the day-to-day operations of Army installations by integrating and delivering base support to enable Army readiness.	<ul style="list-style-type: none"> <li>Manages the installation's personnel, operations, facilities, training, and logistics in support of the INRMP.</li> </ul>
Military District of Washington (MDW)	The Major Command (MACOM) for Fort Belvoir is the MDW.	<ul style="list-style-type: none"> <li>Provides priorities, guidance, command and control.</li> </ul>
Army Environmental Command (AEC)	AEC provides technical guidance and support to installations on issues pertaining to natural resource management	<ul style="list-style-type: none"> <li>Provides environmental services and solutions in support of natural resources management through expertise, contract support, and partnering.</li> </ul>
United States Army Corps of Engineers (USACE)	Fort Belvoir has the option to use the USACE's contracts as vehicles for natural resource management, and to access USACE organizations such as the Engineer Research and Development Center (ERDC) and the Construction Engineering Research Laboratory (CERL) for technical assistance	<ul style="list-style-type: none"> <li>Provides contract management, construction management, and natural resource technical assistance.</li> </ul>
Army Public Health Command (APHC)	APHC provides military preventative services and veterinary support to Fort Belvoir staff and soldiers	<ul style="list-style-type: none"> <li>Provides technical guidance and support to installations on pest management.</li> <li>Supports the installation in the revision and update of the integrated pest management plan.</li> </ul>



<b>Table 2-2: Other Defense and Federal Organizations</b>		
<b>Organization Name</b>	<b>Description</b>	<b>INRMP Responsibilities</b>
DoD Natural Resource and Conservation Programs	To include but not limited to Partners in Flight (PIF), Partners in Amphibian and Reptile Conservation (PARC)	<ul style="list-style-type: none"> <li>Sustains and enhances the military testing, training, and safety mission through proactive, habitat-based. management strategies that maintain healthy landscape and training lands.</li> <li>Effectively manages wildlife on DoD lands focusing on habitat and species management; inventory, research, and monitoring; and education, outreach, and training.</li> </ul>
U.S. Fish and Wildlife Service (USFWS)	USFWS is a signatory agency of this INRMP, as required by the Sikes Act	<ul style="list-style-type: none"> <li>Contributes in implementing the INRMP.</li> <li>Responsible for regulating and enforcing laws affecting federal threatened and endangered species, and fish and wildlife.</li> <li>Provides technical support and services to Fort Belvoir</li> <li>Manages the Potomac River National Wildlife Refuge Complex, which is located approximately 3 miles southwest of Fort Belvoir.</li> </ul>
National Park Service (NPS)	Preserves the unimpaired natural and cultural resources and values of the NPS for the enjoyment, education, and inspiration of this and future generations.	<ul style="list-style-type: none"> <li>Plans for, and maintains, a system of trails throughout the region, including the Potomac Heritage National Scenic Trail (PHNST) being planned along the perimeter of Fort Belvoir.</li> <li>Responsible for managing lands and facilities, including the National Capital Region Parks.</li> </ul>
United States Geological Survey (USGS)	Scientific agency for natural sciences, including earth science and biology	<ul style="list-style-type: none"> <li>Provides support in biological, water quality, and hydrologic surveys.</li> <li>Maintains national-level databases.</li> </ul>
National Marine Fisheries Service (NMFS)	Responsible for the stewardship and management of living marine resources and their habitat	<ul style="list-style-type: none"> <li>Provides technical assistance for anadromous fish management.</li> <li>Responsible for the stewardship of the nation's ocean resources and their habitat.</li> <li>Issues permits under the Marine Mammal Protection Act and the Endangered Species Act for activities that may result in the "take" of a protected species.</li> </ul>

Table 2-2: Other Defense and Federal Organizations		
Organization Name	Description	INRMP Responsibilities
United States Department of Agriculture (USDA)	Provides leadership on food, agriculture, natural resources, rural development, nutrition, and related issues based on public policy, the best available science, and effective management.	<ul style="list-style-type: none"> <li>Provides technical assistance to pest management, wildlife, animal quarantine; enacts and enforces quarantine actions.</li> <li><b>U.S. Forest Service (USFS):</b> In 1990 the USFS and Fort Belvoir signed an interagency agreement to provide cooperative support, coordination, and cost sharing for biological evaluations and specific pest control operations (Appendix A).</li> <li><b>Animal and Plant Health Inspection Service (APHIS):</b> Responsible for the investigation and enforcement of alleged violations relating to animal and plant issues under APHIS' jurisdiction. Provides technical advice and services for managing problem wildlife species and bird aircraft strike hazard planning. Maintains a national database on exotic species and their management.</li> </ul>
Chesapeake Bay Program (CBP)	CBP focuses on undertaking cooperative efforts to reduce nutrient and toxic pollution to the Chesapeake Bay, restore habitat and living resources, and coordinate research. The U.S. Environmental Protection Agency's (USEPA) Region III Office and Office of Water jointly operate the CBP.	<ul style="list-style-type: none"> <li>Coordinates projects and activities to restore and protect the Chesapeake Bay.</li> </ul>
National Capital Planning Commission (NCPC)	NCPC, as the principal planning agency for the federal government in the National Capital Region (which includes Fairfax County), produces a Comprehensive Plan that is a statement of growth and development policies.	<ul style="list-style-type: none"> <li>Reviews plans and programs proposed by various agencies, and considers them according to its goals for the National Capital Region.</li> </ul>

Table 2-3: State Agencies		
Organization Name	Description	INRMP Responsibilities
Virginia Department of Game and Inland Fisheries (VDGIF)	VDGIF has legal authority for fish and wildlife in Virginia. VDGIF is a signatory agency for this INRMP, as required by the Sikes Act	<ul style="list-style-type: none"> <li>• Contributes in implementing the INRMP.</li> <li>• Responsible for regulating and enforcing laws affecting state-listed threatened and endangered species, and fish and wildlife, including hunting and fishing laws.</li> <li>• Provides technical support and services to Fort Belvoir.</li> </ul>
Virginia Department of Environmental Quality (VDEQ)	VDEQ administers state and federal laws and regulations for water quality, water supply, air quality, and land protection	<ul style="list-style-type: none"> <li>• Has primary responsibility for regulating and enforcing air and water quality.</li> <li>• Responsible for regulating non-tidal wetlands by issuing wetland permits.</li> <li>• Regulates stormwater through industrial and municipal separate storm sewer system (MS4) permits</li> </ul>
Virginia Department of Forestry (VDOF)	VDOF helps landowners manage and monitor forest resources through a cost-share program	<ul style="list-style-type: none"> <li>• Provides technical services regarding forest management to Fort Belvoir.</li> </ul>
Virginia Marine Resources Commission (VMRC)	VMRC is responsible for the Commonwealth's marine and aquatic resources	<ul style="list-style-type: none"> <li>• Regulates subaqueous lands in Virginia through a joint federal/state/local permit process.</li> </ul>
Virginia Department of Conservation and Recreation (DCR)	DCR is responsible for preserving Virginia's natural and recreational resources, including the Natural Heritage Program.	<ul style="list-style-type: none"> <li>• Maintains databases of rare, threatened and endangered species; significant habitats; and exotic invasive species.</li> <li>• Manages the Mason Neck State Park, located approximately 2.8 miles southwest of Fort Belvoir.</li> <li>• Advises VDGIF and USFWS regarding conservation of sensitive species.</li> </ul>
Virginia Department of Historic Resources (VDHR)	VDHR is the State Historic Preservation Office (SHPO).	<ul style="list-style-type: none"> <li>• Responsible for fostering, encouraging, and supporting the stewardship of Virginia's significant historic architectural, archaeological, and cultural resources.</li> <li>• Division of Review and Compliance serves to advise and assist Federal and state agencies in determining if their</li> </ul>

Table 2-3: State Agencies		
Organization Name	Description	INRMP Responsibilities
		projects will affect significant historic/cultural resources and, if so, how to address and resolve those effects.
Virginia Department of Agriculture and Consumer Services (VDACS)	VDACS promotes the economic growth and development of Virginia agriculture, provides consumer protection, and encourages environmental stewardship.	<ul style="list-style-type: none"> <li>Responsible for Virginia's animal control, care and welfare mandates, as well as animal disease control, prevention, and diagnostics.</li> <li>Office of Pesticide Services certifies applicators, registers products, and licenses pesticide businesses for the safe and effective control of pests.</li> <li>Protects and manages state-listed endangered and threatened plant and insect species.</li> </ul>

Table 2-4: Regional and Local Agencies		
Organization Name	Description	INRMP Responsibilities
Fairfax County	County level local government	<ul style="list-style-type: none"> <li>• <b>Fairfax County Health Department:</b> coordinates with the installation pest management program manager for monitoring and control of mosquitoes.</li> <li>• <b>Fairfax County Fire and Rescue Department:</b> under the provisions of AR 420-90, <i>Fire and Emergency Services</i>, Fort Belvoir has a cooperative agreement with Fairfax County Fire and Rescue.</li> <li>• <b>Fairfax County Department of Planning:</b> provides GIS data to Fort Belvoir. Administers a wetland permit program through the Wetlands Board.</li> <li>• <b>Fairfax County Park Authority-</b> works with the installation on regional ecosystem and land management initiatives. Manages Huntley Meadows County Park, which is adjacent to Fort Belvoir and several other county parks in the area.</li> </ul>
Northern Virginia	Inter-jurisdictional organizations	<ul style="list-style-type: none"> <li>• <b>Northern Virginia Regional Parks Authority:</b> coordinates with on regional ecosystem management initiatives.</li> <li>• <b>Northern Virginia Regional Planning Commission:</b> coordinates on regional issues and initiatives, including a regional trails system and climate resilience.</li> <li>• <b>Northern Virginia Soil and Water Conservation District:</b> provides technical advice and offers workshops on stream restoration and stormwater management.</li> <li>• <b>Metropolitan Washington Council of Governments:</b> coordinates the implementation of public health and safety initiatives.</li> </ul>
Universities and Institutions	Includes, but is not limited to, George Mason University, American University, and The Smithsonian Institute.	<ul style="list-style-type: none"> <li>• Universities may be contracted to provide specialized services, such as technical support in natural resources management and technical expertise on specific resource issues.</li> </ul>

Table 2-4: Regional and Local Agencies		
Organization Name	Description	INRMP Responsibilities
Non-Government Organizations (NGOs)	Includes, but is not limited to, the Audubon Society, Audubon Society of Northern Virginia, Virginia Bluebird Society, Alice Ferguson Foundation, and Boy Scouts of America.	<ul style="list-style-type: none"> <li>Partnerships are created with local, state, and national organizations relating to, but not limited to, natural and environmental resource management.</li> </ul>

## **2.4 CONSULTING PARTIES**

Fort Belvoir currently has a formal consulting relationship with five Native American tribes: the Catawba Indian Nation, Eastern Band of Cherokee Indians, Pamunkey Indian Tribe, Tuscarora Nation of New York, and United Keetoowah Band of Cherokee Indians in Oklahoma. They will be included as consulting parties on this INRMP. Additionally, Fort Belvoir will be extending an invitation to consult to the tribes in Virginia that gained federal recognition in January of 2018 but have yet to enter into a formal relationship with Fort Belvoir: Chickahominy Indian Tribe, Chickahominy Indians Eastern Division, Upper Mattaponi Tribe, Monacan Indian Nation, Rappahannock Tribe, and Nansemond Indian Tribe

## **2.5 REVIEW, REVISION AND REPORTING**

AR 200-1 requires installations to review their INRMPs annually and to revise them as necessary. Reviews of the INRMP for operation and effect are to be undertaken no less often than every 5 years. Previous NEPA documentation are to be assessed to ensure that the effects of the natural resources management practices in future INRMP updates have been adequately addressed.

This INRMP will take effect upon signature of the Fort Belvoir Garrison Commander. With signature anticipated in 2018, the initial five-year period will be from 2018 – 2023.

Fort Belvoir will review this INRMP annually to address the effectiveness of INRMP implementation. Fort Belvoir will invite the USFWS and Virginia Department of Game and Inland Fisheries (VDGIF) to participate in the annual reviews, and to review and re-sign the INRMP every 5 years. The results of the annual reviews will be incorporated into the INRMP as updates. Fort Belvoir will revise the INRMP, as needed, to address any significant changes.



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## **3.0 US ARMY GARRISON FORT BELVOIR**

### **3.1 MILITARY MISSION**

Fort Belvoir's mission is to provide installation base support to enable readiness. Fort Belvoir garrison organizations operate and maintain the installation; provide quality installation support and services to its customers and to plan, maintain, and execute mobilization readiness, military operations, and contingency missions. Since the departure of the Engineer School in 1988, the emphasis of Fort Belvoir's mission has shifted from training to providing logistical and administrative support to its tenants.

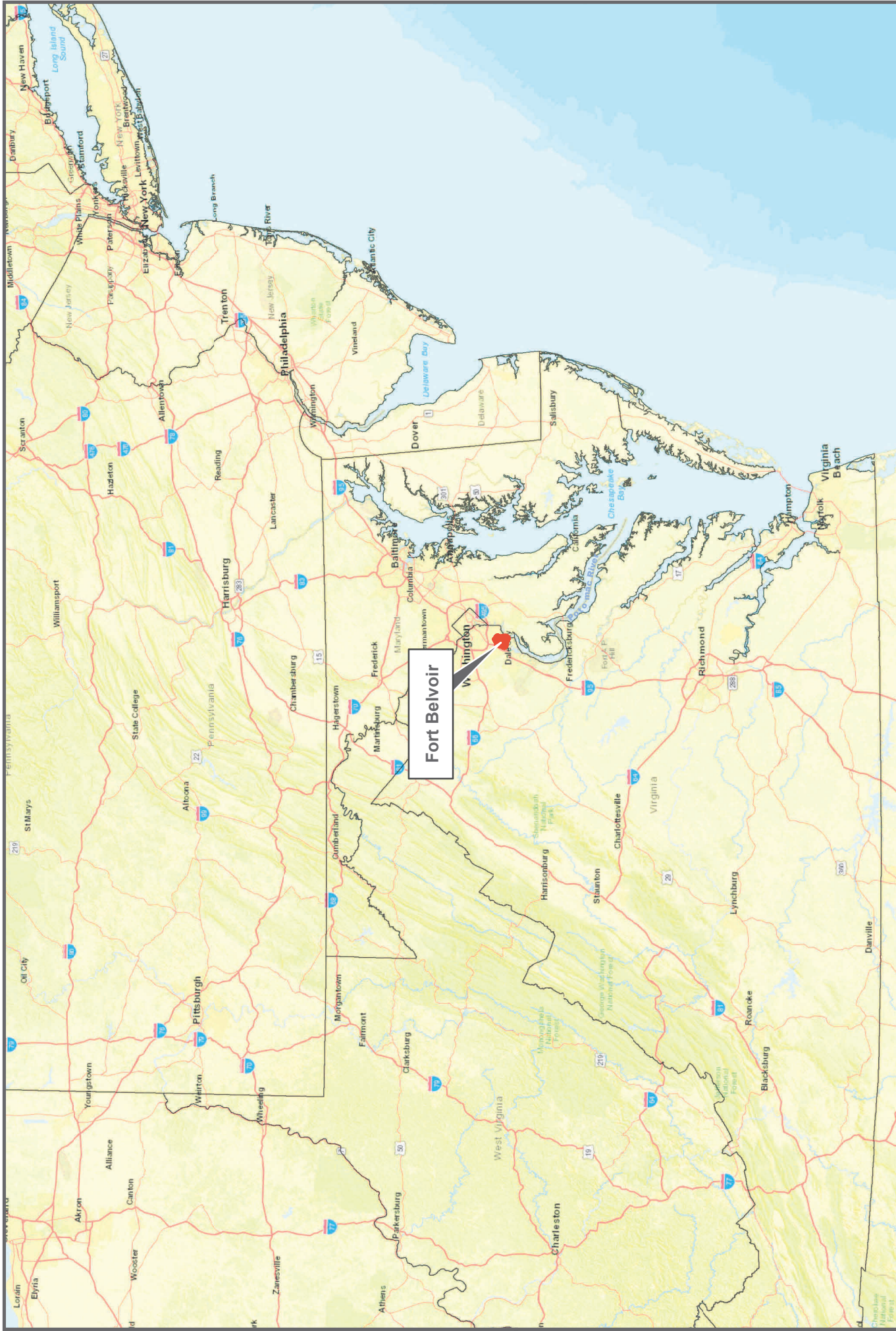
Fort Belvoir functions as an intelligence, medical, community, administrative, operational, family housing and logistics support center with approximately 145 government and non-government tenants. The installation has over 500 buildings with approximately 18 M square feet (SF). Military training at Fort Belvoir consists of occupation-specific training for the units assigned to the installation. As of 2017, Fort Belvoir had a residential population of approximately 7,500, a working population of approximately 40,000, and supported a regional population of approximately 140,000.

### **3.2 INSTALLATION LOCATION AND SETTING**

Fort Belvoir occupies approximately 8,500 acres in southeastern Fairfax County, Virginia, about 18 miles southwest of Washington, DC and 95 miles north of Richmond, the Virginia state capital (Figure 3.1). Fort Belvoir has two separate land areas – Main Post (approximately 7,700 acres) and Fort Belvoir North Area (FBNA) (approximately 800 acres) - roughly 1.5 miles apart. Main Post is bisected by U.S. Route 1 into two distinct areas – North Post and South Post/Southwest Training Areas (Figure 3.2). North Post is further subdivided by the Fairfax County Parkway into Davison Army Airfield (DAAF) to the west and North Post to the east. South Post is further divided by Accotink Creek into Southwest Training Area to the west and South Post to the east.

Fairfax County, home to about 1.1 million people, is the most populous jurisdiction in the National Capital Region. Mostly suburban in character, the County combines residential developments of various densities with major employment and commercial centers. The County is surrounded by other jurisdictions that are similarly developed (City of Alexandria and Arlington County, both in Virginia), or that have portions that have become more developed over the last several decades as the Washington DC metropolitan area has expanded (Prince William and Loudon counties in Virginia).

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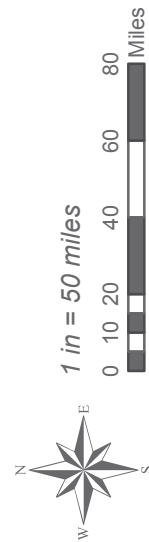


# GENERAL LOCATION OF FORT BELVOIR

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Figure 3.1

Source: ESRI, USGS



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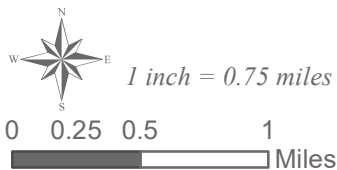
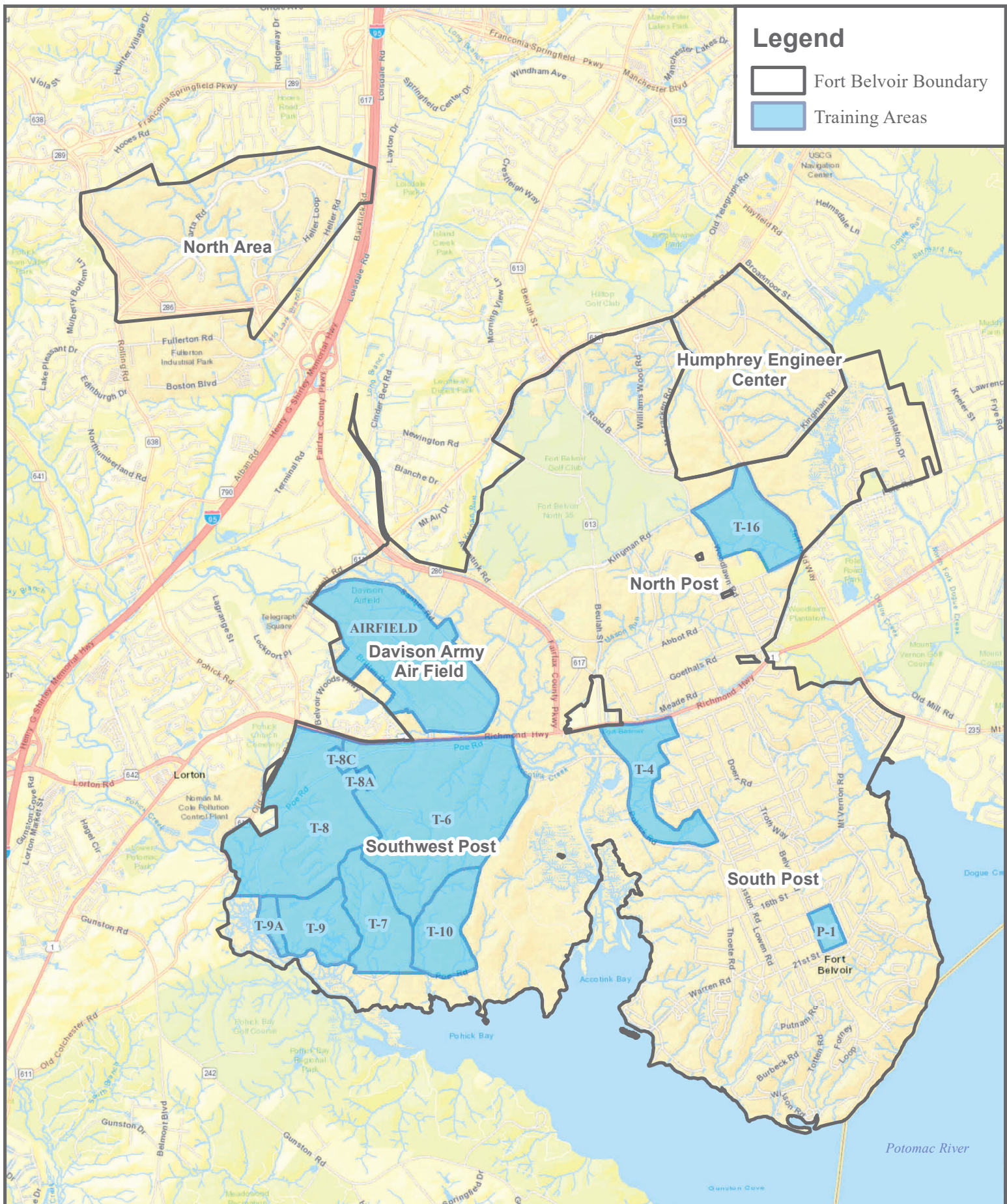
Local land uses outside the installation are predominantly residential, although commercial strip developments occur along major roads such as U.S. Route 1, and industrial developments occur along the Interstate 95 (I-95) corridor in the vicinity of FBNA. Major transportation corridors, such as U.S. Route 1, I-95, Fairfax County Parkway, Telegraph Road, and Jeff Todd Way pass through, or alongside, Fort Belvoir. Major utility, water, waste water, gas, and electric lines pass through or alongside the installation.

Southeastern Fairfax County has a number of sizable tracts that are in public ownership, or that are in private ownership and under conservation management (Table 3-1, Figure 3.3). These include Huntley Meadows County Park adjacent and to the north of Main Post; Woodlawn Plantation and Pole Road Park adjacent and to the east of Main Post; Grist Mill Park, Mount Vernon Estate, Fort Hunt National Park, and George Washington Memorial Parkway to the east; and, Pohick Bay Regional Park, Gunston Hall Plantation, Potomac River Mason Neck National Wildlife Refuge Complex, and Mason Neck State Park to the southwest. As shown in Figure 3.3, these areas align as a fairly contiguous corridor of undeveloped land/open space.

Fort Belvoir is located along the Potomac River, within the Chesapeake Bay Watershed. This geographical location contributes to the significance of natural resources management activities on Fort Belvoir.

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# **TRAINING AREAS ON FORT BELVOIR**

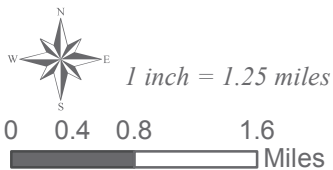
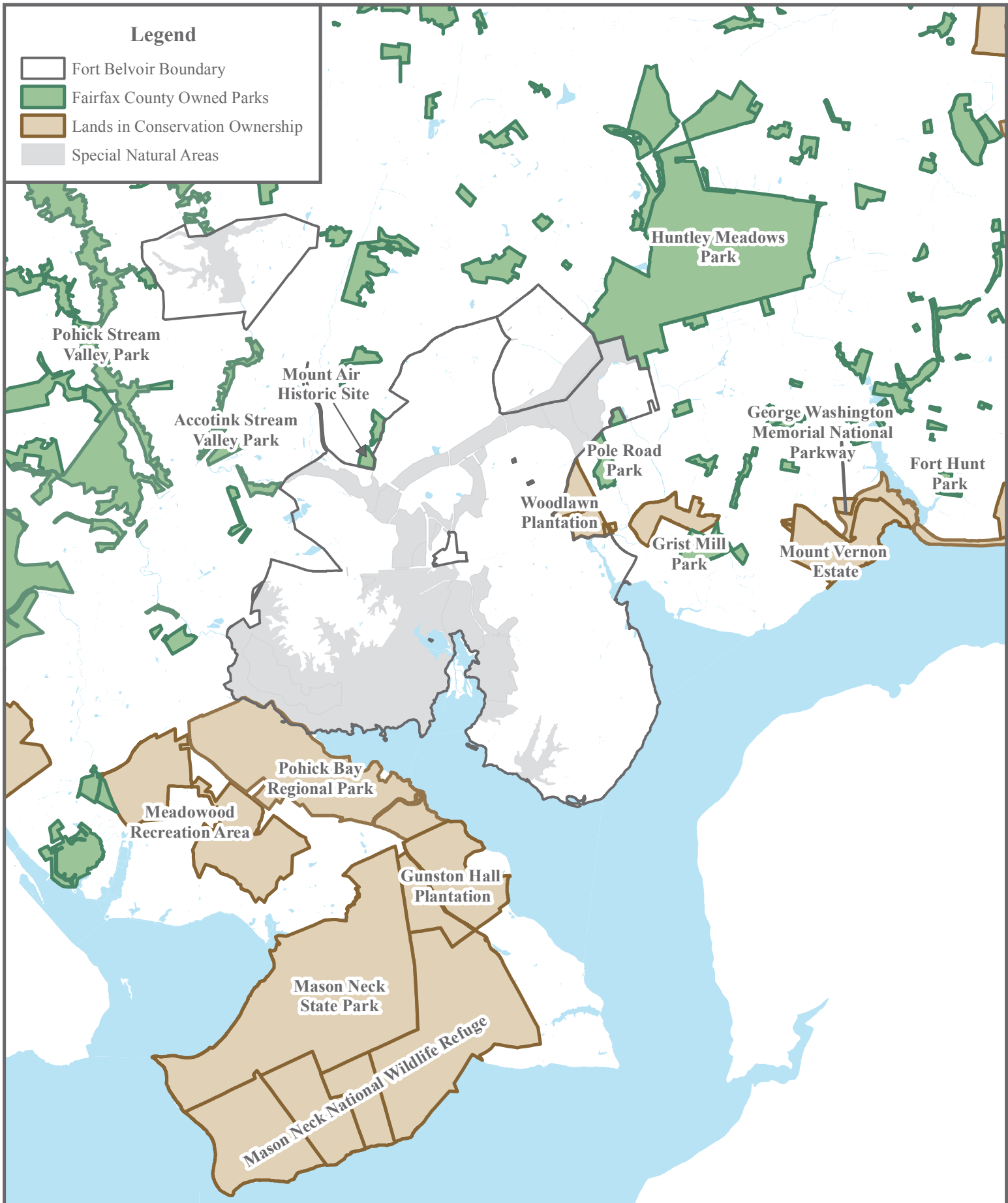
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**Figure 3.2**

Source: Google road maps,  
Fort Belvoir GIS

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## LANDS IN CONSERVATION OWNERSHIP

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**Figure 3.3**

Source: Fairfax County GIS Center,  
Fort Belvoir GIS

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<b>Table 3-1: Major Conservation Lands Near and Adjacent to Fort Belvoir</b>				
<b>Parcel or Property Name</b>	<b>Land Use, Function, or Primary Management Goal</b>	<b>Ownership or Managing Entity</b>	<b>Approx. miles* / bearing from Fort Belvoir</b>	<b>Area* (approx. acres)</b>
Huntley Meadows County Park	Local passive recreational park and wildlife management area	Fairfax County Park Authority	Adjacent, N 50° E	1,400
Pohick Bay Regional Park	Local active and passive recreation	Northern Virginia Park Authority	Adjacent, S 40° W	1,150
Woodlawn Plantation	National Historic Site	National Trust for Historic Preservation	Adjacent, East	80
Pole Road Park	Local active and passive recreation	Fairfax County Park Authority	Adjacent, East	40
Grist Mill Park	Active recreation, team sports, and playing fields	Fairfax County Park Authority	0.4, East	95
U.S. Coast Guard facilities	Various	U.S. Department of Transportation	0.6, N 35° E	185
Gunston Hall Plantation	National Historic Site	Commonwealth of Virginia	1.1, S 35° W	700
Mount Vernon Estate	National Historic Site	Mount Vernon Ladies Association	1.2, N 85° E	525

<b>Table 3-1: Major Conservation Lands Near and Adjacent to Fort Belvoir</b>				
<b>Parcel or Property Name</b>	<b>Land Use, Function, or Primary Management Goal</b>	<b>Ownership or Managing Entity</b>	<b>Approx. miles* / bearing from Fort Belvoir</b>	<b>Area* (approx. acres)</b>
Pohick Creek Stream Valley Parks	Local active and passive recreation	Fairfax County Park Authority	2.1, N 60° W	280
Mason Neck State Park	Regional active and passive recreation and wildlife management	Virginia Department of Conservation and Recreation	2.8, S 15° W	1,800
George Washington Memorial Parkway	Scenic drive and local active and passive recreation	National Park Service	3.0, East and North	7,200
Mason Neck National Wildlife Refuge (part of the Potomac River National Wildlife Refuge Complex)	Wildlife habitat preservation	U.S. Fish and Wildlife Service	3.0, S 30° W	1,050
Accotink Stream Valley Park	Local active and passive recreation	Fairfax County Park Authority	3.1, N 20° W	55
Piscataway Park	National colonial farm and natural area maintained for views from Mount Vernon	National Park Service	3.8, East	4,050

Table 3-1: Major Conservation Lands Near and Adjacent to Fort Belvoir					
Parcel or Property Name	Land Use, Function, or Primary Management Goal	Ownership or Managing Entity	Approx. miles* / bearing from Fort Belvoir	Area* (approx. acres)	
Fort Hunt Park (part of the George Washington Memorial Parkway)	Local passive recreation	National Park Service	3.8, N 80° E	240	
Lake Accotink Park	Local active and passive recreation	Fairfax County Park Authority	4.8, N 35° W	950	
Fort Washington Park	National Historic Site	National Park Service	5.0, East	340	

Sources:

- USGS 7.5 minute quadrangles: Fort Belvoir, Virginia – Maryland, 1965; Mount Vernon, Virginia – Maryland, 1966; Occoquan, Virginia, 1966
- Fairfax County Section Maps, Revised 1/12/88
- ADC Northern Virginia Street Map Book, 1996
- Street Atlas USA 4.0 Delorme, 1996 \* Distances to land holdings are estimated from the point on the Fort



### **3.3 SUBINSTALLATIONS AND SATELLITE INSTALLATIONS/FACILITIES**

#### **3.3.1 Rivanna Station**

Fort Belvoir has one subinstallation – the 75-acre Rivanna Station, which is in Albemarle County, approximately 12 miles north of Charlottesville, Virginia. Rivanna Station hosts administrative and associated support facilities for several DoD tenants. It is about 95 miles (driving distance) southwest of Fort Belvoir Main Post. Due to its small size and predominantly developed condition, Rivanna Station will not be covered in detail throughout this INRMP. Instead, it will be addressed separately in Appendix B: Rivanna Station.

#### **3.3.2 Antenna Tower Sites and Outer Marker Site**

Fort Belvoir has two antenna tower sites and one outer marker site that together total less than four acres. One tower is located in Fairfax County, Virginia; the other is in Prince Georges County, Maryland. The outer marker site is located in Charles County, Maryland. These three sites consist of structures and maintained turf. Due to their small size and general lack of natural resources, they will not be discussed in detail throughout this INRMP.

#### **3.3.3 Humphreys Engineer Center**

The 580-acre Humphreys Engineer Center (HEC) adjoins the northeastern corner of Fort Belvoir Main Post (Figure 3.2). HEC is under the control of the U.S. Army Corps of Engineers. While Fort Belvoir provides specific services to HEC under an Interagency Support Agreement (ISA), HEC is not part of Fort Belvoir and therefore is not covered by this INRMP.

#### **3.3.4 Accotink Village**

Accotink Village is a 33-acre unincorporated area along U.S. Route 1. While it is entirely surrounded by Main Post, Accotink Village is not part of Fort Belvoir and therefore not covered by this INRMP.

### **3.4 INSTALLATION HISTORY**

#### **3.4.1 Pre-Military History**

According to archaeological records, early humans inhabited the Fort Belvoir region as early as 11,500 years ago. These peoples consisted of the Patawomeke, Piscataway, and Dogue Native American Indian tribes. Historical accounts place

the villages of these tribes spread along the Potomac River where they subsisted on maize, beans, fish, and game. Relationships between the Native Americans and incoming European settlers were friendly in the early years of colonization but deteriorated rapidly as colonial land claims expanded.

In colonial times, the Fort Belvoir region was a part of the vast Northern Neck proprietary between the Potomac and Rappahannock Rivers established in 1649 by Lord Thomas Fairfax. In 1741, his cousin, Colonel William Fairfax, built a spacious manor on the estate and dubbed the home "Belvoir". The manor house was destroyed by fire in 1783 and the rest of the site severely damaged in The War of 1812 (Woolpert, 1993).

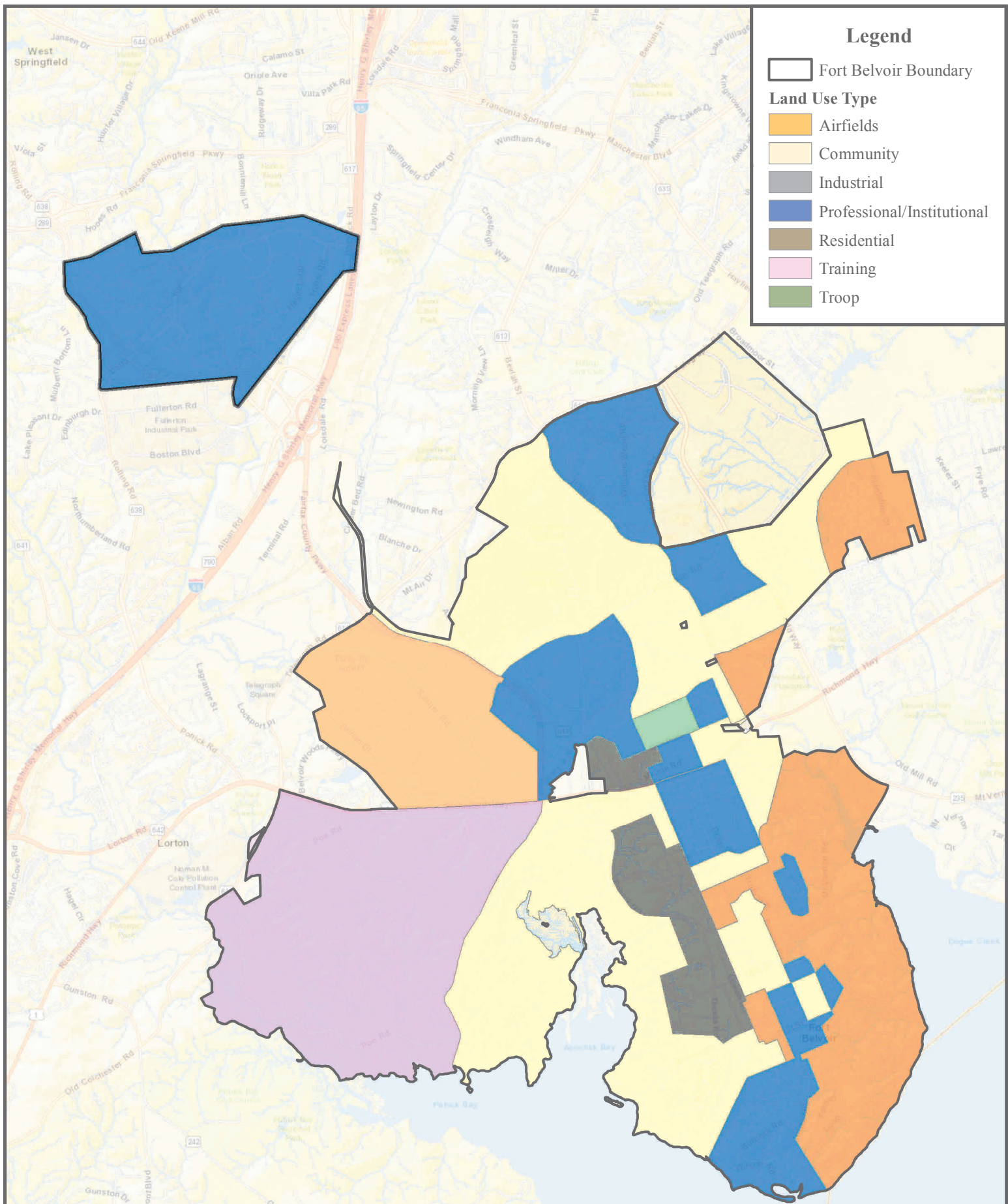
### **3.4.2 Military History**

The installation was originally established in 1912, as Camp A.A. Humphreys on a 1,500-acre tract of the estate, to provide training grounds for Army engineers stationed in the Washington Barracks at Fort McNair. On December 23, 1917, Congress approved the official transfer of the US Army Engineer School to the post. The government acquired an additional 4,800 acres (mainly north of U.S. Route 1) through 1920. In 1935, Camp A.A. Humphreys was designated as Fort Belvoir, in honor of the historic Belvoir plantation. The installation trained engineers until June 1, 1988, when the Engineer School was officially moved to Fort Leonard Wood, Missouri. On October 4, 2006, Fort Belvoir was transferred from the MDW to IMCOM. Under the Base Realignment and Closure (BRAC) Act of 1988, Fort Belvoir developed as the principal administrative, housing and logistics center of the US Army in the National Capital Region. Under the BRAC Act of 2005, Fort Belvoir's on-post military/civilian working population increased from 29,978 to more than 40,000.

### **3.4.3 Land Use**

Approximately 65 percent of Fort Belvoir is undeveloped and extensive areas are forested, particularly in the Southwest Area (US Army, 2014), which covers approximately 2,100 acres. Developed areas are found throughout the installation, with the South Post area being the most densely developed area. Open Space is present throughout the developed area; as of 2017, only 16% of the installation is in impervious surface. Table 3-2 outlines current land use acreage throughout Fort Belvoir (Figure 3.4).

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1 inch = 0.75 miles

0 0.25 0.5 1 Miles

## LAND USE ON FORT BELVOIR Figure 3.4

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Source: Google road maps,  
Fort Belvoir GIS

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<b>Table 3-2: Existing Land Use</b>			
<b>Land Use Category</b>	<b>Existing Land Use Acreage</b>		
	<b>Total</b>	<b>Constrained</b>	<b>Developable</b>
Professional/ Institutional	2,113	863	1,250
Residential	1,240	655	585
Troop	46	0	46
Community	2,569	1,626	943
Range/ Training	1,463	1,003	460
Airfield	690	472	218
Industrial	378	95	284
TOTAL	8,500	4,714	3,786
TOTAL PERCENTAGES	100	55	45
MAIN POST TOTAL	7,696	4,421	3,275
FBNA TOTAL	804	293	511
Source: U.S. Army, 2014			

Fort Belvoir can be segmented into four subsections: the North Post, South Post, FBNA, and DAAF (Figure 3.2). North Post covers approximately 2,250 acres and is generally bounded by Telegraph Road to the north, Huntley Meadows Park to the east, U.S. Route 1 to the south, and Fairfax County Parkway to the west. North Post is clustered and of moderate to low density; land use is dominated by community, professional/institutional and residential uses. South Post is located south of U.S. Route 1 and occupies approximately 2,550 acres on a peninsula extending into the Potomac River between Gunston Cove and Accotink Bay (to the west) and Dogue Creek (to the east). South Post is the most intensively developed part of Fort Belvoir and is dominated by Residential and Community Uses. FBNA, formerly known as the Engineer Proving Ground (EPG), is an 804-acre noncontiguous portion of the installation located about 1.5 miles northwest of Main Post. Land use on FBNA is classified as Professional/Institutional. DAAF is located west of North Post within an 800-acre property that is bounded by Fairfax County Parkway to the north and east and U.S. Route 1 to the south.



## **3.5 HOUSING, BARRACKS, LODGING, AND INFRASTRUCTURE**

### **3.5.1 Housing**

Housing on Fort Belvoir was privatized in 2003 under a 50-year lease to Fort Belvoir Residential Communities (FBRC). There are 14 housing villages on post. As of 2018, there are 2,154 homes on post. Upon completion of Dogue Creek Village renovation, the end state will be 2,106 homes. FBRC owns the houses and associated infrastructure within the leased housing areas, and is responsible for their operation and maintenance.

### **3.5.2 Barracks**

Fort Belvoir has barracks serving a maximum of 1,000 permanent party and Warriors in Transition. The barracks are operated and maintained by Fort Belvoir.

### **3.5.3 Lodging**

Lodging on Fort Belvoir was privatized in 2012 under a 50-year lease to Rest Easy, LLC.

### **3.5.4 Utilities**

The following utility systems are on Fort Belvoir:

- potable water
- sanitary sewer
- storm sewer
- electric power
- natural gas, and
- telecommunications

The installation's steam system, once used to heat major facilities on post, has been discontinued.

All of the utility services (with the exception of the storm sewer system which has remained under government ownership and operation) are provided by public or private utility companies operating in the area. Each of these companies maintains a network of major utility corridors, distribution/collection lines, and supporting facilities throughout the installation. Major utility corridors and many of the service lines on post generally require regular maintenance to keep



areas clear of woody vegetation. Utilities in undeveloped installation areas also require trails/roads for routine maintenance and repair access.

### **3.5.5 Water System**

Fort Belvoir purchases its potable water from the Fairfax County Water Authority (Fairfax Water), which operates two water treatment facilities in Fairfax County (the James J. Corbalis Jr. treatment plant at the northern tip of Fairfax County and the Frederick P. Griffith Jr. treatment plant at the southern border of Fairfax County). There are no water treatment facilities, or groundwater wells supplying potable water, on post.

The majority of the water distribution system on post is owned and operated by American Water under a 50-year Utilities Privatization (UP) contract to provide water and wastewater infrastructure services. The remaining portions of the installation's water system are under government control.

As of 2017, there were approximately 46.6 miles of water main (greater than 6-inch pipe), one pumping station, and 3 elevated water storage tanks with a combined capacity of approximately 3 MG on post. Since the award of the UP contract in 2009, American Water has completed a number of projects, including replacement of 39.3 miles of inadequate and leaking water lines, replacement of 3 water storage tanks, and stabilization of three stream crossings.

### **3.5.6 Sanitary Sewer System**

Fort Belvoir purchases sanitary sewer treatment services from Fairfax County's Noman M. Cole Jr. Pollution Control Plant. The Plant is adjacent to the southwestern boundary of Fort Belvoir and discharges to Pohick Creek. There are no sanitary sewer treatment facilities in operation on post. In the past, the installation operated two treatment facilities – one along Dogue Creek and one along Gunston Cove. Treatment operations were discontinued in 1980, and now both facilities are only operated as main pumping stations.

The majority of the sanitary sewer system on post is owned and operated by American Water under the UP contract to provide water and wastewater infrastructure services. The remaining portions of the system remain under government control.

As of 2017, there were 43.6 miles of sanitary sewer main (greater than 6-inch pipe) and 47 sewer lift stations. Separate from American Water's assets, Fort Belvoir owns and operates a septic tank without a septic field at the Golf Course Maintenance Facility on Telegraph Road.

Since the award of the UP contract in 2009, American Water has completed a number of system upgrades, including replacement or relining of 12.7 miles of inadequate/failing sewer pipes, relocation/realignment of utility runs, improvement/upgrade of mechanical systems such as lift stations, installation of system monitoring devices, stabilization of three stream crossings, and elimination of cross-connections.

### **3.5.7 Storm Sewer System**

Fort Belvoir owns and operates the storm sewer system under a Virginia Pollutant Discharge Elimination System (VPDES) General Permit for Discharges of Stormwater from Small MS4 and a VPDES Individual Industrial Stormwater (ISW) Major Permit. The MS4 Permit (Permit Number VAR040093) covers approximately 7,730 acres of the Garrison and the Individual ISW Major Permit (Permit Number VA0092771) covers approximately 770 acres.

Fort Belvoir incorporates low impact development (LID) best management practices (BMPs) on all projects per Army guidance and has design approval and construction inspection procedures in place to ensure quantity and quality standards established by the Virginia Stormwater Management Program are met. A comprehensive stormwater mapping effort was completed in 2010/2011 by Paciulli, Simmons, and Associates, Ltd (PSA). The study located and assessed over 7,000 stormwater structures ranging from inlets, manholes, outfalls and BMPs. The stormwater conveyance system is covered under the MS4 Phase II permit and consists of a combination of closed and open drainage mostly managed by stormwater BMP controls. Approximately 230 of the 7,000 stormwater features were categorized as stormwater management BMPs. All BMPs are to be inspected annually for maintenance and functionality.

### **3.5.8 Electric Power System**

Fort Belvoir purchases its electricity from Dominion Energy (DE). There are no commercial power generating stations on Fort Belvoir that would be capable of powering the entire post.

As of 2016, the energy distribution system on Fort Belvoir consisted of more than 112 miles of overhead and underground electric line, three switching stations, and one substation. DE also owns and operates medium-sized emergency diesel generators to provide back-up power for critical functions throughout the installation.

Most of Fort Belvoir's electricity distribution system is owned and operated by DE under a 50-year UP services contract. There are portions of Fort Belvoir that are not currently covered under the UP contract, and are fed by the regulated side of DE.

Under the UP contract, DE is responsible for operation and maintenance of the electric distribution system, as well as for making system upgrades. Since the contract was awarded in 2007, DE has completed a number of projects to provide additional capacity, reliability, and resilience to the distribution system. These include undergrounding of existing overhead lines and installation of various equipment upgrades. DE has undergrounded almost 40 miles of overhead facilities since 2007.

### **3.5.9 Natural Gas System**

Fort Belvoir purchases natural gas from Washington Gas Holdings, Inc. (Washington Gas). There are no natural gas production, or storage, facilities on Fort Belvoir.

The natural gas distribution system on Fort Belvoir is owned and operated by Washington Gas under a privatization agreement (December 1998). Washington Gas is responsible for the operation and maintenance of all system appurtenances, including pipes, valves, and header distribution fixtures. As of 2016, the natural gas distribution system on Fort Belvoir included a network of approximately 120 miles of pipe throughout the installation.

### **3.5.10 Telecommunications**

Telecommunication services on-post are provided by several contracted commercial vendors, including Verizon Federal, under privatized agreements. The system includes overhead and buried transmission lines, duct banks, and other supporting facilities. Maintenance, repair and upgrade of this system is done by the commercial vendors.

### **3.5.11 Steam System**

Fort Belvoir's steam system consisted of three high-pressure steam plants and approximately 13 miles of steam lines, providing steam for heat and hot water to several areas of the post. This system has been phased out, and the above-ground portion of the steam distribution system has been removed.

### **3.5.12 Transportation System**

Fort Belvoir's transportation system consists of roadways, multi-use trails, and a military airfield (DAAF). There is no rail service, or water transportation service, in operation on post.

### **3.5.13 Roadways**

Road access to Fort Belvoir is primarily through six named Access Control Points (Gates) off U.S. Route 1, Farrar Gate (to DAAF only) and Kingman Gate off the Fairfax County Parkway, Telegraph/Beulah Gate off Telegraph Road, and Walker Gate off Old Mount Vernon Highway. A new gate is under construction that will provide access to North Post from U.S Route 1 across from Pence Gate. There are several other unnamed gates, mostly to training areas, throughout the installation. These gates are locked, and accessible only by authorized users.

Access to Fort Belvoir is generally by public highways and major and minor arterial roads (Figure 3.2). Three state-maintained public highways – U.S. Route 1 (6-lane, divided), Fairfax County Parkway (4-lane, divided) and Jeff Todd Way (4-lane, divided) - traverse the installation. Four additional state-maintained public roads – Telegraph Road (4-lane, divided), Pole Road (2-lane), Old Colchester Road (2-lane), and Old Mount Vernon Highway (2-lane) – border the installation.

Installation roads include paved 2- and 4-lane roads through the developed areas and unpaved vehicle trails through the training areas. There are several major bridges in the Fort Belvoir road network including multiple bridges over Dogue and Accotink Creeks, and one over U.S. Route 1. There are numerous smaller bridges and culverts throughout the installation. Fort Belvoir maintains all of the bridges and crossings on the installation. Bridges and crossings on US Route 1, Fairfax County Parkway, and Jeff Todd Way are maintained by the state.

### **3.5.14 Multi-use and Pedestrian Trails**

Fort Belvoir has a network of multi-use trails designed to complement the various roads on post. Improved surface trails parallel many of the roads and developments on post.

## **3.6 INSTALLATION REVIEW PROCESSES**

Fort Belvoir has standard review processes that address site/project planning through project construction. DPW- Environmental Division is a participant in these review processes, which include the following:

- Master planning and sub-area planning
- 1391 development
- Site development planning
- NEPA review
- Report of Availability for real estate actions
- Engineering plan set review

- Work Order review
- Excavation Permit review
- Building Demolition review
- Annual Operations and Maintenance work plan development

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## **4.0 ENVIRONMENTAL CONDITIONS**

### **4.1 SETTING**

Fort Belvoir lies within the Southeastern Plains Ecoregion, based on the EPA's 2013 Level III Ecoregions classification (EPA, 2013). The Southeastern Plains Ecoregion extends from the Gulf of Mexico to southern Maryland, and is composed of irregular, relatively flat plains. In general, long growing seasons and abundant rainfall are paired with relatively poor sandy soils in this ecoregion. Natural forests consist of mixed pine, hickory, and oak. Since the 1980's, natural forest cover has declined significantly throughout this region (Sohl, 2016).

Fort Belvoir is located on the western shore of the Potomac River, approximately 75 miles upstream of the Chesapeake Bay. The installation has more than 12 miles of shoreline, 1,085 acres of wetland areas, and 5,396 acres of forested areas. Fort Belvoir's surrounding local area (metropolitan Washington DC area) and regional area (Chesapeake Bay region) are both experiencing rapid conversions of undeveloped natural areas to developed land uses. Within the metropolitan Washington DC area, Fort Belvoir represents a significant tract of native vegetation in terms of size, diversity, and position relative to the location of off-post tracts of native vegetation. Fort Belvoir has recognized the ecological importance of on-post natural habitats by designating three installation refuges, the two installation corridors, wetlands, and steep-sloped areas as environmentally constrained areas. These large areas of native vegetation afford a contiguous band of wildlife habitat through the installation and provide for connection with wildlife habitat areas outside the installation. Because of this, healthy populations of many common wildlife and plant species, as well as several endangered, threatened and rare species, can be found throughout the installation and its surrounding area.

### **4.2 CLIMATE PATTERNS**

Virginia is classified as a "Moist Mid-Latitude Climate", subtype "Humid Subtropical" (Cfa) by the Köppen Climate Classification System. This climate subtype is characterized by mild winters and warm, humid summers, and an absence of an annual dry season. During winter, freezes occur, but do not persist for long periods. During summer, warm and wet flows from the tropics result in muggy conditions and frequent thunderstorms.

The most recent (1981–2010) "Climate Normals" reported by the National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS) weather station at Washington Reagan National Airport (DCA), located approximately 11 miles north-east of Fort Belvoir) show the warmest months of



the year to be June, July and August with average maximum temperatures of 84.2, 88.4 and 86.5, respectively, and the coolest months of the year to be January, February and December with average minimum temperatures of 28.6, 30.9 and 32.5, respectively (Table 4-1). The Climate Normals show precipitation to be fairly evenly distributed throughout the year, ranging from a monthly average low of 2.62 inches in February to a monthly average high of 3.99 inches in May, for monthly average of 3.3 inches. (NOAA, 2017).

<b>Table 4-1: 1981-2010 Climate Normals</b>				
<b>Month</b>	<b>Precipitation (inches)</b>	<b>Minimum Temperature</b>	<b>Average Temperature</b>	<b>Maximum Temperature</b>
January	2.81	28.6	36.0	43.4
February	2.62	30.9	39.0	47.1
March	3.48	37.6	46.8	55.9
April	3.06	47.0	56.8	66.6
May	3.99	56.5	66.0	75.4
June	3.78	66.3	75.2	84.2
July	3.73	71.1	79.8	88.4
August	2.93	69.7	78.1	86.5
September	3.72	62.4	71.0	79.5
October	3.17	41.2	49.6	57.9
November	3.17	41.2	49.6	57.9
December	3.05	32.5	39.7	46.8

Source: NOAA, 2010

Fort Belvoir is within the USDA Plant Hardiness Zone 7, an area where the expected minimum winter temperature is between 0 to 10 degrees Fahrenheit (USDA, 2017). The first and last frosts of the year for the Fort Belvoir area most commonly occur around October 15 and April 22, respectively.

Storm systems generally move from west to east across the State, but may also approach from the southwest paralleling the coast and the Gulf Stream. This shift to a northeast track results in part from the tendency of storms to follow frontal boundaries between the cold land air mass and the warm Gulf Stream water. Storms may grow rapidly as they cross the coast, and as they move northeastwards moisture-laden air from the storm crosses Virginia from the east and northeast. Precipitation from these storms tends to be greater in the mountain areas than in the eastern part of Virginia (UVA, 2017).

More information on Virginia's climate and weather may be found on the University of Virginia Climatology Office website, the Southeast Regional Climate Center (University of North Carolina Chapel Hill) and the National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS) websites.

## 4.3 AIR QUALITY

The Clean Air Act (CAA) addresses ambient air quality in terms of six (6) criteria pollutants and requires the USEPA to establish National Ambient Air Quality Standards (NAAQS) for acceptable concentrations of these pollutants Table 4-2.

<b>Table 4-2: National Ambient Air Quality Standards</b>			
<b>Pollutant</b>	<b>Standard</b>	<b>Averaging Time</b>	<b>Ambient Concentration</b>
<b>CO</b>	Primary	1-hour <sup>a</sup> (ppm)	35
		8-hour <sup>a</sup> (ppm)	9
<b>NO<sub>2</sub></b>	Primary	1-hour <sup>b</sup> (ppm)	100
	Primary and Secondary	Annual <sup>c</sup> (ppm)	53
<b>O<sub>3</sub></b>	Primary and Secondary	8-hour <sup>d</sup> (ppm)	0.075
<b>SO<sub>2</sub></b>	Primary	1-hour <sup>e</sup> (ppb)	75
	Secondary	3-hour <sup>a</sup> (ppm)	0.5
<b>PM<sub>2.5</sub></b>	Primary and Secondary	24-hour <sup>f</sup> (µg/m <sup>3</sup> )	35
	Primary	Annual arithmetic mean <sup>g</sup> (µg/m <sup>3</sup> )	12
	Secondary	Annual arithmetic mean <sup>g</sup> (µg/m <sup>3</sup> )	15
<b>PM<sub>10</sub></b>	Primary and Secondary	24-Hour <sup>h</sup> (µg/m <sup>3</sup> )	150

Source: 40 CFR 50.1-50.12; USEPA, 2015

CO = carbon monoxide; µg/m<sup>3</sup> = micrograms per cubic meter; NAAQS = National Ambient Air Quality Standards; NO<sub>2</sub> = nitrogen dioxide; O<sub>3</sub> = ozone; ppb = parts per billion; ppm = parts per million; PM<sub>2.5</sub> = particulate matter less than 2.5 microns; PM<sub>10</sub> = particulate matter less than 10 microns; SO<sub>2</sub> = sulfur dioxide

<sup>a</sup> Not to be exceeded more than once per year.

<sup>b</sup> 98<sup>th</sup> percentile, averaged over 3 years.

<sup>c</sup> Annual mean.

<sup>d</sup> The 3-year average of the fourth highest daily maximum 8-hour average O<sub>3</sub> concentrations over each year must not exceed 0.08 ppm.

<sup>e</sup> The 3-year average of the 99<sup>th</sup> percentile of 1-hour daily maximum concentrations.

<sup>f</sup> The 3-year average of the 98<sup>th</sup> percentile of 24-hour concentrations.

<sup>g</sup> The 3-year average of the weighted annual mean.

<sup>h</sup> Not to be exceeded more than once per year, on average over 3 years.

The USEPA classifies areas as “attainment” (meeting the NAAQS) or “nonattainment” (not meeting the NAAQS), and designates “Air Quality Control Regions” (ACQRs) for areas that do not meet NAAQS (i.e., areas that are nonattainment for at least one of the criteria pollutants). Fort Belvoir is located within the designated “National Capital Interstate Air Quality Control Region”,

which is comprised of the District of Columbia, portions of Maryland and Virginia. As of 2018 this Region is classified as

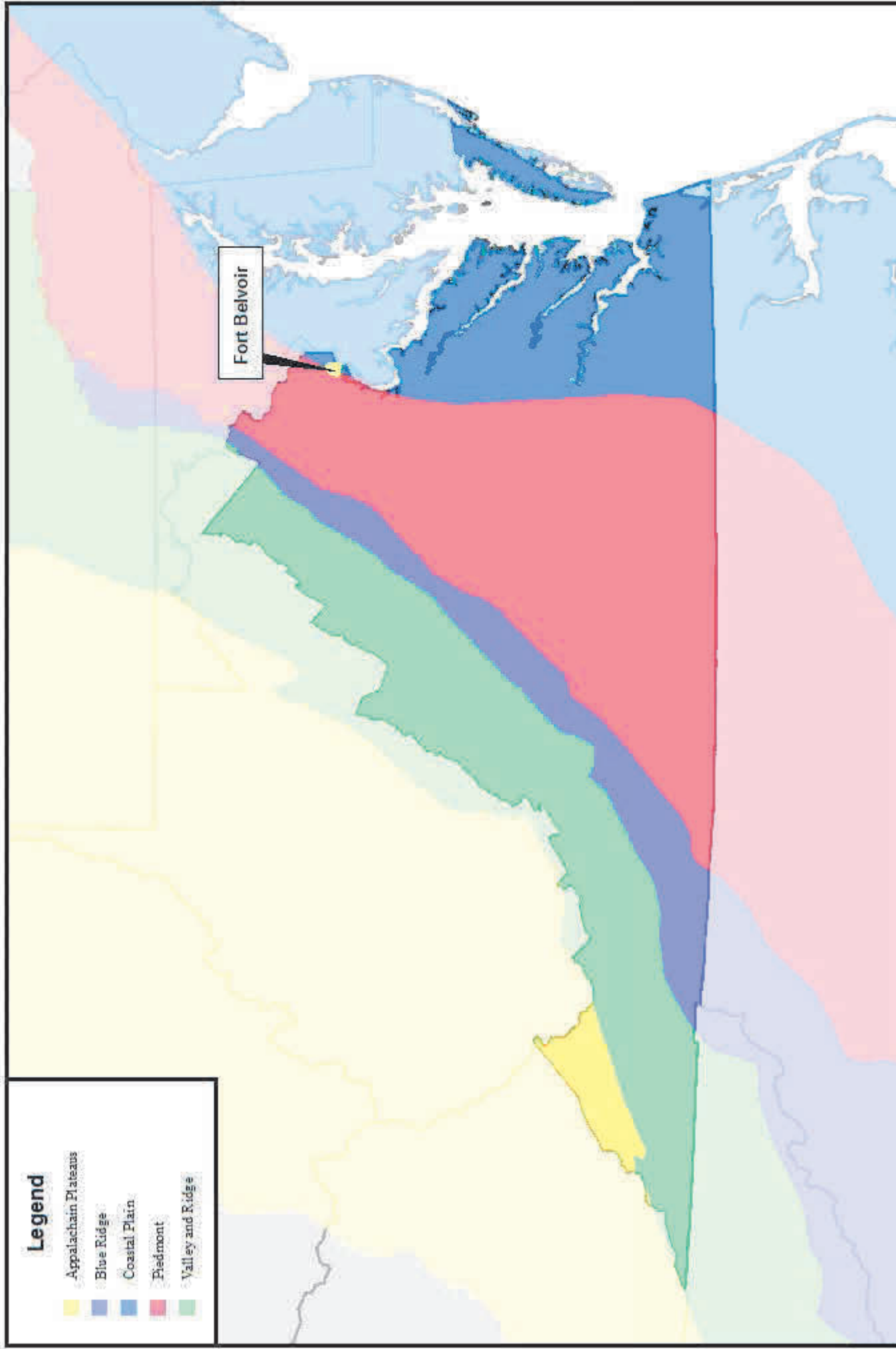
- Marginal nonattainment for the 2008 8-hour O<sub>3</sub> NAAQS
- Moderate nonattainment for the 1997 8-hour O<sub>3</sub> NAAQS
- Nonattainment for the 1997 PM<sub>2.5</sub> NAAQS
- Attainment for all other criteria pollutants

The CAA authorizes the USEPA to delegate NAAQS enforcement down to the states. In Virginia, this authority has been delegated to the Virginia Department of Environmental Quality (VDEQ). As required by the CAA, the VDEQ has a federally approved State Implementation Plan (SIP) showing how the state plans to reduce and maintain criteria pollutants at or below NAAQS. More information on the Virginia SIP and Virginia's air quality programs can be found on the VDEQ website.

## **4.4 PHYSIOGRAPHY AND TOPOGRAPHY**

The Commonwealth of Virginia spans five physiographic provinces. These provinces transition from high elevations with rugged terrains and interspersed valleys in the western part of the state, to broad rolling hills with decreasing elevations and less-rugged terrain in the central part of the state, to broad, flat, low areas of the coastal plain in the eastern part of the state (Figure 4.1). Waterways exhibit similarly varied characteristics, transitioning from defined channels with steep gradients and fast flows in the west, to wide, meandering channels with slow flows in the east. (VDEQ website, Physiographic Provinces of Virginia, 2016).

The terrain at Fort Belvoir consists of wide, flat plateaus dissected by steep ravines. Elevation decreases from west to east, ranging from a high of 300 feet above mean sea level (MSL) in the northwestern corner of the North Area to 230 feet above MSL at the intersection of Beulah Street and Woodlawn Road near the northern edge of Main Post, to sea level at the eastern edge of Main Post along the Potomac River (Figure 4.2).



**Legend**

- Appalachian Plateaus
- Blue Ridge
- Coastal Plain
- Piedmont
- Valley and Ridge

**PHYSIOGRAPHIC PROVINCES**

**of VIRGINIA**

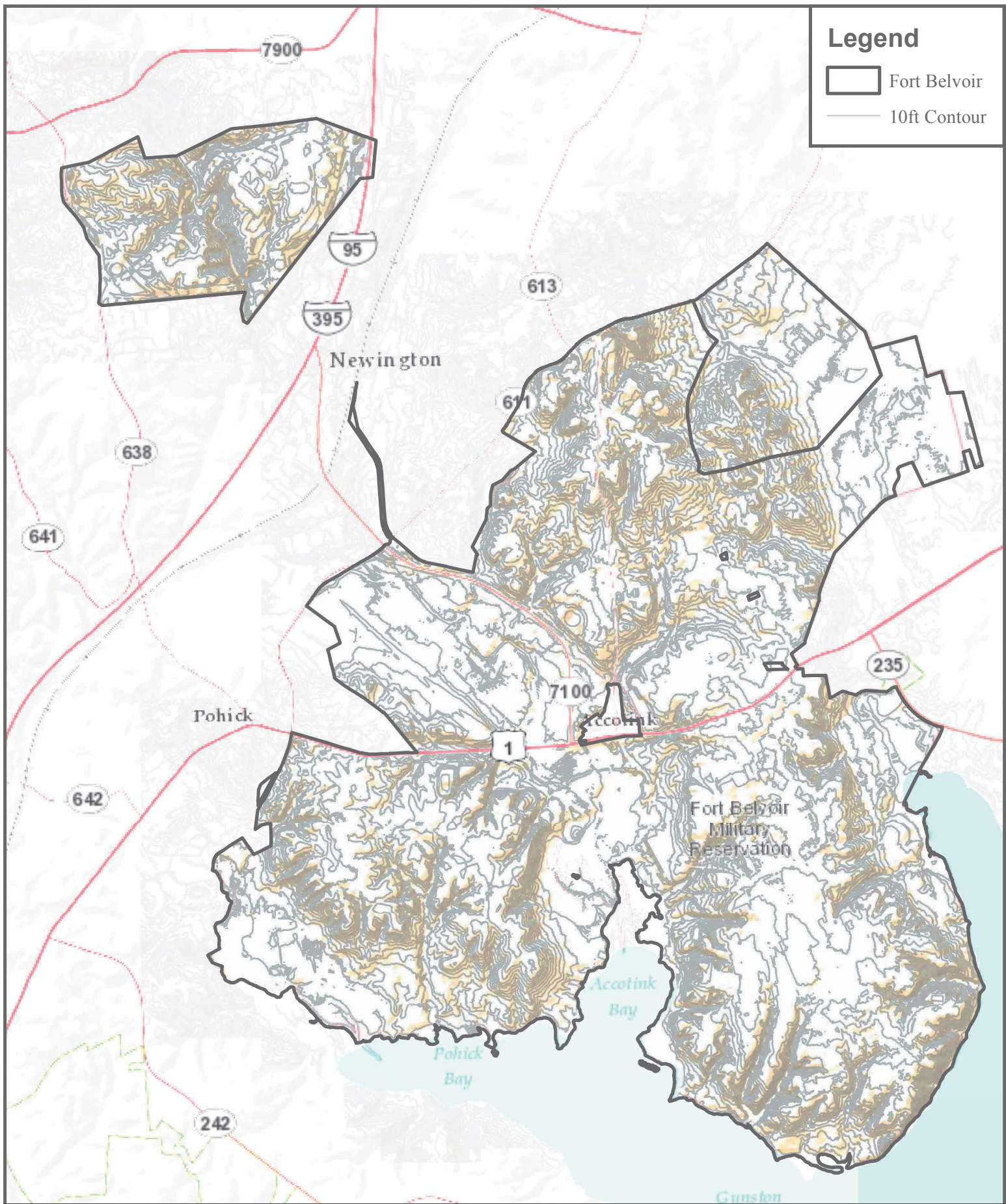
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**Figure 4.1**

Source: Virginia Tech Digital Atlas of Virginia

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# TOPOGRAPHY ON FORT BELVOIR

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**Figure 4.2**

Source: ESRI basemap,  
Fort Belvoir GIS

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## 4.5 GEOLOGY

Fort Belvoir spans the eastern part of the Piedmont Province and the upper part of the Coastal Plain Province (from west to east), and as such exhibits characteristics of both provinces. The Fall Line, which runs north to south through Virginia, crossing Fairfax County at approximately the I-95 corridor, forms the transition zone between the resistant, igneous and metamorphic rock of the Piedmont and the softer, sedimentary rocks of the Coastal Plain.

A finger of Piedmont Upland province bedrock extends from north to south along Accotink Creek. Piedmont Upland bedrock outcrops form the bed and adjacent slopes of the creek. Most of the more gently sloping areas to the east and west of the creek consist of unconsolidated deposits from the Coastal Plain Province (USATHAMA, 1990).

The southern and central portions of Fort Belvoir are situated on the Coastal Plain Physiographic Province, which is comprised of several geologic formations, including the Potomac Formation, Bacons Castle Formation, Shirley Formation, and Alluvium and Pliocene sand and gravel. These formations are characterized by unconsolidated sand, silt, and clay underlain by residual soil and weathered crystalline rocks. The Potomac Group, which makes up the majority of the Coastal Plain Physiographic Province under Fort Belvoir, is characterized by lens-shaped deposits of interbedded sand, silt, clay, and gravel, primarily of non-marine origin (USATHAMA, 1990).

The northern portion of Fort Belvoir is situated on the Piedmont Plateau Physiographic Province. The underlying geology of this Province is characterized by hard, crystalline igneous and metamorphic formations with some areas of sedimentary rocks, with saprolite deposits overlying the bedrock (VDEQ, 2016).

## 4.6 GEOMORPHOLOGY

Fort Belvoir's uplands are underlain by sands, silts and clays of riverine origin. Uplands underlain by sands and silts tend to be more stable than those underlain by clays. Uplands that are underlain by clayey soils form undulating and rolling hills, and the dominant geomorphic process in the clayed areas is mass wasting – including downhill creep, landslides, slumping and rockfalls.

Lowlands and valley bottoms are typically underlain with alluvium. The dominant geomorphic process is active riverine erosion and deposition during overbank flooding. Surface drainage is commonly poor due to the shallow water table.

The dominant geomorphic process in the sloping valley sides is gravitational mass wasting. This includes downhill creep, landslides, slumping and rockfalls.

Drainage usually occurs as surface runoff, with runoff greatest on the steeper slopes and increasing with construction activity and the removal of vegetation, which greatly increases the rate of erosion and the probability of creep and slumping.

## **4.7 SOIL**

A soil resource report was compiled by the online web soil survey provided by the Natural Resource Conservation Service (NRCS) for Fort Belvoir Main Post in July 2016. Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (NRCS, 2006). There are twenty-six soil types present at Fort Belvoir Main Post. Of the area included in the survey, 1,813 acres are described as urban built-up, which represents 22.2% of the soil on Fort Belvoir. The urban built-up unit includes primarily ridge top or other well-drained flatter areas that have been minimally to drastically disturbed by construction and development over the years. Areas within the urban built-up unit that are not under buildings or paving are vegetated, generally with lawn and landscape trees and shrubs. The most abundant native soils on post include Beltsville silt loam (875.1 acres) and Sassafras-Marumsco complex (753.6 acres). Tables 4-3 and 4-4 list the soils mapped within Fort Belvoir Main Post and FBNA, respectively, along with some selected features.

<b>Table 4-3: Soils within Fort Belvoir</b>			
<b>Map Unit Symbol</b>	<b>Map Unit Name</b>	<b>Approximate Acres in Fort Belvoir</b>	<b>Approximate Percent within Fort Belvoir</b>
7B	Beltsville silt loam, 2 to 7 percent slopes	875.1	10.7%
29A	Codorus silt loam, 0 to 2 percent slopes, occasionally flooded	40.7	0.5%
30A	Codorus and Hatboro soils, 0 to 2 percent slopes, occasionally flooded	492.6	6.0%
33A	Downer loamy sand, 0 to 2 percent slopes	59.0	0.7%
36A	Elkton silt loam, 0 to 2 percent slopes, occasionally ponded	81.6	1.0%
40	Grist Mill sandy loam, 0 to 25 percent slopes	408.7	5.0%
46B	Grist Mill-Mattapex complex, 2 to 7 percent slopes	0.5	0.0%
48A	Gunston silt loam, 0 to 2 percent slopes	636.2	7.8%
49A	Hatboro silt loam, 0 to 2 percent slopes, frequently flooded	271.5	3.3%
60A	Honga peat, 0 to 1 percent slopes, very frequently flooded, tidal	59.0	0.7%
66	Kingstowne sandy clay loam, 0 to 45 percent slopes	0.9	0.0%
71C	Kingstowne-Sassafras-Marumsko complex, 7 to 15 percent slopes	1.4	0.0%
72B	Kingstowne-Sassafras-Neabsco complex, 2 to 7 percent slopes	6.1	0.1%
74B	Lunt-Marumsko complex, 2 to 7 percent slopes	108.1	1.3%
76B	Matapeake silt loam, 2 to 7 percent slopes	213.4	2.6%
77A	Mattapex loam, 0 to 2 percent slopes	78.3	1.0%
77B	Mattapex loam, 2 to 7 percent slopes	364.7	4.5%
86	Pits, gravel	18.0	0.2%
90A	Sassafras sandy loam, 0 to 2 percent slopes	7.5	0.1%
90B	Sassafras sandy loam, 2 to 7 percent slopes	113.9	1.4%
90C	Sassafras sandy loam, 7 to 15 percent slopes	143.2	1.8%
91C	Sassafras-Marumsko complex, 7 to 15 percent slopes	634.7	7.8%
91D	Sassafras-Marumsko complex, 15 to 25 percent slopes	753.6	9.2%
91E	Sassafras-Marumsko complex, 25 to 45 percent slopes	512.2	6.3%
95	Urban land	1,813.5	22.2%
109B	Woodstown sandy loam, 2 to 7 percent slopes	432.3	5.3%

<b>Table 4-3: Soils within Fort Belvoir</b>			
<b>Map Unit Symbol</b>	<b>Map Unit Name</b>	<b>Approximate Acres in Fort Belvoir</b>	<b>Approximate Percent within Fort Belvoir</b>
W	Water	52.0	0.6%
<b>Subtotals for Soil Survey Area</b>		<b>8,178.7</b>	<b>100.0%</b>
<b>Totals for Area of Interest</b>		<b>8,178.7</b>	<b>100.0%</b>

Source: USDA, 2016

Soils on FBNA were surveyed by the Natural Resources Conservation Service from 2002 to 2008. A digital soil survey documented twenty eight separate soil types within the North Area of Fort Belvoir (USDA, 2016) The predominant soil types surveyed, which collectively cover the majority of North Area are Beltsville silt loam (21.8%), Kingstown sandy clay loam (19.4%), and Rhodhiss sandy loam (11.4%).

<b>Table 4-4: Soils within North Area Fort Belvoir</b>			
<b>Map Unit Symbol</b>	<b>Map Unit Name</b>	<b>Approximate Acres in Fort Belvoir</b>	<b>Approximate Percent within Fort Belvoir</b>
4B	Barkers Crossroads-Nathalie complex, 2 to 7 percent slopes	0.5	0.1%
5C	Barkers Crossroads-Rhodhiss complex, 7 to 15 percent slopes	0.1	0.0%
7B	Beltsville silt loam, 2 to 7 percent slopes	174.4	21.8%
30A	Codorus and Hatboro soils, 0 to 2 percent slopes, occasionally flooded	16.6	2.1%
38B	Fairfax loam, 2 to 7 percent slopes	3.4	0.4%
39B	Glenelg silt loam, 2 to 7 percent slopes	21.8	2.7%
39C	Glenelg silt loam, 7 to 15 percent slopes	11.	1.5%
66	Kingstowne sandy clay loam, 0 to 45 percent slopes	154.8	19.4%
70C	Kingstowne-Sassfras complex, 7 to 15 percent slopes	0.1	0.0%
71C	Kingstowne-Sassafras-Marumsc complex, 7 to 15 percent slopes	0.0	0.0%
72B	Kingstowne-Sassafras-Neabsco complex, 2 to 7 percent slopes	0.1	0.0%

Table 4-4: Soils within North Area Fort Belvoir			
Map Unit Symbol	Map Unit Name	Approximate Acres in Fort Belvoir	Approximate Percent within Fort Belvoir
76B	Matapeake silt loam, 2 to 7 percent slopes	1.7	0.2%
78B	Meadowville loam, 2 to 7 percent slopes	1.8	0.2%
79B	Nathalie gravelly loam, 2 to 7 percent slopes	18.1	2.3%
79C	Nathalie gravelly loam, 7 to 15 percent slopes	37.5	4.7%
79D	Nathalie gravelly loam, 15 to 25 percent slopes	9.8	1.2%
86	Pits, gravel	5.9	0.7%
87C	Rhodhiss sandy loam, 7 to 15 percent slopes	4.3	0.5%
87D	Rhodhiss sandy loam, 15 to 25 percent slopes	38.4	4.8%
87E	Rhodhiss sandy loam, 25 to 45 percent slopes	91.3	11.4%
88E	Rhodhiss-Rock outcrop complex, 25 to 45 percent slopes	0.0	0.0%
90B	Sassafras sandy loam, 2 to 7 percent slopes	10.1	1.3%
90C	Sassafras sandy loam, 7 to 15 percent slopes	25.5	3.2%
91C	Sassafras-Marumsco complex, 7 to 15 percent slopes	75.4	9.4%
91D	Sassafras-Marumsco complex, 15 to 25 percent slopes	48.9	6.1%
91E	Sassafras-Marumsco complex, 25 to 45 percent slopes	11.2	1.4%
92B	Sassafras-Neabsco complex, 2 to 7 percent slopes	0.5	0.1%
95	Urban land	34.1	4.3%
<b>Totals for Area of Interest</b>		<b>798.3</b>	<b>100.0%</b>

Source: USDA, 2016

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## 5.0 WATER RESOURCES

The DoD recognizes that its water resources play a multi-faceted role in maintaining military readiness, quality of life, and ecosystem integrity. Water resources such as streams and wetlands, referred to as waters of the U.S. (WOUS), perform numerous functions important to maintaining environmental quality of natural and cultural resources. Healthy water resources, such as wetlands and streams, supply essential habitat for unique plant communities, fish, and wildlife species. They improve environmental quality and resilience by moderating flood flows, mitigating storm surges, protecting against erosion, improving water quality, enhancing groundwater recharge, performing stream flow maintenance, supporting the global cycling of nutrients (available nitrogen and phosphorus), and sequestering greenhouse gases (especially carbon dioxide and methane). Additionally, water resources provide aesthetic, cultural, and recreational value while supplying realistic training conditions for field exercises. Therefore, the DoD utilizes its water resources to its benefit in order to meet the military mission and enhance the quality of life for soldiers.

Fort Belvoir is located within the Lower Potomac River watershed, a sub-watershed of the greater Chesapeake Bay watershed (Figure 5.1). Most water resources found in this region exhibit characteristics of the upper Coastal Plain and lower Piedmont, with resources typically occurring within a drainage network. The larger tributaries of the Potomac River found at Fort Belvoir - the Accotink Creek, Dogue Creek, and Pohick Creek - tend to have wide areas of tidal wetlands (marsh and mudflats) at their outfalls. Upstream from the mouths of these tributaries, the marsh wetland habitats transition to a floodplain/bottomland hardwood forest ecosystem within a riparian zone. This forested area tends to be wider in the lower reaches, where the tidally influenced floodplain spreads over the wide and low topography, and diminishes in extent further upstream concurrent with the narrowing of the floodplain. This narrowing of the floodplain results in a concentration of numerous water resources. Further upstream, smaller headwater streams and seeps occur.

As the largest estuary in the United States, the Chesapeake Bay is a complex ecosystem with various types of water resources and associative communities. Over the last 200 years, the Chesapeake Bay watershed has been and continues to be degraded by:

- Ditching and filling of wetlands for agriculture and development
- Constructed impoundments converting streams to manmade lakes/ponds
- Dredging and channelization of streams for drainage, flood control and navigation



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## Legend



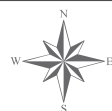
Fort Belvoir Boundary



Chesapeake Bay Watershed



**Fort Belvoir**



1 inch = 50 miles

0 15 30 60  
Miles

# CHESAPEAKE BAY WATERSHED

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**Figure 5.1**

Source: Chesapeake Bay Foundation,  
HUC8 USGS Watersheds, Fort Belvoir GIS

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- Disposal of dredged material in wetlands and waterways
- Logging, mining, and overgrazing by domestic animals
- Agricultural runoff containing contaminants from pesticides and herbicides
- Urban and industrial pollutants, air contaminants, and toxic chemicals
- Invasive species infestations
- Inadequate management of stormwater runoff from impervious surfaces and cleared lands
- Excess nutrients from agricultural and urban lands causing eutrophication
- Dams, culverts, and other structures blocking movement of aquatic life in waterways

Degraded water resources are vulnerable to further damage from natural processes that would otherwise generally not be harmful. Sea-level rise, droughts, flooding, and hurricanes and other large storm events can cause substantial erosion of sediments and material contributing to the degradation and loss of these ecosystems already impacted by human action.

Improper management of water resources can have far-reaching ecosystem effects. Inadequately managed stormwater runoff and water pollution can cause the loss of fish and wildlife populations via habitat degradation and increased problems with diseases. Local drought and storm conditions are likely to become more severe, exacerbating the effects of improper water resource management. The resulting increases in riverine and coastal flood severity pose additional risk of serious ecosystem damage. Therefore, the DoD recognizes the value of maintaining sustainable water resources to prevent such impacts and to meet the military mission. The DoD is committed to the minimization of impacts to and no net loss of such resources on its lands in order to achieve the military mission.

Fort Belvoir follows all required federal and state water resource laws in order to maintain and improve these vital resources. The DoD's water resources can be used in a variety of ways, such as for amphibious training, water purification training, recreation, and as a drinking water supply. Fort Belvoir is working to maintain and improve on-post water resources by implementing a watershed-based approach to planning management and by meeting regulatory requirements to preserve, protect, and enhance its water resources.

## 5.1 WATER RESOURCE POLICIES

### 5.1.1 Federal Water Resources Policy

- ***Clean Water Act (CWA) (33 CFR Part 320-350, 40 CFR Part 230, 33 USC §401-§1413)***

The CWA is the primary federal law that regulates water resources and establishes a national commitment to restore and maintain the chemical, physical, and biological integrity of the nation's water. This has been accomplished by implementing pollution control programs and setting water quality standards for contaminants in surface waters. The regulatory authority for CWA activities rests with USACE and the USEPA. Implementation of the CWA involves permitting and compliance monitoring of water pollution which directly impacts water resources, such as the placement of dredge or fill material into wetlands, lakes, streams and rivers; stormwater pollution; industrial stormwater pollution; waste water; industrial wastewater; aquaculture; and oil spills and spill prevention.

- ***Coastal Zone Management Act (CZMA) (16 USC §1452, et seq. most recently amended through the Coastal Management Enhancement Act of 1999)***

The CZMA's goal is to preserve, protect, develop, and where possible, to restore or enhance, the resources of the Nation's coastal zone (§1452[1]), including wetlands, floodplains, estuaries, fish and wildlife, and their habitats. The National Oceanic and Atmospheric Administration (NOAA) administers this program nationally, and the states administer the CZMA under their own programs with each state designating a lead agency. In Virginia, this program is known as the Virginia Coastal Zone Management Program (CZMP), and the Virginia Department of Environmental Quality (VDEQ) serves as the lead agency. The CZMP is a network of Virginia State agencies and local governments which administer enforceable laws and regulations to protect coastal resources and promote sustainable development. Together, NOAA, VDEQ, and their partners establish the designated coastal zone for Virginia, which covers 29 percent of Virginia and includes all of Virginia's Atlantic coast watershed, the Chesapeake Bay, and four tidal rivers reaching as far as 100 miles inland (James, York, Rappahannock, and Potomac Rivers). The program focuses on problems associated with, but not exclusively limited to, fisheries management, subaqueous lands management, wetlands management, dunes management, non-point source pollution control, shoreline sanitation, air pollution control, and coastal lands management.

- ***The Sikes Act (16 USC Section 670a, et seq.) as amended in the Sikes Act Improvement Act of 1997***
- ***North American Wetlands Conservation (16 USC §4408)***

- ***The Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (16 USC 4701 et seq.)***
- ***Wetlands Resources (16 USC §3901)***
- ***The American Heritage Rivers Initiative of 1997***
- ***The Chesapeake Bay Restoration Act of 2000***
- ***Executive Order 11988 – Floodplain Management (Fed. Reg. 26951)***
- ***Executive Order 11990 – Protection of Wetlands (Fed. Reg. 26961)***
- ***Executive Order 13508 – Chesapeake Bay Protection and Restoration (Fed. Reg. 23099)***
- ***Executive Order 13693 – Planning for Federal Sustainability in the Next Decade (80 Fed. Reg. 15871)***
- ***Safe Drinking Water Act (16 USC Sec. 300f et seq.)***
- ***Energy Independence Security Act (42 USC Sec. 17094)***
- ***Unified Federal Policy for a Watershed Approach to Federal Land and Resource Management (65 Fed. Reg. 62565-62572)***
- ***The 2014 Chesapeake Bay Watershed Agreement***

### **5.1.2 State Water Resources Policy**

- ***Virginia Water Control Law (Virginia Code §62.1-44.2)***

The Virginia Water Control Law is a comprehensive policy protecting the waters of Virginia. The Virginia Department of Environmental Quality (VDEQ) was given regulatory authority under this law, as well as the Virginia Water Protection Permit Program Regulation (9 VAC 25-210) and the Virginia Pollution Discharge Elimination System (VPDES) Permit Program Regulation (9 VAC 25-31), to protect various components of water resources.

***Subaqueous Guidelines, Constitution of Virginia (Title 28.2, Chapter 12)*** Tidal waters in Virginia are regulated by the Virginia Marine Resources Commission (VMRC). The VMRC operates under the mandates of the Virginia Wetlands and Subaqueous Laws under the Code of Virginia, Title 28.2, Chapter 12-1200. All the beds, bays, rivers, creeks, and the shores of the sea within Jurisdiction of the Commonwealth, not conveyed by special grant or compact according to the law shall remain the property of the Commonwealth. As such, submerged lands, to include wetlands are regulated by the Commonwealth to prevent the despoliation and destruction within its jurisdiction while accommodating necessary economic development.

- ***Chesapeake Bay Program (CBP)***

The CBP, established in 1983, is a cooperative, voluntary program comprised of various federal, state, and local agencies working towards the restoration and protection of the Chesapeake Bay. Since its inception, the program has evolved through numerous agreements, directives, and policies.

Executive Order 13508 from 2009 declared the Chesapeake Bay a national treasure and required the federal government to take action and accountability to help meet the goals of the CBP. The Army has established five strategy goals.

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

This agreement effectively guides development of a watershed-based approach for natural resources management that promotes the goals of the CBP.

- ***Chesapeake Bay Preservation Areas (9 VAC 25-830-50)***

Under this regulation, any locality found within Tidewater Virginia is required to maintain a vegetative buffer no less than 100 feet wide located adjacent to and landward of all tidal shores, tidal wetlands, and non-tidal wetlands connected by surface flow and contiguous to tidal wetlands along water bodies with perennial flow. Fort Belvoir also applies a 35 foot buffer for all intermittent streams. These areas are known as Resource Protection Areas (RPAs).

- ***Virginia Pollutant Discharge Elimination System (VPDES) Permits***

Fort Belvoir's stormwater system is governed under two separate VPDES permits: a General Permit for Discharge of Stormwater from a Municipal Separate Storm Sewer System (MS4) and an Industrial Stormwater (ISW) Individual Major Permit.

- ***Chesapeake Bay Preservation Act (Virginia Code §10.1-2100 et seq.)***
- ***Virginia Water Protection Regulations (9 VAC 25-210)***
- ***Virginia Water Quality Standards (9 VAC 25-260)***
- ***Authority to enact the Virginia Water Protection permit (Virginia Code §62.1-44.15:20)***
- ***Virginia Water Quality Improvement Act (Virginia Code §10.1-2117 through 2134)***
- ***Virginia Water Protection Regulations (Virginia Regulations, VR 680-15-02)***
- ***Virginia Stormwater Management Act (Virginia Code §62.1-44.15 through 44.30)***



- ***Surface Water Management Act of 1989 (Virginia Code §62.1-242 et seq.)***
- ***Virginia Water Protection Permit (Section 401 certification)***
- ***Virginia Water Protection Permit (Virginia Code §62.1-44.15:5)***
- ***Virginia Chesapeake Bay Preservation Act (CBPA, Virginia Code §§ 62.1-44.15:67 through 62.1-44.15:79)***

### **5.1.3 Department of Defense Water Resources Policy**

- ***Natural Resources Conservation Program (DoDI 4715.03)***  
DoD's natural resources management policy and instruction requires installations to follow an ecosystem-based approach using adaptive management of natural resources, to inventory and protect important biological resources, and promote biodiversity while being able to provide continued access to installation air, water and land for realistic military training and testing. The instruction also allows for multiple uses of an installation's natural resources, and for public access to these resources for recreation, education, and scientific research and study, compatible with the installation's ecosystem management goals, and military mission. Excerpts from DoDI 4715.03 that are applicable to water resources management are presented below.

<b>Excerpts from DoDI 4715.03 Select Provisions Applicable to Water Resources</b>
<ul style="list-style-type: none"> <li>• The principle purpose of DoD lands, water, airspace, and coastal resources is to support mission-related activities. All DoD natural resources conservation program activities shall work to guarantee DoD continued access to its land, air, and water resources for realistic military training and testing and to sustain the long-term ecological integrity of the resource base and the ecosystem services it provides, in accordance with 16 USC Section 670a-670o.</li> <li>• DoD shall demonstrate stewardship of natural resources in its trust by protecting and enhancing those resources for mission support, biodiversity conservation, and maintenance of ecosystem services.</li> <li>• DoD Components shall ensure no net loss of size, function, and value of wetlands, and will preserve the natural and beneficial values of wetlands in carrying out activities in accordance with E.O. 11990 and the White House Office on Environmental Policy (Reference (ah)).</li> <li>• DoD shall manage DoD lands, waters, airspace, and coastal resources or natural resources for multiple uses when appropriate, including sustainable yield of all renewable resources, scientific research, education, and recreation.</li> <li>• All DoD facilities and installations shall plan, program, and budget to achieve, monitor, and maintain compliance with all applicable Federal natural resources statutory and regulatory requirements, E.O.s, and Presidential memorandums.</li> </ul>

**Excerpts from DoDI 4715.03**  
**Select Provisions Applicable to Water Resources**

- DoD shall follow an ecosystem-based management approach to natural resources-related practices and decisions, using scientifically sound conservation procedures, techniques, and data.
- DoD Components shall use a watershed-based approach to manage operations, activities, and lands to avoid or minimize impacts to wetlands, ground water, and surface waters on or adjacent to installations in accordance with the guidelines and goals established in the Unified Federal Policy for a Watershed Approach to Federal Land and Resource Management, pages 62565 through 62572 of volume 65, FR (Reference (ae)) and E.O. 13508 (Reference 9af)).
- When avoidance of wetlands and other waters of the United States is not practicable, and impacts have been minimized, participation in an approved off-site mitigation bank or in-lieu fee instrument is encouraged as sound conservation planning and is authorized by section 2694b of Reference (v). Offsite mitigation may provide a preferred alternative to meet watershed protection and ecosystem goals and meet future mission requirements. The enhancement, creation, or restoration of wetlands or streams on DoD property may also be an acceptable means for mitigating mission impacts on wetlands to meet permit conditions as required by 33 USC Section 1344.(Reference (ai)).
- In the event that discharges of pollutants into wetlands or other U.S. waters are necessary, DoD Components will ensure appropriate permits are obtained and mitigation completed as required by Section 1344.
- DoD Components shall comply with applicable nonpoint source laws respecting the control and abatement of water pollution in accordance with 1323 of Reference (ai). DoD shall incorporate the best management practices for runoff for the State in which the installation is located to minimize nonpoint sources of water pollution.
- Adverse impacts on floodplains shall be avoided when possible. The direct or indirect support of floodplain development shall be avoided where there is a practicable alternative in accordance with E.O. 11988 (Reference (aj)).
- DoD installations shall complete planning-level surveys, as defined in the DoDI 4715.03 glossary, to characterize significant installation resources.
- Areas on DoD installations that contain natural resources (e.g., ecological, scenic, recreational, or educational) that warrant special conservation efforts may be designated as Special Natural Areas where such conservation is consistent with the military mission.
- DoD shall, as practicable, manage its operations, activities, and natural resources to avoid or minimize adverse effects to natural resources on, adjacent to, or in close proximity to DoD lands or near-shore areas.

## 5.1.4 Department of the Army Water Resources Policy

- ***Environmental Protection and Enhancement (AR 200-1)***

The Army's natural resources management policy is contained within AR 200-1, Environmental Protection and Enhancement. This regulation establishes the Army's requirements for complying with applicable Federal, State, and local laws and regulations regarding, but not limited to, water resources management. This regulation is used for preserving, protecting, conserving, and restoring the quality of the environment. This regulation supports the Army Strategy for the Environment, which presents the Army's environmental vision as sustainable operations, installations, systems, and communities enabling the Army mission. AR 200-1 addresses recreational waters, water resource protection and management, watershed management, wastewater and storm water, and drinking water. AR 200-1 also addresses sediment and erosion control, federal actions in or affecting a coastal zone, the protection of aquatic resources, and access to water areas suitable for recreational use. Excerpts from AR 200-1 that are applicable to water resources management are presented below.

<b>Excerpts from AR 200-1 Sections Applicable to Water Resources</b>
<ul style="list-style-type: none"><li>• [The Army will] obtain and comply with all required Federal, State, and local Clean Water Act (CWA), Coastal Zone Management Act (CZMA), and Safe Drinking Water Act (SDWA) permits (includes wastewater and storm water permits, operational permits for drinking water systems, groundwater discharge permits, wetland 404/401 permits, septic system permits, underground injection control, and so forth).</li><li>• All Army organizations and activities will comply with legally applicable Federal, State, and local regulations, E.O.s, and FGS to conserve, protect and restore surface water resources (including wetlands, estuaries, streams, lakes and so forth), and groundwater (wells and aquifers).</li><li>• Executive Order 11988 addresses the action federal agencies take to identify and protect flood plains and wetlands, respectively.</li><li>• Executive Order 11990 addresses the actions federal agencies take to identify, protect, and initiate action to enhance wetlands natural values.</li><li>• The CZMA requires that activities within the coastal zone of any state must be consistent with the state's Coastal Zone Management Plan.</li><li>• Unique biological resources, including wetlands, require a level of planned management that can be addressed by an INRMP.</li><li>• Installations use a watershed management approach when evaluating projects and programs to satisfy environmental regulations, facility projects, and master planning that may impact the quality of water resources. Using a watershed approach means that installations should develop a framework or plan for coordinating, integrating and managing their mission activities that impact the quality of water resources located</li></ul>

## **Excerpts from AR 200-1**

### **Sections Applicable to Water Resources**

on (and those that migrate off) their installation. This approach also requires a strong commitment to involving stakeholders, both internal and external, in the management of water resources.

- Comply with facilities policy concerning use of wastewater collection/treatment systems that are owned and operated by public or private entities when economically feasible and when security is not compromised.
- Comply with all requirements, substantive and procedural, for control and abatement of water pollution, as outlined in the CWA that require Army Compliance.
- Control or eliminate sources of pollutants and contaminants to protect water bodies and groundwater.
- Employ abatement measurement for non-point source runoff from construction, facility operations, and land management activities.
- Encourage reuse or recycling of wastewater, sewage sludge, wash rack sediment, greases or oils, and other waste whenever economically feasible and environmentally beneficial.
- Provide drinking water to fixed facilities in accordance with the requirements of the SDWA and applicable State and local regulations.
- Conduct Planning Level Surveys (PLSs) of surface waters that describe and map the distribution and extent of surface waters, and is consistent with USGS standards.
- Ensure that turbidity and sediment levels do not irreparably degrade aquatic biota and habitat from an ecosystem perspective, or significantly impact shallow ground water aquifers.
- Keep soil sediment, as a pollutant, in wetlands and waterways within compliance limits.
- Promote biodiversity and ecosystem sustainability on Army lands and waters consistent with the mission and INRMP objectives.
- Manage species at risk and habitats [in aquatic resources] to prevent listing that could affect military readiness.

### **5.1.5 Fort Belvoir Water Resources Policy**

Fort Belvoir has no overarching water resources policy, other than the policy addressed in this INRMP. The installation does, however, have three garrison policy memorandums: *Environmental Policy*, *Stormwater Pollution Prevention*, and *Stormwater Pollution Plan Requirements* – that address environmental and stormwater issues. Fort Belvoir also has four technical bulletins for erosion and sediment control, providing requirements for construction projects of various types and disturbance areas. The wetlands program has an informal guidance document for activities that impact WOUS, providing step-by-step direction on how to evaluate and proceed with projects impacting WOUS.

- ***Fort Belvoir's Environmental Policy***

This policy promulgates the installation's commitment to environmental management. It promotes integrating sound pollution prevention practices, waste minimization, and sustainable practices into daily decisions, activities, and planning. This policy also affirms that Fort Belvoir will proactively manage environmental issues and will conserve and protect its natural resources, special natural areas, and wetlands through efficient use, reuse and sustainable management.

- ***Fort Belvoir's Stormwater Pollution Prevention Policy***

This policy acknowledges the direct connection between stormwater pollution and impacts to the water quality of the post's waterways, the associated ecosystems, and to human health and recreational opportunities. This policy is in place to prevent illicit discharges and illegal dumping into the storm sewer systems on post in order to ensure protection of the water quality of Fort Belvoir's waterways and compliance with the Fort Belvoir VPDES MS4 and ISW permits. This policy has several provisions addressing such activities as materials storage; spill response; waste material disposal; vehicle cleaning, maintenance, and disposal; and use of de-icing materials.

- ***Fort Belvoir's Stormwater Pollution Prevention Plan (SWPPP) Requirements Policy***

This policy provides specific requirements for commanders, supervisors, facility operators, and construction contractors regarding implementing and maintaining operational compliance with facility-specific SWPPPs. SWPPPs are required as part of the post's MS4 and ISW permits.

## **5.2 BASELINE WATER RESOURCES CONDITIONS**

Fort Belvoir completed three separate baseline inventories for water resources on Main Post and on FBNA. The purpose of these inventories and surveys was to identify and map the boundaries and composition of watersheds and WOUS on post and to identify the existing aquatic resources present on Fort Belvoir. The baseline inventories do not provide the resolution to make pin point management decisions on water resources features or systems such as streams, wetlands or ecosystems. Field surveys and analysis (i.e. wetland delineations, benthic investigations, submerged aquatic vegetation investigations, physical constituents sampling, stream assessments) are performed to provide the needed resolution that is unavailable from the baseline inventories. Field surveys and analysis will be integrated to further refine and increase the quality of the baseline resources data.

## **5.2.1 Watersheds**

### **5.2.1.1 Watershed Studies**

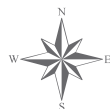
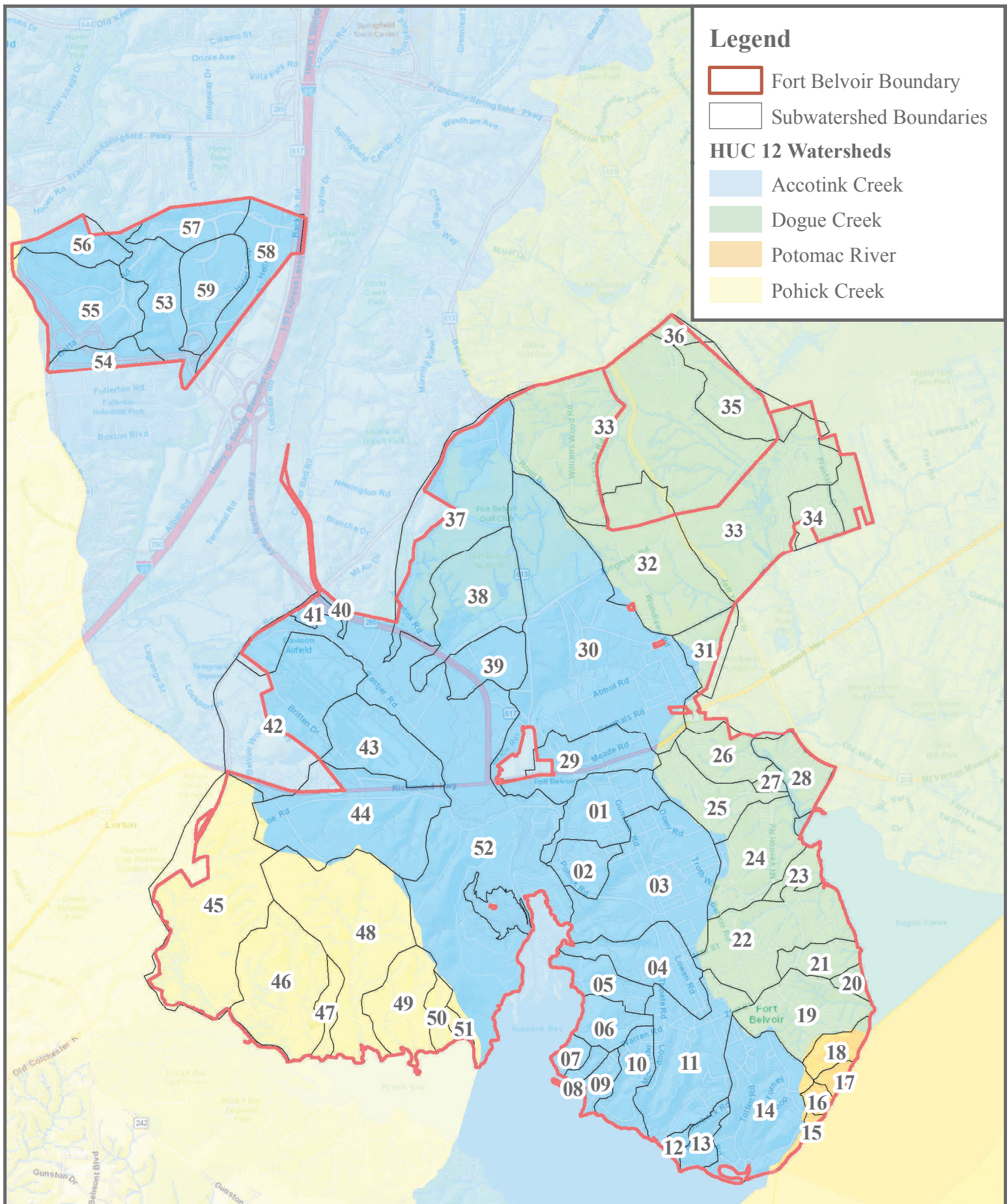
Information on watershed conditions at Fort Belvoir has been obtained through the following efforts:

A comprehensive baseline watershed survey was undertaken to characterize installation waterways and their associated watersheds, identify existing problems within installation waterways, and recommend concepts to correct problems. The findings of this watershed survey are reported in *Watershed Delineation Project and Problem Site Descriptions, Including Maps and Photographs* (Landgraf, 1999). The data from this survey have been incorporated into the Fort Belvoir GIS (Figure 5.2).

A stream corridor assessment was undertaken to further address the problem conditions identified in the 1999 watershed survey, and to develop management recommendations to correct existing problems and prevent future problems. The results of the stream corridor assessment, including management recommendations, are reported in *Watershed-based Stream Corridor Management and Protection, Fort Belvoir, Virginia*, which was prepared by the U.S. Army Corps of Engineers Waterways Experiment Station (Allen et al., 1999). This report presents a planned approach to stormwater management; erosion control; water quality management; riparian buffer restoration, maintenance and protection; and fish and wildlife habitat protection and restoration. The report addresses specific types of stream corridor problems, describes solutions, and provides overall recommendations and action items to conserve, enhance, and restore ecological conditions within stream corridors, and prevent future problems.

Finally, numerous stream assessments have been carried out yearly as a monitoring tool in order to track any changes reported in the above baseline surveys. This information is used to update the RPA information for on post streams (Figure 5.3) as well as other natural resource areas. Results from the yearly assessments are used to update information incorporated into the Fort Belvoir GIS as well as a means to provide a more thorough baseline of individual streams and waterways. This information is retained on file and utilized when appropriate for stream restoration or enhancement.





1 inch = 0.75 miles

0 0.25 0.5 1 Miles

## WATERSHEDS AND SUBWATERSHEDS ON FORT BELVOIR

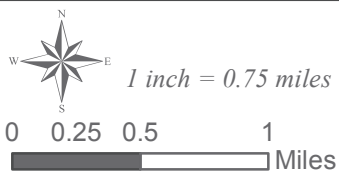
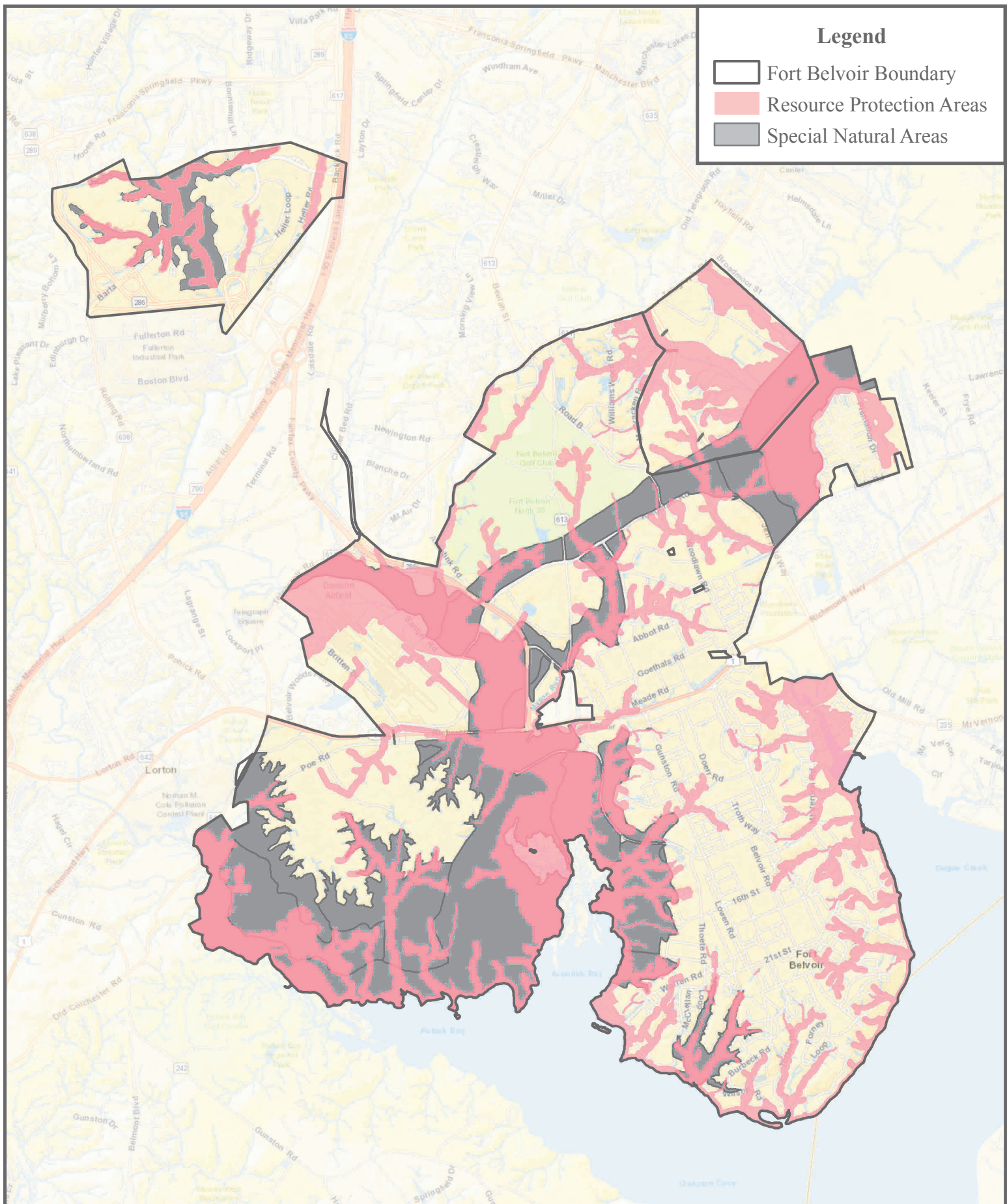
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**Figure 5.2**

Source: HUC12 USGS Watersheds,  
Fort Belvoir GIS



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# **RESOURCE PROTECTION AREAS ON FORT BELVOIR**

Unclassified // FOUO

**Figure 5.3**

Source: Fort Belvoir GIS,  
Google road maps,

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**Table 5-1: Fort Belvoir Major Watershed  
Survey Summary**

<b><i>Watershed</i></b>	<b><i>Size (acres)</i></b>	<b><i>Impervious Surface (%)</i></b>	<b><i>Forest (%)</i></b>	<b><i>Open Area (%)</i></b>	<b><i>Wetland (%)</i></b>
Accotink Creek	4,514.66	10.11	63.06	28.06	13.49
Dogue Creek	2,334.83	11.40	65.99	22.65	17.78
Pohick Creek	698.91	0.50	94.96	4.24	19.97
Gunston Cove	680.57	16.49	51.85	31.66	2.98
Accotink Bay	603.91	18.58	45.35	42.13	4.42
Pohick Bay	565.68	0.01	93.46	6.54	5.50
Potomac River	236.61	14.24	59.62	26.15	4.34

Source: Landgraf, 1999 updated with information from the 2000 Watershed Update.

### **5.2.1.2 Watershed Conditions**

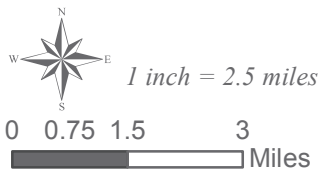
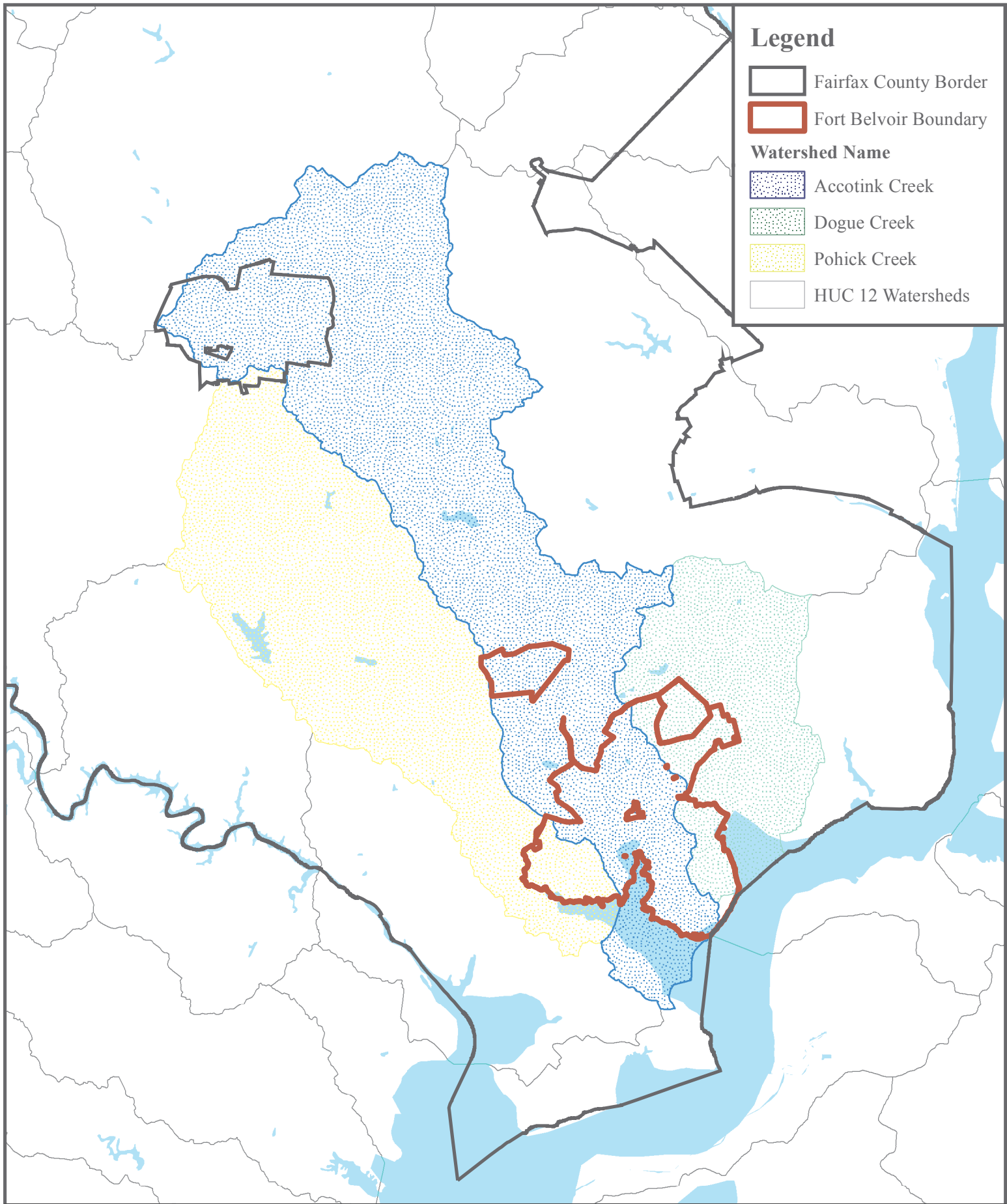
The baseline watershed survey (Landgraf, 1999) identified seven main watersheds on Fort Belvoir (Figure 5.2, 5.4 and Table 5.1). Fort Belvoir's three largest watersheds originate off-post: the Accotink Creek, Pohick Creek, and Dogue Creek watersheds. The majority of water from within installation boundaries flows into these three watersheds. The remaining installation areas that do not drain to the three major creeks belong to four smaller on-post watersheds: the Accotink Bay, Pohick Bay, Gunston Cove, and the Potomac River watersheds. The baseline watershed survey further delineated Fort Belvoir's seven main watersheds into 53 sub-watersheds (Figure 5.2). Please note that most information below from Landgraf, 1999 has not been updated since 2000 (Landgraf, 2000) and as such does not reflect the most up to date information. An updated assessment is needed.

#### **Accotink Creek**

The Accotink Creek watershed is the largest watershed on the installation. Its total acreage on Fort Belvoir, including the FBNA, is 4,515 acres. The area is comprised of 14 sub-watersheds (Figure 5.2, 5.4, Table 5.2), 13 of which lie within the Main Post and on FBNA. Accotink Creek and its tributaries flow through the central portion of the installation, draining 3,707 acres, or 44%, of the Main Post. Forests cover 63.06% of Accotink Creek watershed on Fort Belvoir. This watershed is tidally influenced to U.S. Route 1 and is relatively undeveloped, containing only 10.11% impervious surface. The headwaters of Accotink Creek originate east of the City of Fairfax and just south of the City of Vienna. The Accotink Creek watershed contains the third highest percentage of wetlands (13.49%) on the installation (Landgraf, 1999).

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## MAJOR WATERSHEDS ORIGINATING OUTSIDE of FORT BELVOIR

**Figure 5.4**

Unclassified // FOUO

Source: Fairfax County Government,  
USGS HUC 12 Watersheds, Fort Belvoir GIS

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<b>Table 5-2: Fort Belvoir Watershed Survey Accotink Creek</b>								
<b>Sub-water shed</b>	<b>Size (acres)</b>	<b>Impervious Surface Acres (%)</b>		<b>Forest Acres (%)</b>		<b>Open Area Acres (%)</b>		<b>Wetland Acres (%)</b>
1	133.22	19.82	(14.9)	71.37	(53.57)	42.03	(31.55)	8.81 (6.61)
2	62.43	12.63	(20.2)	38.43	(61.56)	11.37	(18.21)	11.54 (18.48)
29	147.83	37.91	(25.6)	53.47	(36.17)	56.44	(38.18)	8.87 (6.01)
30	699.63	121.15	(17.3)	296.81	(42.42)	281.67	(40.26)	23.02 (3.29)
37	344.14	20.97	(6.1)	255.66	(74.29)	65.51	(19.04)	9.73 (2.83)
38	205.97	9.77	(4.8)	85.16	(41.35)	111.04	(53.91)	15.93 (7.73)
39	97.97	45.28	(46.2)	11.02	(11.25)	41.67	(42.53)	1.43 (1.46)
40	7.68	0.83	(10.8)	1.87	(24.35)	4.98	(64.84)	1.13 (14.71)
41	21.20	5.59	(26.4)	7.87	(37.14)	7.73	(36.48)	5.86 (27.65)
42	352.08	55.10	(15.6)	171.33	(48.66)	113.65	(32.28)	33.58 (9.54)
43	154.93	35.63	(23.0)	44.89	(28.97)	92.41	(48.03)	1.77 (1.14)
44	329.93	7.91	(2.4)	266.85	(80.88)	55.17	(16.72)	10.67 (3.23)
52	1,150.95	32.79	(2.9)	920.60	(79.99)	197.56	(17.16)	451.04 (39.19)
53	806.70	51.02	(6.3)	621.19	(77.00)	185.51	(23.00)	25.71 (3.19)
<b>Total*</b>	<b>4,514.66</b>	<b>456.40</b>	<b>(10.11)</b>	<b>2846.52</b>	<b>(63.06)</b>	<b>1266.74</b>	<b>(28.06)</b>	<b>609.09</b> <b>(13.49)</b>

Source: Landgraf, 1999 updated with information from the 2000 Watershed Update.

\*Total acreages (and percentages) under each land use/land cover category (i.e., impervious, forest, open area, and wetland) do not combine to equal the total acreage (100%) for the watershed because some areas of overlap exist.

Within the past 5 years, major development activity within the watershed has caused substantial changes. Most development in the watershed on post is concentrated in the area north of U.S. Route 1 and includes new/expanded facilities for the Post Exchange, new National Museum of the U.S. Army, new administrative buildings, new roads and supporting infrastructure, updates and improvements to existing infrastructure, and new industrial facilities. Development over the last 10 years includes administrative buildings, the Fort Belvoir Community Hospital, U.S. Army Legal Services Agency (USALSA), United Service Organizations (USO) Warrior and Family Center, and other support infrastructure. The impacts to this watershed will increase runoff and subsequently increase stream flow volume, both of which contribute to the instability of stream channels, and degradation of water quality and riparian lands (Landgraf, 1999). Several areas within the Accotink Creek watershed are under consideration for future facilities construction according to the RPMP.

## Dogue Creek

The northeast portion of Fort Belvoir is in the Dogue Creek watershed, the second largest watershed on the installation. The Dogue Creek watershed has 15 sub-watersheds, all of which are on the Main Post (Figure 5.2, 5.4, Table 5.3). Fort Belvoir covers slightly more than one-fifth (2,335 acres) of the Dogue Creek watershed in Fairfax County (10,883 acres). The Dogue Creek watershed has the

second highest percentage of wetlands (17.78%) on the installation, including large wetland areas in the Jackson Miles Abbott Wetland Refuge (JMAWR), to help reduce storm flow velocities. Impervious surfaces cover 11.40% of the Dogue Creek watershed on Fort Belvoir, and forests cover 65.99% (Landgraf, 1999).

<b>Table 5-3: Fort Belvoir Watershed Survey Dogue Creek</b>							
<b>Subwatershed</b>	<b>Size (acres)</b>	<b>Impervious Surface Acres (%)</b>	<b>Forest Acres (%)</b>	<b>Open Area Acres (%)</b>	<b>Wetland Acres (%)</b>		
20	16.82	0.46 (2.7)	12.39 (73.66)	3.97 (23.61)	0.76 (4.52)		
21	54.22	8.61 (15.9)	27.74 (51.16)	17.87 (32.96)	2.22 (4.09)		
22	217.74	45.99 (21.1)	84.51 (38.81)	87.25 (40.07)	12.17 (5.59)		
23	40.72	3.94 (9.7)	30.87 (75.81)	5.91 (14.51)	6.22 (15.28)		
24	161.99	29.72 (18.3)	89.98 (55.55)	42.29 (26.11)	11.74 (7.25)		
25	113.35	15.61 (13.8)	39.79 (35.11)	57.95 (51.12)	3.93 (3.47)		
26	72.61	6.40 (8.8)	35.02 (48.23)	31.19 (42.96)	7.72 (10.63)		
27	26.89	4.90 (18.2)	9.76 (36.31)	12.23 (45.48)	7.08 (26.33)		
28	72.47	14.96 (20.6)	16.57 (22.86)	40.94 (56.49)	19.38 (26.74)		
31	68.95	14.10 (20.4)	39.65 (57.51)	15.21 (22.04)	0.37 (0.54)		
32	302.28	16.12 (5.3)	258.71 (85.58)	27.46 (9.08)	18.35 (6.07)		
33	830.69	58.91 (7.1)	704.77 (84.84)	67.02 (8.07)	223.75 (26.94)		
34	202.62	33.40 (16.5)	76.36 (37.69)	92.86 (45.83)	46.71 (23.05)		
35	130.29	11.53 (8.8)	97.03 (74.47)	21.73 (16.68)	47.31 (36.31)		
36	23.19	0.77 (3.3)	17.56 (75.72)	4.86 (20.96)	7.41 (31.91)		
<b>Total*</b>	<b>2334.83</b>	<b>265.42 (11.40)</b>	<b>1540.71 (65.99)</b>	<b>528.74 (22.65)</b>	<b>415.12 (17.78)</b>		

Source: Landgraf, 1999.

\*Total acreages (and percentages) under each land use/land cover category (i.e., impervious, forest, open area, and wetland) do not combine to equal the total acreage (100%) for the watershed because some areas of overlap exist.

The Dogue Creek watershed has the most intense off-post development of the three main watersheds on Fort Belvoir over the last 15 years. Much of Base Realignment and Closure (BRAC) development (i.e., Fort Belvoir Community Hospital, MDA, and supporting infrastructure) occurred in this watershed. Development only recently has slowed. Portions of the watershed within the limits of Fort Belvoir remain relatively undeveloped due to the presence of JMAWR.

Within the installation, the Dogue Creek watershed contains nine of the fourteen housing areas, a school, day care, administrative offices, two hotels, a marina, and supporting infrastructure. All of these developed areas contribute a considerable amount of impervious surface area which ultimately drain to Dogue Creek. The high percentage of impervious surface area leads to increases in runoff velocities, pollution, and accelerates downstream erosion. Several areas within the Dogue Creek watershed are under consideration for future facilities construction according to the RPMP.

## Pohick Creek

The Pohick Creek watershed is in the southwest corner of the installation, in the undeveloped South Post training area. Fort Belvoir contains only 3% (699 acres) of the overall area (22,755 acres) of the Pohick Creek watershed as delineated by Fairfax County. Two subwatersheds of Pohick Creek are located on post (Figure 5.2, 5.4, Table 5.4). Pohick Creek is the least developed of the three main Fort Belvoir watersheds. The headwaters of Pohick Creek originate just south of the City of Fairfax (Figure 5.4) and are tidally influenced up to the Old Colchester Road crossing at Fort Belvoir's western boundary. As with the other major watersheds, the Pohick Creek watershed has been experiencing development outside of the limits of Fort Belvoir. Much of the available land just outside of the installation limits has been developed with much of the greater watershed experiencing the same type of development. Within the installation, the Pohick Creek watershed has the lowest percentage of open area (4.24%), the second lowest percentage of impervious surface (0.5%), and the highest percentage of wetlands (19.97%) and forests (94.96%) (Landgraf, 1999).

<b>Table 5-4: Fort Belvoir Watershed Survey Pohick Creek</b>					
<b><i>Sub watershed</i></b>	<b><i>Size (acres)</i></b>	<b><i>Impervious Surface Acres (%)</i></b>	<b><i>Forest Acres (%)</i></b>	<b><i>Open Area Acres (%)</i></b>	<b><i>Wetland Acres (%)</i></b>
45	458.51	3.51 (0.80)	424.64 (92.61)	28.36 (6.19)	87.11 (19.00)
46	240.40	0.05 (0.02)	239.07 (99.45)	1.28 (0.53)	52.46 (21.82)
<b>Total*</b>	<b>698.91</b>	<b>3.56 (0.50)</b>	<b>663.71 (94.96)</b>	<b>29.64 (4.24)</b>	<b>139.57 (19.97)</b>

Source: Landgraf, 1999.

\*Total acreages (and percentages) under each land use/land cover category (i.e., impervious, forest, open area, and wetland) do not combine to equal the total acreage (100%) for the watershed because some areas of overlap exist.

The Noman M. Cole, Jr. Pollution Control Plant, formerly known as the Lower Potomac Pollution Control Plant, is a wastewater treatment facility located immediately adjacent to Fort Belvoir on Pohick Creek between Old Colchester Road and U.S. Route 1. Discharges from the treatment plant can represent a substantial increase to the natural flow regime of Pohick Creek increasing discharge flows up to an additional 67 million gallons per day. The plant has been meeting 100% NPDES permit compliance for the last 18 years, helping to minimize impacts to water resources on Fort Belvoir. The only on-post development in this watershed are the horse stables in the south west training area.

## Gunston Cove

The Gunston Cove watershed consists of areas on Fort Belvoir that drain directly from Fort Belvoir into Gunston Cove, without first entering Accotink Bay or Pohick Bay. It is one of the four watersheds that originate on post, and is

completely contained within Fort Belvoir. Gunston Cove is a tidal waterway, and its watershed is comprised of seven subwatersheds on the installation totaling 681 acres (Figure 5.2, 5.4, Table 5.5). Of the seven Fort Belvoir watersheds, the Gunston Cove watershed contains the second highest percentage of both impervious surface and open area (16.49% and 31.66% respectively). The watershed also contains the lowest percentage of wetlands (2.98%). The Gunston Cove watershed on Fort Belvoir is 51.85% forested (Landgraf, 1999).

<b>Table 5-5: Fort Belvoir Watershed Survey Gunston Cove</b>					
<b>Subwatershed</b>	<b>Size (acres)</b>	<b>Impervious Surface Acres (%)</b>	<b>Forest Acres (%)</b>	<b>Open Area Acres (%)</b>	<b>Wetland Acres (%)</b>
8	14.83	2.45 (16.5)	8.26 (55.71)	4.12 (27.78)	0.31 (2.02)
9	30.56	1.51 (4.9)	23.31 (76.28)	5.75 (18.82)	1.35 (4.42)
10	78.31	5.36 (6.8)	57.29 (73.16)	15.66 (20.01)	2.47 (3.15)
11	251.62	45.51 (18.1)	125.34 (49.81)	80.77 (32.11)	8.86 (3.52)
12	12.28	2.44 (19.9)	3.79 (30.86)	6.05 (49.27)	0.59 (4.81)
13	44.59	9.37 (21.0)	16.49 (36.98)	18.73 (42.01)	1.71 (3.83)
14	248.38	45.58 (18.4)	118.41 (47.67)	84.41 (33.98)	5.02 (2.02)
<b>Total*</b>	<b>680.57</b>	<b>112.22 (16.49)</b>	<b>352.89 (51.85)</b>	<b>215.49 (31.66)</b>	<b>20.31 (2.98)</b>

Source: Landgraf, 1999.

\*Total acreages (and percentages) under each land use/land cover category (i.e., impervious, forest, open area, and wetland) do not combine to equal the total acreage (100%) for the watershed because some areas of overlap exist.

Within the Gunston Cove watershed on Fort Belvoir, steeply graded tributary streams coming down from the upper plateau area are accelerating downstream gully and bank erosion. Sediment from the gully erosion is being deposited in the wetland area prior to Gunston Cove. The impacted streams in this watershed continue to have impacts on water resources.

### **Accotink Bay**

The Accotink Bay watershed consists of areas that drain directly from Fort Belvoir into Accotink Bay without first draining into Accotink Creek. The watershed originates on, and is completely contained within, Fort Belvoir. Accotink Bay is tidal, and receives drainage from five subwatersheds with a total area of 604 acres (Figure 5.2, 5.4, Table 5.6). It has the highest overall impervious surface and open area percentages on the installation (18.58% and 42.13% respectively), making it a candidate for reforestation and reduction of impervious surface area. The watershed is 4.42% wetland, and contains the lowest percentage of forested land (45.35%) (Landgraf, 1999).

<b>Table 5-6: Fort Belvoir Watershed Survey Accotink Bay</b>					
<b>Subwatershed</b>	<b>Size (acres)</b>	<b>Impervious Surface Acres (%)</b>	<b>Forest Acres (%)</b>	<b>Open Area Acres (%)</b>	<b>Wetland Acres (%)</b>
3	330.68	54.74 (16.60)	134.99 (40.82)	140.95 (42.62)	14.94 (4.52)
4	132.38	39.54 (29.90)	38.99 (29.45)	53.85 (40.68)	7.12 (5.38)
5	58.01	10.76 (18.60)	39.68 (68.41)	44.11 (13.05)	1.82 (3.14)
6	60.87	4.01 (6.60)	54.04 (88.79)	2.82 (4.63)	2.39 (3.93)
7	21.97	3.15 (14.30)	6.15 (27.99)	12.67 (57.67)	0.41 (1.87)
<b>Total*</b>	<b>603.91</b>	<b>112.20 (18.58)</b>	<b>273.85 (45.35)</b>	<b>254.40 (42.13)</b>	<b>26.68 (4.42)</b>

Source: Landgraf, 1999.

\*Total acreages (and percentages) under each land use/land cover category (i.e., impervious, forest, open area, and wetland) do not combine to equal the total acreage (100%) for the watershed because some areas of overlap exist.

Improvements in this watershed include a regional stormwater pond that is being constructed as well as several stream restorations. This will decrease impacts from impervious area; however, a high percentage of impervious area will remain due to the preexisting development in this watershed.

### **Pohick Bay**

The Pohick Bay watershed consists of areas on Fort Belvoir that drain directly from Fort Belvoir into Pohick Bay, without first draining into Pohick Creek. The watershed originates on Fort Belvoir. Pohick Bay is tidal and receives drainage from five subwatersheds with a total area of 566 acres (Figure 5.2, 5.4, Table 5.7). The Pohick Bay watershed has the lowest percentage of impervious surface (0.01%) and the second highest percentage of forest (93.46%). The watershed on post is 5.50% wetland. Most of Pohick Bay's subwatersheds on post contain little or no impervious surface, and little or no open area (Landgraf, 1999).

<b>Table 5-7: Fort Belvoir Watershed Survey Pohick Bay</b>						
<b>Subwatershed</b>	<b>Size (acres)</b>	<b>Impervious Surface Acres (%)</b>	<b>Forest Acres (%)</b>	<b>Open Area Acres (%)</b>	<b>Wetland Acres (%)</b>	
47	33.25	0.00 (0.000)	33.24 (99.97)	0.01 (0.03)	2.23 (6.71)	
48	363.08	0.01 (0.003)	326.11 (89.82)	36.96 (10.18)	16.84 (4.64)	
49	127.18	0.02 (0.015)	127.15 (99.97)	0.01 (0.01)	10.47 (8.23)	
50	31.63	0.00 (0.000)	31.62 (99.97)	0.01 (0.03)	1.02 (3.22)	
51	10.54	0.00 (0.000)	10.54 (100.00)	0.00 (0.00)	0.56 (5.31)	
<b>Total*</b>	<b>565.68</b>	<b>0.03 (0.010)</b>	<b>528.66 (93.46)</b>	<b>36.99 (6.54)</b>	<b>31.12 (5.50)</b>	

Source: Landgraf, 1999.

\*Total acreages (and percentages) under each land use/land cover category (i.e., impervious, forest, open area, and wetland) do not combine to equal the total acreage (100%) for the watershed because some areas of overlap exist.

This watershed is in the undeveloped South Post training area, and includes part of the Accotink Bay Wildlife Refuge (ABWR). Subwatershed 48 contains the only known intact example of an upper coastal plain stream. This stream has remained minimally un-impacted and naturalized and is recommended to be used as a baseline for stream restorations on the installation. The predominant development feature in this watershed is the network of paved and unpaved training roads. Problem areas in the watershed are isolated and usually occur at culvert crossings on the training roads.

### **Potomac River**

A small part of Fort Belvoir drains directly into the Potomac River without first entering Accotink Creek, Dogue Creek, Pohick Creek, Gunston Cove, Accotink Bay, or Pohick Bay. This watershed originates on, and is completely contained within, Fort Belvoir. The Potomac River watershed is comprised of five subwatersheds and has a total area of 237 acres, making it the smallest watershed on the installation (Figure 5.2, 5.4, Table 5.8). The watershed is 14.24% impervious, 59.62% forested, and 4.34% wetland. The Potomac River subwatershed 15 is the smallest subwatershed on post at slightly more than five acres, and is 100% forested (Landgraf, 1999).



<b>Table 5-8: Fort Belvoir Watershed Survey Potomac River</b>							
<b>Subwatershed</b>	<b>Size (acres)</b>	<b>Impervious Surface Acres (%)</b>		<b>Forest Acres (%)</b>	<b>Open Area Acres (%)</b>		<b>Wetland Acres (%)</b>
15	5.26	0.00	(0.0)	5.26 (100.00)	0.00	(0.00)	0.35 (6.65)
16	16.61	0.02	(0.1)	16.02 (96.45)	0.59	(3.54)	1.32 (7.95)
17	15.91	1.10	(6.9)	13.07 (82.15)	1.74	(10.94)	1.08 (6.79)
18	43.97	5.27	(12.0)	27.19 (61.84)	11.51	(26.18)	0.90 (2.05)
19	154.86	27.31	(17.6)	79.52 (51.35)	48.03	(31.01)	6.62 (4.27)
<b>Total*</b>	<b>236.61</b>	<b>33.70</b>	<b>(14.24)</b>	<b>141.06</b>	<b>61.87</b>	<b>(26.15)</b>	<b>10.27</b>
				<b>(59.62)</b>			<b>(4.34)</b>

Source: Landgraf, 1999.

\*Total acreages (and percentages) under each land use/land cover category (i.e., impervious, forest, open area, and wetland) do not combine to equal the total acreage (100%) for the watershed because some areas of overlap exist.

The Potomac River watershed also has the steepest stream gradients on the installation, with slopes as high as 60%. Three of the subwatersheds are relatively undeveloped due to the severe slopes above the Potomac River.

## 5.2.2 Aquatic Resources

### 5.2.2.1 Aquatic Studies

A baseline aquatic inventory of Main Post and FBNA (EA, 2000) was performed in 2000 in order to characterize the installation's aquatic resources and provide management recommendations. A Natural Heritage Inventory was performed on Main Post to address the biodiversity of the installation's natural resources (Hobson, 1996; 1997). The baseline inventory included the collection and analysis of basic water quality parameters, the sampling of fish (including anadromous fish) and aquatic invertebrates, and the development of habitat indices. Data from the baseline aquatic inventory and Natural Heritage Inventory have been incorporated into the installation GIS.

Aquatic studies which assess water quality, physical, and biological conditions within Fort Belvoir water resources are on Table 5.9. Most aquatic studies over the last five years have been limited to project studies and were used to establish the baseline condition of a particular water resource such as a tributary stream or shoreline or used for future restoration to meet mitigation goals.



<b>Table 5-9: Fort Belvoir Area Aquatic Resources Studies</b>				
<b>Agency</b>	<b>Author</b>	<b>Survey Area</b>	<b>Information</b>	<b>Years</b>
Fairfax County	Jones and Kelso (George Mason University)	Accotink Creek, Pohick Creek, Gunston Cove, Dogue Creek	Climate, water quality, plankton, fish (including anadromous fish), benthic organisms	1984
U.S. Geological Survey (USGS)	Ator et al.	5 miles upstream of EPG (now known as FBNA) and 8 miles upstream of Fort Belvoir Main Post on Accotink Creek in Potomac River basin	Hydrology, environmental setting, water quality parameters (nutrients, pesticides, organics, metals, sediment), water quality ranking in a national context	1992, 1996
Fort Belvoir	Dames and Moore, Inc., 1997	North Post Golf Course drainages	Water quality (nutrient and pesticide runoff)	1996, 1997
Fort Belvoir	Jones and Kelso (George Mason University)	Accotink Creek, Pohick Creek, Dogue Creek	Benthic macroinvertebrates, plankton, fish, habitat, water quality	1999
Fort Belvoir	EA	Accotink Creek, Dogue Creek, Mason Run, UN-1, UN-2	Benthic macroinvertebrates, fish (including anadromous fish), habitat, water quality	1999
Fort Belvoir	EA	Accotink Creek, Dogue Creek, Mason Run, UN-1, UN-2	Benthic macroinvertebrates, fish (including anadromous fish), habitat, water quality	2001
Fort Belvoir	SES	Stream 7, Marrow Road	Stream Assessment (Physical Characterization/Water Quality and Habitat Assessment)	2011
Fort Belvoir	U.S. Army Corps of Engineers, Baltimore District	Sharon Lane Stream, Child Development Center Stream, Golf Course Stream	Geomorphic Analysis	2012

Table 5-9: Fort Belvoir Area Aquatic Resources Studies				
Agency	Author	Survey Area	Information	Years
Fort Belvoir	Williamsburg Environmental Group, Inc.	Timber Pedestrian Bridge Accotink Creek	Threatened and Endangered Species	2013
Fort Belvoir	EA	7 Streams on Main Post	Stream Assessment (Physical Characterization /Water Quality and Habitat Assessment)	2014
Fort Belvoir	Department of Public Works	Rep 002 Stream at DAAF	Stream Assessment (Physical Characterization /Water Quality and Habitat Assessment)	2015
Fort Belvoir	Department of Public Works	Hunting Area W-2	Stream Assessment (Physical Characterization /Water Quality and Habitat Assessment)	2015
Fort Belvoir	Department of Public Works	Pohick Road Stream	Stream Assessment (Physical Characterization /Water Quality and Habitat Assessment)	2015
Fort Belvoir	Department of Public Works	Rep 003 Stream and Tributary at DAAF	Stream Assessment (Physical Characterization /Water Quality and Habitat Assessment)	2015
Fort Belvoir	Department of Public Works	Road Millings Area and Tributary to Road Millings Storage	Stream Assessment (Physical Characterization /Water Quality and Habitat Assessment)	2015
Fort Belvoir	Department of Public Works	Accotink and Dogue Creek	Native Freshwater Mussel Study	2015
Fort Belvoir	Aerostar SES LLC	Main Post	Benthic Macroinvertebrate, Periphyton, Habitat Assessment, Physical Characterization, Riparian Vegetation	2015
Fort Belvoir	Department of Public Works	Staybridge Suites Stream	Stream Assessment (Physical Characterization /Water Quality and Habitat Assessment)	2015, 2016

<b>Table 5-9: Fort Belvoir Area Aquatic Resources Studies</b>				
<b>Agency</b>	<b>Author</b>	<b>Survey Area</b>	<b>Information</b>	<b>Years</b>
Fort Belvoir	Aerostar SES LLC	South post streams	Benthic Macroinvertebrate, Periphyton, Habitat Assessment, Physical Characterization, Riparian Vegetation	2016
Fort Belvoir	Department of Public Works	Stuart Road Stream	Geomorphology, Hydrology, Biology	2016
Fort Belvoir	Department of Public Works	Tompkins Basin Stream	Geomorphology, Hydrology, Biology	2016
Fort Belvoir	Department of Public Works	Golf Course Streams	Stream Assessment (Physical Characterization/Water Quality and Habitat Assessment)	2016
Fort Belvoir	SES Construction & Fuel Services LLC	Gunston Cove and Accotink Bay	Freshwater Bivalve and Submerged Vegetation Sampling	2016

## **5.2.2.2 Aquatic Conditions**

### **Water Quality**

Fort Belvoir regularly collects water quality samples in the Accotink Creek and Dogue Creek Watersheds and tests for regulated constituents, including, but not limited to, total suspended solids (TSS), pH, total petroleum hydrocarbons (TPH), Nitrogen, Phosphorous, and metals. This sampling is performed in order to comply with the Virginia Pollutant Discharge Elimination System permit requirements, which establishes benchmarks for maximum allowable discharges. If any benchmark exceedances occur, corrective actions are taken. Because the Pohick Creek Watershed remains undeveloped, no monitoring is performed there.

The water quality sampling results provide a means to assess the chemicals which impact water resources strictly on post, minimizing influences from Fairfax County. Regardless of existing water quality conditions, the Accotink, Pohick, and Dogue Creeks are all recognized by the State of Virginia as impaired waterways due to high levels of regulated constituents and other substances, such as sediment and E. coli, which have been historically proven to degrade water.

Water quality assessments have limitations due to inconsistencies in sampling techniques. In addition, development occurring outside of Fort Belvoir impacts water quality assessments on post. However, this data can be evaluated along with regulatory monitoring data and additional studies to find trends and hypothesize future water resource impacts. While the Dogue Creek and Pohick Creek watersheds will most likely not reach the same level of degradation as Accotink Creek, further impacts to water quality for all watersheds can be expected.

### **Physical Conditions**

Physical conditions of water resources found at Fort Belvoir include a mix of Riverine and Palustrine ecosystems. The Riverine systems include the Accotink, Dogue and Pohick Creeks as well as various tributaries and streams feeding these creeks. The three creeks are considered lower perennial streams with unconsolidated bottoms consisting of a mixture of cobble-gravel, sand, muds, and organics. The mouths of the three creeks have conditions consistent with emergent, unconsolidated, and rocky shores.

The various tributaries and streams that feed into these three creeks were observed to be perennial, intermittent, and ephemeral tributary streams that can be composed of rubble, cobble-gravel, sand, muds, and organics. They originate from a mixture of groundwater, stormwater, wetlands, rain, and seeps. All are considered to be warm water systems due to the regional location and general shallow flows in relation to ambient temperature typical of Northern Virginia.

Most of the riverine systems are found to have riparian habitat that includes trees, shrubs, and an herbaceous layer. In-stream features typically observed range from partly open to shade with a combination of riffles, runs, and pools. Channelization is common within tributaries of these watersheds due to concentrated flows over the last 70 years but the Accotink, Dogue and Pohick Creeks remain un-channelized. There is one known physical barrier located just outside of Fort Belvoir on Dogue Creek that acts as an impediment to fish and other aquatic organisms.

Physical habitat degradation (e.g., lower bank stability, bank erosion) is prevalent within virtually all of the installation's waterways surveyed. Aquatic vegetation can be found on a case by case basis and can typically include submerged and attached algae as well as various types of aquatic vegetation. Aquatic beds can be found in the channels and along the shores of Accotink, Dogue, and Pohick Creeks as well.

The second type of ecosystem and the most predominant on Fort Belvoir is Palustrine. Palustrine systems can include forested, scrub-shrub, emergent, seep, and open wetlands. There is great variability to these habitats, including groundwater recharge/discharge rates, flood flow alterations, habitat conditions, vegetation, and hydrology. These types of physical conditions most often are found to have some nexus with Riverine systems. Most systems present at Fort Belvoir are Palustrine forested or Palustrine emergent.

## **Benthic Community**

Studies of macrobenthic organisms on unrestored streams within Fort Belvoir (Table 5-9) continually indicate a macroinvertebrate community fairly typical of upper Coastal Plain streams. These studies show a predominance of pollution tolerant species such as Chironomidae, Naidinae, Cyclopoidea, Amphipod, and Isopods. Studies performed on Fort Belvoir suggest decreased occurrence of the traditional non-pollution tolerant species of EPT (i.e., Ephemeroptera, Plecoptera, Trichoptera) typically associated with optimal streams. The species composition found in tributary streams indicates a benthic community tolerant of impaired physical habitats, as well as poor to fair water quality. Some streams contain benthic communities that have a greater dominance of non-pollution tolerant species of EPT; however, most benthic communities resemble a composition of pollution tolerant communities due to the past 70 years of development.

## **Habitat Assessments**

Habitat assessment of riverine communities is performed by assessing ten habitat parameters to make a determination on conditions of aquatic resources. The parameters are epifaunal substrate/available cover, pool substrate characterization, pool variability, sediment deposition, channel flow status, channel alteration, channel sinuosity, bank stability, vegetative protection, and

riparian vegetative zone width. These parameters are used to rank the habitat condition as either optimal, suboptimal, marginal, or poor. Many of the tributary streams are found to be suboptimal to marginal due to development and concentrated stormwater flows into streams. Additionally, the Accotink Creek, Dogue Creek, Pohick Creek, Pohick Bay, Accotink Bay, and Gunston Cove are known to contain submerged aquatic vegetation (SAV). Finally, habitat assessments of the Accotink, Dogue, and Pohick Creeks are typically done for species management actions and information on this can be found in the wildlife section.

## **5.2.3 Wetland Resources**

### **5.2.3.1 Wetland Studies**

Information on wetlands at Fort Belvoir has been and continues to be obtained through the following efforts:

First, a comprehensive baseline wetland survey was undertaken to characterize installation wetlands, and their corresponding location association with identified water ways. The findings of this wetlands survey are reported in Paciulli, Simmons and Associates, 1997a and Paciulli, Simmons and Associates, 1999b. The purpose of these baseline surveys, also referred to as planning level surveys (PLS), was to identify and map the general locations and types of wetlands on post. The surveys were not intended to serve as jurisdictional determinations.

The baseline wetland inventories were done using photointerpretation of installation aerial photography with limited field surveys to ground truth. Numerous wetland delineations were then performed following the U.S. Army Corps of Engineers wetland delineation manual (Environmental Laboratory, 1987), and the wetland types were classified according to the U.S. Fish and Wildlife Service classification system (Cowardin et al., 1979) to verify the accuracy of the photointerpretation. This was the foundation of the baseline wetlands inventory.

Second, numerous wetland delineations are performed as the primary in-field mechanism in order to confirm wetland locations and jurisdiction. The results of the wetland delineations become incorporated into the comprehensive baseline wetland survey in order to improve the accuracy of the resource.

Third, a wetland functions and values assessment can be performed as a tool to rapidly characterize the functions and values of wetland ecosystems. This tool is traditionally only required under circumstances that will involve the impact of greater than one acre of wetlands. This assessment is limited in use due to the above threshold value but it does provide valuable information on the processes or series of processes that typically take place in these specific areas. This

information becomes catalogued and can be referenced for management actions or future work at Fort Belvoir.

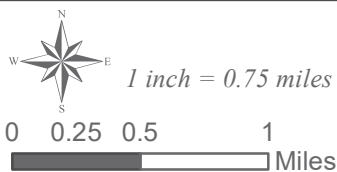
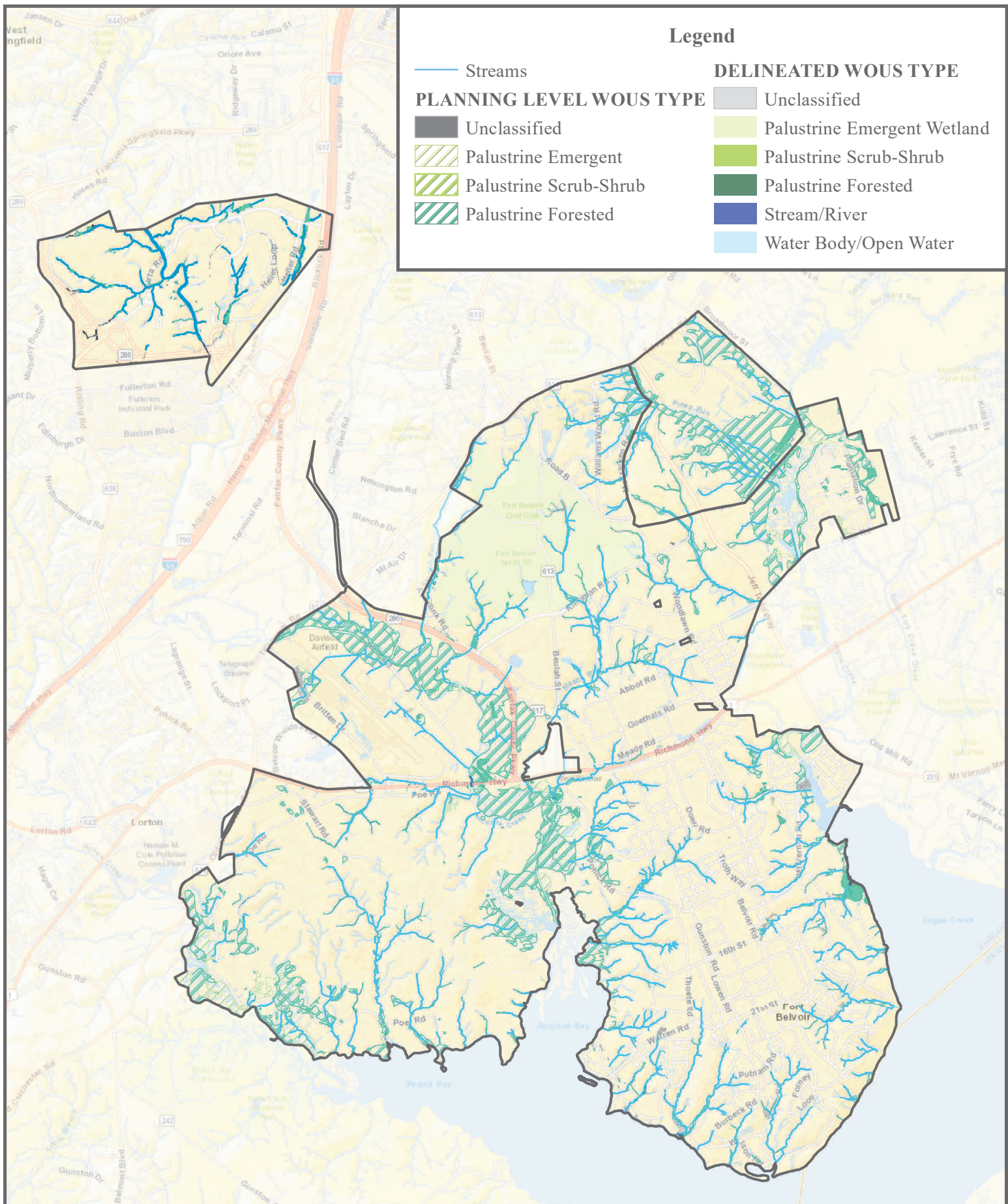
Finally, Resource Protection Area (RPA) assessments are carried out during wetland delineation by a project proponent when the appropriate water resources are present. This information is used in conjunction with wetland delineations in order to highlight what the State of Virginia views as sensitive natural resources as well as to designate the perenniality of a stream system for use in federally required mitigation when appropriate. This can impact the mitigation requirements by the USACE for WOUS impacts. Results from RPA assessments are used to update information in the Fort Belvoir GIS as well as a means to provide more thorough baseline information for wetland resources and waterways. This information is retained on file and utilized when appropriate to provide exclusion limits for projects or to identify areas that would be ideal for enhancement.

### **5.2.3.2 Wetland Conditions**

As of the 1997 baseline inventory, approximately 1,250 acres of wetlands were identified on Fort Belvoir's Main Post and approximately 26 acres on Fort Belvoir North Area using the baseline wetland surveys (Paciulli, Simmons and Associates, Ltd., 1997a; 1999b). These figures remain relatively unchanged at this time. In total, this represents approximately 11% and 3% of the two installation areas, respectively. As shown in Figures 5.5-5.9, the predominant wetland type on Fort Belvoir is Palustrine Forested, which tends to occur in association with the riparian areas of Accotink, Dogue, and Pohick Creeks. Other wetlands typically found within the limits of Fort Belvoir include Palustrine Emergent and Palustrine Scrub-Shrub.

In 2007, Fort Belvoir performed a wetland delineation and obtained a jurisdictional determination for all of FBNA as well as a large portion of main post under BRAC 2005. A final wetland delineation and jurisdictional determination was also obtained in 2009 for numerous American Water infrastructure upgrade projects. These were the last large updates to baseline wetland inventories.





# WATERS OF THE US ON FORT BELVOIR

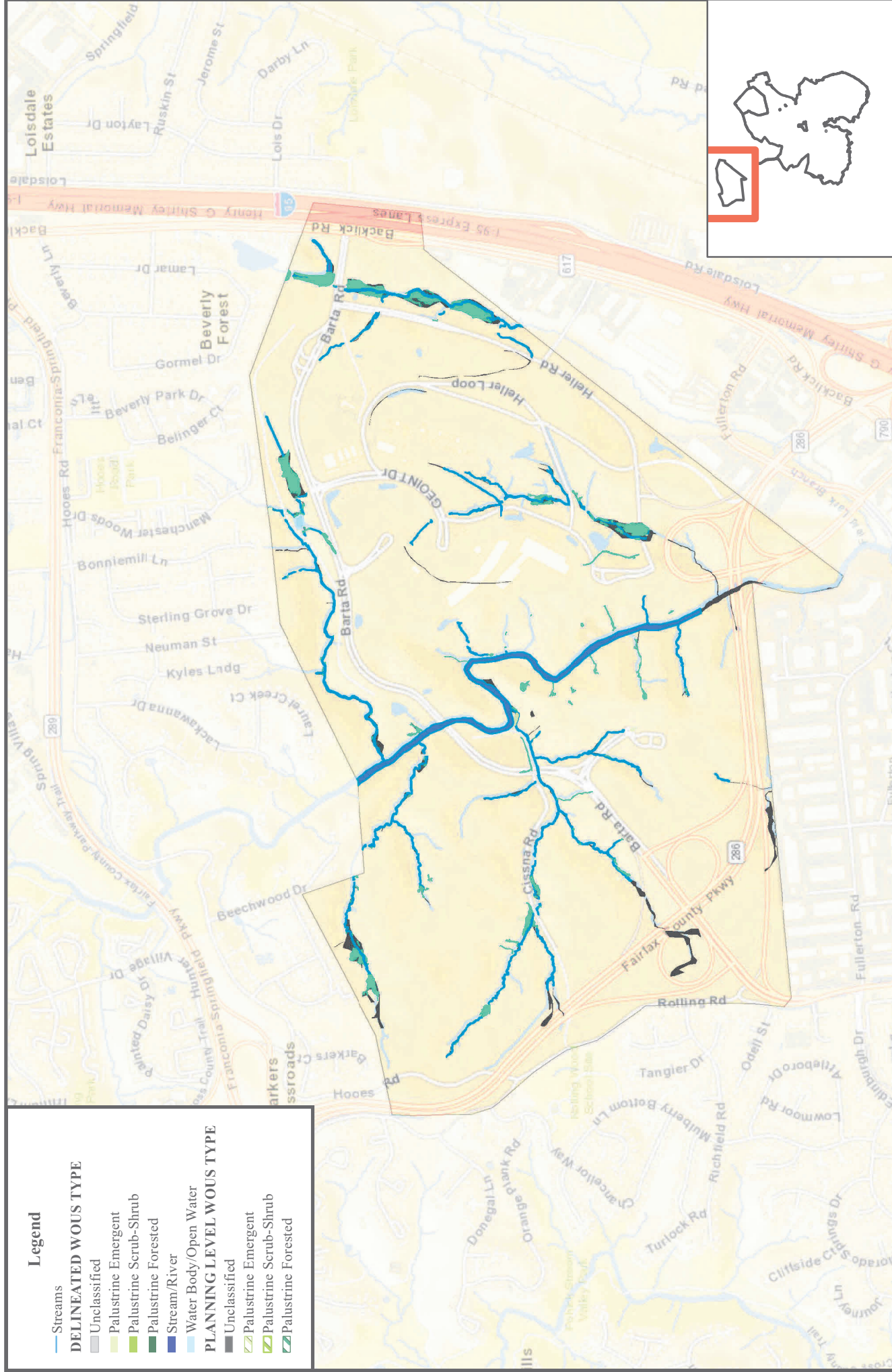
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**Figure 5.5**

Source: Fort Belvoir 1997 wetland surveys, additional jurisdictional determinations from 1997-2017, Google road maps,

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# FORT BELVOIR WATERS OF THE US, NORTH AREA

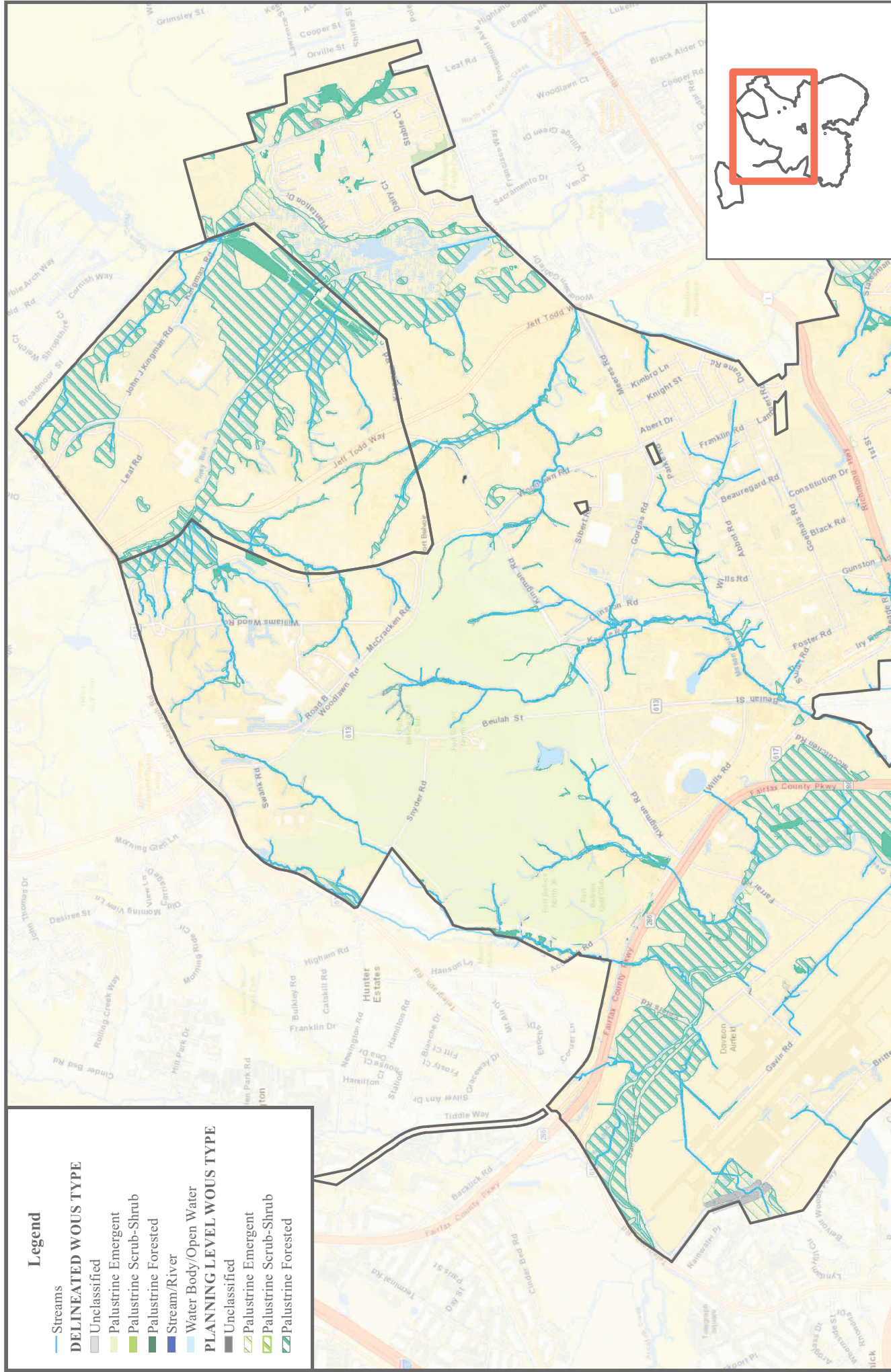
**Figure 5.6**

Source: Fort Belvoir 1997 wetland surveys,  
additional jurisdictional determinations from  
1997-2017, Google road maps

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# FORT BELVOIR WATERS OF THE US,

**NORTH**

Unclassified // FOUO

**Figure 5.7**

Source: Fort Belvoir 1997 wetland surveys, additional jurisdictional determinations from 1997-2017, Google road maps

1 inch = 0.4 miles

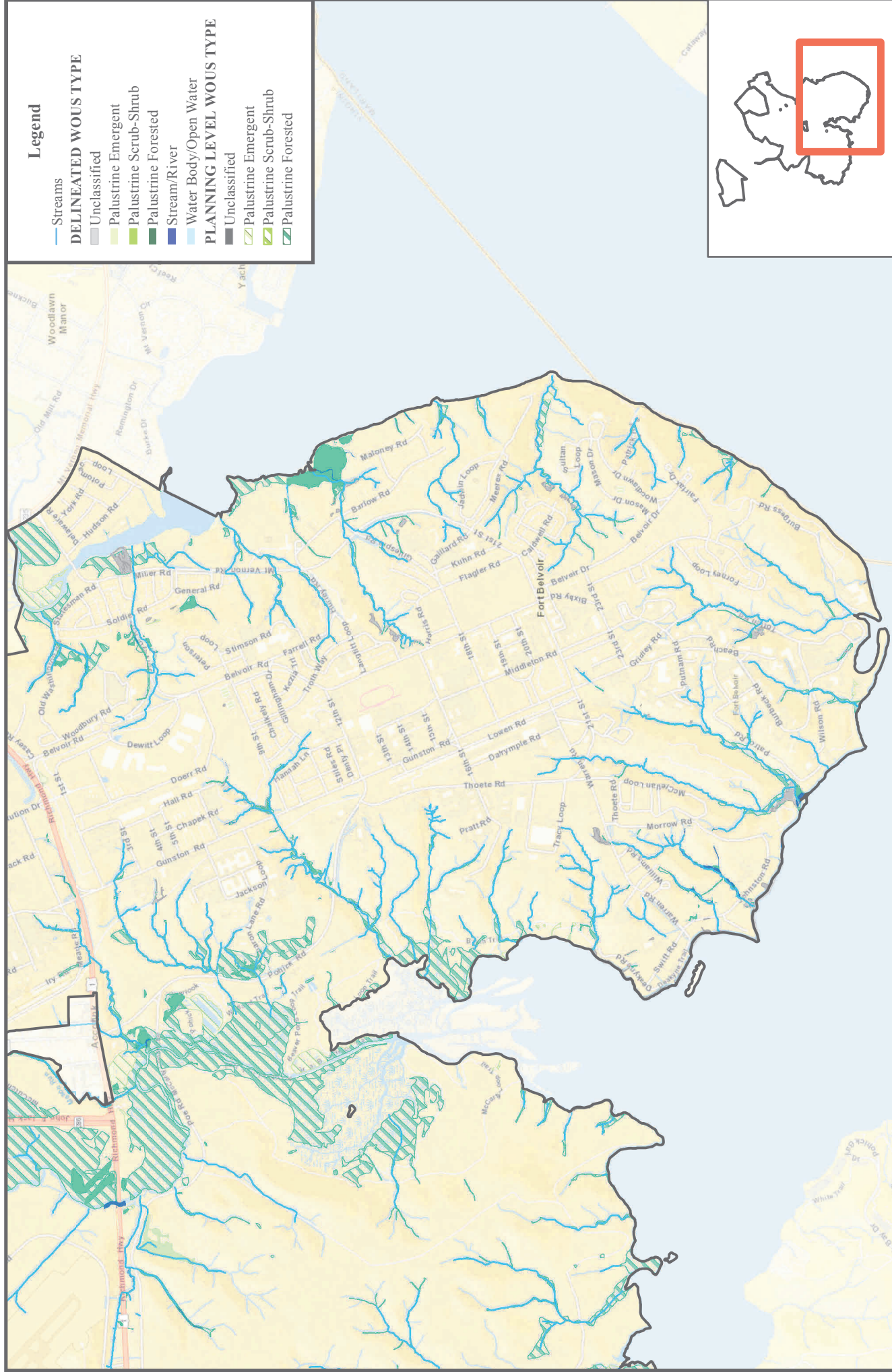
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# WATERS OF THE US ON FORT BELVOIR, SOUTH EAST

**Figure 5.8**

Source: Fort Belvoir 1997 wetland surveys,  
additional jurisdictional determinations from  
1997-2017, Google road maps

1 inch = 0.4 miles



0.5

0.125

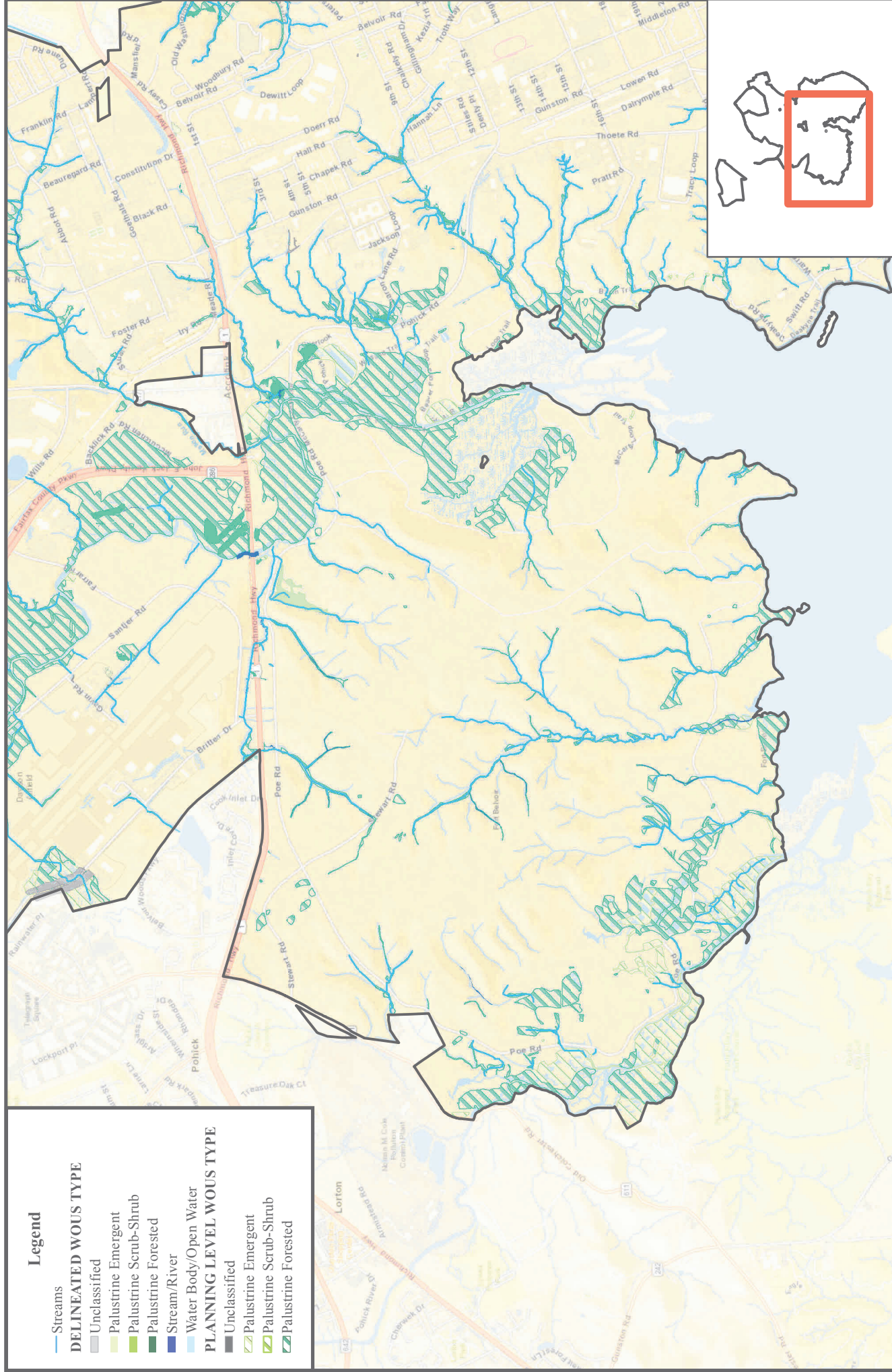
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## WATERS OF THE US ON FORT BELVOIR, SOUTH WEST

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**Figure 5.9**

Source: Fort Belvoir 1997 wetland surveys,  
additional jurisdictional determinations from  
1997-2017, Google road maps

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## 5.3 WATER RESOURCES MANAGEMENT

### 5.3.1 Water Resources Recommendations

Fort Belvoir recognizes that streams, impoundments, tidal resources and wetlands are inextricably linked to land conditions and activities throughout the watershed. As a result, Fort Belvoir's water resources management program focuses on a combination of watershed management that impacts both aquatic (e.g., in-stream, tidal) and terrestrial (e.g., wetlands, seeps, ponds, stormwater best management practices) resources in order to achieve a watershed-based management approach which meets the military mission.

Water resources management recommendations evolved out of a necessity to meet regulatory requirements under the CWA. Since the early 2000's, there has been a large regulatory-driven push to address and mitigate wetland impacts. Based on the baseline wetland surveys, it is known that Fort Belvoir possesses extensive areas of wetlands, including wetlands that have high conservation priority. While land disturbance (e.g., construction, land disturbing training, outdoor recreation) represents a direct threat to installation wetland resources, Fort Belvoir's wetland resources are more often vulnerable to disturbance by invasive/exotic species, stormwater (e.g., erosion and sedimentation), problematic wildlife (e.g., beaver (*Castor canadensis*)), and impacts from adjacent land-use developments and activities. Specific management recommendations include the following:

- Monitoring wetlands that have high conservation priority
- Monitoring and controlling invasive vegetation (e.g., *Phragmites*)
- Monitoring and controlling destruction by beaver activity
- Implementing stormwater management actions to control habitat impacts
- Performing hydrologic and water quality assessments of wetland areas and undertaking improvements as needed
- Maintaining a buffer around the Jackson Miles Abbott Wetland Refuge (JMAWR) wetlands
- Characterizing and protecting groundwater quality and flow at the T-17 ravine
- Monitoring changes of existing wetland and water resources

Later in the same decade, stormwater began receiving similar scrutiny for impacts to water resources. The minimum acceptable water quality standards are now more stringent and include quality and quantity measurements, a tracking system, and extensive project reviews. Furthermore, stormwater management requirements under the TMDL Action Plan for Fort Belvoir (March 2016) require the decrease of sediments and nutrients from stormwater in order to meet compliance requirements for improved water quality.

Finally, industrial stormwater management requirements, as defined in the 2017 Industrial Stormwater (ISW) permit for Fort Belvoir, include a similar regulatory-driven push to address deficiencies in this area as a means of improving water quality. There is now a greater accountability for the release of known pollutants which can impact water quality from industrial sources.

Based on the regulatory requirements, improvements to water resources (e.g. streams, tributaries, wetlands) will continue to be addressed with both engineered actions and preventative measures. Fort Belvoir will continue to monitor and address physical habitat loss, bank instability, habitat degradation, erosion, sedimentation, increased flows, and increased flow duration. Likewise, water quality degradation due to transport of pollutants, such as sediments, TSS, TPH, Nitrogen, Phosphorous, hardness and metals, will continue to be monitored and addressed. Specific actions that will be considered and taken, as appropriate, include, but are not limited to, channelization, installation of hardened riprap, planning living shorelines, conducting stream restorations, making green infrastructure improvements, using BMPs, and conducting wetland restoration. These options remain the traditional, scientifically, and industry accepted recommendations to address water resources deficiencies as defined by the various regulations and permits. The efficient use of resources and minimal impact to the military mission will continue to be a top priority.

### **5.3.2 Water Resources Multiple Use Requirements**

DoDI 4715.03, *Natural Resources Conservation Program*, stipulates that installations should allow for multiple uses of their natural resources, including water resources. The use requirements include: realistic military training and testing; conservation; outdoor recreation; environmental education and scientific research and study; and water supply. Fort Belvoir provides for these multiple uses. Land development and facility maintenance are also of particular importance regarding water resources at Fort Belvoir.

#### ***Military Training and Testing Requirements***

Fort Belvoir has hands-on occupational specific training that sometimes involves water resources. Access to water-based training is controlled and managed through existing shoreline training facilities on post. Training planned to be conducted in areas other than existing training facility locations is reviewed by and coordinated with the DPW-Environmental Division.

#### ***Conservation***

Conservation of natural resources, including water resources, is a major objective at Fort Belvoir. As stipulated in various regulations, guidance, and policies, conservation is to be considered as a viable means for protection of water resources.



## ***Outdoor Recreation Requirements***

The principal outdoor recreation activities involving water resources at Fort Belvoir are fishing, canoeing, kayaking, waterfowl hunting, boating, hiking, nature watching (e.g., bird watching) and nature art (e.g., outdoor photography). The use and enjoyment of water resources by each type of activity is predicated on the water resources being in a healthy condition. Dogue Creek Marina provides engineered shoreline facilities, including a boat launch, boat slips and docks, and a marina building for the use of gasoline-powered watercraft. Watercraft such as canoes, kayaks, and car-top boats can be put in at Tompkins Basin. Hiking trails and fishing piers provide access facilities for fishing, waterfowl hunting, hiking, nature watching, and nature art require much simpler access facilities, such as hiking trails and fishing piers.

## ***Environmental Education and Scientific Research and Study Requirements***

Fort Belvoir is an excellent location for environmental education and scientific research and study of water resources. Access to Fort Belvoir's water resources is available via the trail network and boat launch facilities.

## ***Land Development and Facilities Maintenance Requirements***

While not specifically addressed in the DoD and Army management policies, land development and facilities maintenance must be considered as one of the multiple uses of installation lands and waters. This is especially true for Fort Belvoir, which as of 2017, supports approximately 150 tenant organizations, approximately 2,070 housing units, a working population of approximately 40,000 and plans to support an additional 17,000 personnel by 2030. The siting, construction, maintenance, and use of these facilities represent the most significant source of potential impact to water resources on Fort Belvoir.

### **5.3.3 Water Resources Management Actions to Date**

Fort Belvoir manages water resources in accordance with the resource conservation and multiple use requirements of DoDI 4715.03 and AR 200-1. Management actions to date have prioritized balancing conservation of water resources with meeting the military mission to support and sustain multiple use of water resources. Fort Belvoir approaches water resources management on a watershed based strategy, consistent with the Chesapeake Bay Program requirements.

Fort Belvoir recognizes promoting regional water resources management by: (1) avoiding any additional impacts to water resources if possible, (2) minimizing impacts to water resources whenever possible, (3) mitigating impacts as required by law, and (4) correcting, either through restoration or enhancement, existing



problems within the watersheds that are entirely within the installation's control, as possible. This is the accepted management process for all projects performed at Fort Belvoir.

Wetland resources in particular receive some of the greatest protection from loss and disturbance typically caused by construction, land disturbing activities, outdoor recreation, and military training or testing activities. In those instances where wetland loss is unavoidable and the action meets the minimum threshold required for the mitigation of impacts, it has been Fort Belvoir policy to mitigate the wetland impact as determined by the corresponding regulatory wetland permit. The desired approach by both the U.S. Army Corps of Engineers, Baltimore District (USACE) and the VDEQ involves the purchase of wetland credits from an approved wetland mitigation bank off site. However, on-site mitigation can be requested and implemented as an alternative.

Water resources that remain naturalized, undeveloped, or have been restored due to regulatory requirements will receive periodic assessment such as invasive species management, habitat analysis, and wildlife studies to ensure water resources remain in an acceptable condition. These resources, are typically found in the installation riparian areas, and throughout the ABWR, Jackson Miles Abbott Wetland Refuge (JMAWR), T-17 Refuge, Fort Belvoir Forest and Wildlife Corridor (FWC), and Accotink Creek Conservation Corridor.

### **5.3.3.1 Water Resources Conservation Actions**

Fort Belvoir works to protect and enhance native aquatic biodiversity and water quality by conserving and enhancing native aquatic habitats, correcting and preventing stormwater-related problems, and protecting against overuse and misuse of aquatic resources (e.g., illegal fishing). To date, Fort Belvoir's water resources conservation actions have taken the following approach:

- Designating key installation areas (i.e., ABWR, JMAWR, T-17 Refuge, FWC, and Accotink Creek Conservation Corridor) as conservation areas in accordance with DoDI 4715.03. (DODI 4715.03 authorizes installations to designate as "Special Natural Areas" specific areas of an installation which have ecological, scenic, recreational, and educational value warranting special conservation efforts, if consistent with the military mission. All conservation area designations since the 1990's were undertaken as mitigation actions under NEPA.
- Performing stormwater improvements (e.g. BMPs) to control and reduce excess flows
- Restoring stream corridors and adjacent, connected, or nearby wetlands
- Performing aquatic habitat restoration
- Implementing and enforcing water resource protection regulations under Section 10, 401, and 404 of the Clean Water Act. Implementing and enforcing state water resources protection regulations under State Water Control Law, Virginia Stormwater Management Act, Virginia Stormwater

Management Program Regulations, and the Virginia Water Protection Permit Program Regulations

- Performing regional coordination with Federal, State, and Local Organizations

Each of these conservation actions is discussed below.

### **Conservation Area Designation**

Fort Belvoir has previously designated five installation areas for conservation as Special Natural Areas: ABWR, JMAWR, T-17 Refuge, FWC, and Accotink Creek Conservation Corridor (Section 9). All of the Pohick Creek, Pohick Bay, lower Accotink Creek and Accotink Bay shorelines on post are included within the ABWR. All of the upper Dogue Creek stream corridor and Mulligan Pond are within the JMAWR. Sections of upper Accotink Creek and Mason Run are within the FWC. T-17 is within Gunston Cove watershed and Accotink Creek Conservation Corridor is within Accotink Creek watershed. (Section 9)

### **Stormwater Control**

Fort Belvoir has been actively addressing failing and improperly functioning stormwater BMP's over the last 15 years. These actions are in response to meeting strict regulatory requirements for water quality in order to protect water resources. Conservation actions typically involve adapting existing storm water features to allow for greater retention of stormwater, increased infiltration to decrease concentrated flows, decreased flow velocities, and adequate stabilization of outfalls leading to water resources. These are some of the many conservation options that stormwater management can utilize to protect water resources.

### **Water Resources Restoration**

Since 1999, Fort Belvoir has been implementing projects to restore water resources, including channels and riparian areas as a key feature of the installation watershed management program. Fort Belvoir began using natural stream design to stabilize highly eroded areas. Some example projects include stream restorations at a tenant facility along Telegraph Road and throughout main post and as part of BRAC 2005 and the main post infrastructure upgrade. Slope stabilization, riparian buffer enhancements, and stream bed restorations were accomplished using innovative in-stream, low-flow channel structures. In addition, new stormwater control structures, such as energy dissipation and flow moderation devices, were installed or existing ones were repaired. Plantings were also done to correct flow problems.

As part of the BRAC 2005 construction, Fort Belvoir began using stream restorations to achieve "adequate outfall" (rather than hardening channels) for stormwater management. Additionally, the privatized improvement of the water

and wastewater systems done as part of a main post infrastructure upgrade has been using natural stream design and channel stabilization techniques to correct situations where in-stream erosion has been threatening existing utility crossings. In total, there are 42 locations which have been identified as appropriate locations for restoration. These locations can be found in this document and in the Real Property Master Plan (RPMP).

Table 5.10 presents a summary of stream mitigation and restoration projects that have been completed or are proposed on Fort Belvoir. Figure 5.10 has the location of some of the water resources restoration and mitigation sites. Not all stream mitigation sites are identified on the map due to rendering issues.

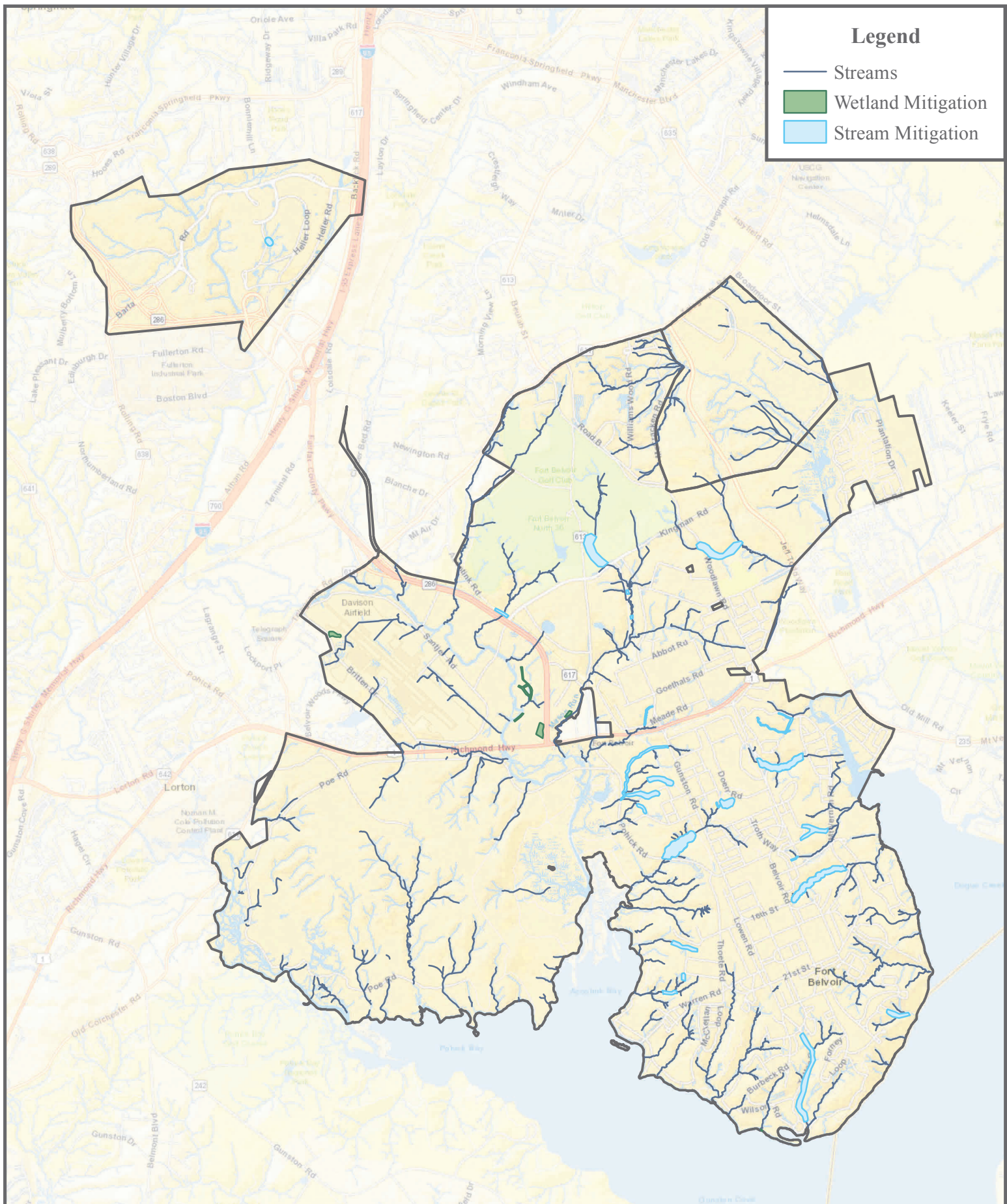
<b>Table 5-10: Water Resources Restoration and Mitigation Projects to Date</b>				
<b>Location</b>	<b>Sub Water Shed</b>	<b>Description</b>	<b>Status</b>	
Mason Run Crossing 3	30	Infrastructure improvement for privatized utility	Concept Design	
Mason Run Crossing 4	30	Infrastructure improvement for privatized utility	Concept Design	
Division Army Airfield	42	Palustrine Emergent Wetland Restoration	Completed	
Division Army Airfield	40	Stream Bank Stabilization	Completed	
Accotink Creek Accesses Road for Waste Water Utility Area 1	40	Palustrine Forested Wetland Restoration for Impacts at Fairfax Parkway	Completed	
Accotink Creek Accesses Road for Waste Water Utility Area 2	40	Palustrine Forested Wetland Restoration for Impacts at Fairfax Parkway	Completed	
Accotink Creek Accesses Road for Waste Water Utility Area 3	40	Palustrine Forested Wetland Restoration for Impacts at Fairfax Parkway	Completed	
Troth Way and Farrell Road	24	Stream Restoration	Completed	
Accotink Creek next to John J. Kingman Road	40	Bank Stabilization	Completed	
Surveyor Road	25	Mitigation	Completed	
Hospital, Warrior Transition Unit, 6 <sup>th</sup> Street	3	Mitigation	Completed	
Fort Belvoir North Area	53G	Mitigation	Completed	
Herryford Village	3	Rear Property Master Plan Mitigation	Completed	
Meade Road	29	Rear Property Master Plan Mitigation	Completed	
North Area	53	Restoration	Completed	
Pohick Road	03	Stream Restoration	Completed	
Totten Road	14	Rear Property Master Plan Mitigation	Permitting	

<b>Table 5-10: Water Resources Restoration and Mitigation Projects to Date</b>				
<b>Location</b>	<b>Sub Water Shed</b>	<b>Description</b>	<b>Status</b>	
Tracy Loop Pond Stream	5	Rear Property Master Plan Mitigation	Permitting	
Gillespie and Hurley Roads	22	Rear Property Master Plan Mitigation	Proposed	
Behind Dewitt Hospital	24	Rear Property Master Plan Mitigation	Proposed	
Between 1 <sup>st</sup> and 3 <sup>rd</sup> Street	1	Rear Property Master Plan Mitigation	Proposed	
Tracy Loop South	6	Rear Property Master Plan Mitigation	Proposed	
Between Marrow Road and Tracy Loop	6	Rear Property Master Plan Mitigation	Proposed	
Patrick Beach	18	Rear Property Master Plan Mitigation	Proposed	
Jackson Loop South	2	Rear Property Master Plan Mitigation	Proposed	
Jackson Loop North	2	Rear Property Master Plan Mitigation	Proposed	
Old Washington Road	26	Rear Property Master Plan Mitigation	Proposed	
Woodlawn Road	32	Rear Property Master Plan Mitigation	Proposed	
Golf Course Reach of Mason Run	38	Rear Property Master Plan Mitigation	Proposed	
Gunston and Pohick Stream	01	Stream and Wetland Restoration	Proposed	
Stream at NMUSA	38	Rear Property Master Plan Mitigation	Design	
Sharon Lane Road	2	Rear Property Master Plan Mitigation	Proposed	
American Water Stream Crossing 5	22	Infrastructure Improvement	Completed	
American Water Stream Crossing 7	24	Infrastructure Improvement	Completed	
American Water Stream Crossing 8	25	Infrastructure Improvement	Completed	
American Water Stream Crossing 2	19	Infrastructure Improvement	Design and Permitting	

<b>Table 5-10: Water Resources Restoration and Mitigation Projects to Date</b>				
<b>Location</b>	<b>Sub Water Shed</b>	<b>Description</b>	<b>Status</b>	
American Water Stream Crossing 3	21	Infrastructure Improvement	Design and Permitting	
American Water Stream Crossing 4	22	Infrastructure Improvement	Design and Permitting	
American Water Stream Crossing 6	24	Infrastructure Improvement	Design and Permitting	
Tenant along Telegraph Road	33	Stream Restoration	Completed	
Tenant along Telegraph Road	33	Stream Restoration/ Stream Stabilization	Construction	
300 Military Boat Ramp	13	SAV planting in intertidal zone	Completed	



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# **STREAM AND WETLAND MITIGATION ON FORT BELVOIR**

**Figure 5.10**

Source: Fort Belvoir GIS, Google road maps

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## **Aquatic Habitat Enhancement**

Aquatic habitat on Fort Belvoir has previously received little consideration. However, changes in regulatory guidance and permitting now allows for more types of aquatic habitat enhancements. Aquatic habitats found at Fort Belvoir include three installation ponds: the 2-acre Mulligan Pond in the JMAWR, the less than one-acre pond on the North Post Golf Course, and the less than one-acre stormwater pond on the Army Intelligence and Security Command (INSCOM) facility. Additional aquatic habitat can be found along the stream banks of Dogue Creek, Accotink Creek, Pohick Creek, Accotink Bay, and the Potomac River.

One aquatic habitat enhancement project was performed in the last five years. This project entailed correcting bank erosion and planting riparian vegetation along the INSCOM pond shore to improve the values and functions of the ecosystem while also mitigating stormwater impacts.

## **Enforcement of Water Resource Protection Regulations**

Regulatory policies under various federal and state regulations provide the most comprehensive management directives to date. WOUS are fully protected under these policies, which guide and encourage any development, discharge, restoration, or enhancement at Fort Belvoir. As of 2017, Fort Belvoir has over 30 various permits that stipulate how water resources are to be protected and managed.

## **Regional Coordination**

Fort Belvoir continues to work with stake holders and neighbors to coordinate watershed GIS mapping. Fort Belvoir's Special Agent (responsible for Conservation Law Enforcement on post) provides support to federal and state agents on investigative and enforcement actions regarding water resources within the region.

### **5.3.3.2 Wetlands Survey Updates**

The baseline wetlands inventories that were conducted in 1997, have been continually updated. The update process occurs in one of two ways. The predominant method involves wetland delineations that are prompted by proposed projects that will disturb areas that are semi-improved, un-improved areas or have known water resources. Upon the completion of a wetland delineation, the corresponding information is provided to the GIS department in order to update the existing baseline wetland layer that Fort Belvoir maintains.

The second method involves performing either visual and/or hands-on monitoring of wetland sites identified in the baseline wetland inventory. The visual monitoring involves performing a wetland walk-over to quickly identify

wetlands limits and wetland type. The hands-on monitoring involves performing a more in-depth determination of wetlands limits, wetlands type, and wetland functions. Both the visual and hands-on monitoring should be completed by the on-site wetland professional or other qualified individual as determined by the Wetlands Program Manager or contractor.

### **5.3.3.3 Wetlands Protection**

The majority of the installation's wetland area is included in 5 designated "Special Natural Areas". The RPMP identifies these areas, as well as wetlands outside the Special Natural Area boundaries, as environmentally constrained, thereby encouraging future development to avoid wetland areas. The NEPA Record of Decision (ROD) for the RPMP (U.S. Army, 2016) indicates that wetland impacts are expected to be less than 0.09 percent of the total estimated wetlands on post.

These land-use designations as well as a broad understanding of wetland values and functions have been effective at safeguarding installation wetlands from loss to development or installation operations. As such, many projects result in only temporary wetland impacts that are restored at the completion of the project.

### **5.3.4 Wetlands Enhancement**

Fort Belvoir addresses conservation and enhancement of native biodiversity within ecological communities, to include wetland communities, by identifying and controlling threats from invasive/exotic species, stormwater-related problems, problem wildlife, and cumulative and human impacts (i.e., direct and indirect development).

As addressed in Section 6.3.8.2 Fort Belvoir has an invasive/exotic vegetation management program. The first invasive/exotic vegetation management actions in wetlands on Fort Belvoir were undertaken in 1999 in an effort to control *Phragmites australis* (phragmites) in Accotink Bay and Dogue Creek. Since then, Fort Belvoir has and continues to manage numerous invasive/exotic species to include the periodic spot treatment of invasive vegetation such as, but not limited to, oriental bittersweet (*Celastrus orbiculatus*), marsh dewflower (*Murdannia keisak*), and wineberry (*Rubus phoenicolasius*), treatment of habitat restoration projects, and treatment in Fort Belvoir's Special Natural Areas with a special emphasis on the ABWR.

As stated previously, Fort Belvoir has implemented a watershed-based management approach that addresses restoration by correcting stormwater-related problems within installation stream corridors, and implementing BMPs to safeguard against future problems. In selecting locations for watershed restoration projects, Fort Belvoir has emphasized watersheds associated with the sensitive lower Accotink Creek-Accotink Bay wetlands as well as projects which



will help Fort Belvoir meet TMDL goals. The first project, completed in 1999, addressed subwatershed 03, which drains to refuge area JMAWR. The latest stream system to be restored is in the Accotink Creek Watershed and has led to a reduced load in sediments. As of 2017, there were four other streams on post that are being reviewed for improvement in order to help Fort Belvoir meet TMDL requirements and one stream that is currently being actively restored in North Post, within the Dogue Creek watershed.

## **5.4 CONTINUING AND FUTURE WATER RESOURCE MANAGEMENT**

Fort Belvoir intends to continue the management emphasis and actions addressed in Section 5.3. The installation will continue management for a no net loss of wetlands and WOUS, as well as to enhance and restore wetlands and WOUS that support the military mission, enhance biodiversity, and as required by regulation and DoD guidance. Fort Belvoir will continue to conserve and enhance native water resources, while providing balance among the multiple legitimate uses and users such as construction or other land disturbing activities, land development, and military training. Continued support of military training and testing will take primacy. After that, management emphasis will be on conservation and enhancement of water resources in accordance with established DoD and DA natural resources management policies, as well as stewardship programs, such as the Chesapeake Bay Program.

Fort Belvoir recognizes that the most significant threats to local water resources today arise from stormwater related problems and land development. Consequently, Fort Belvoir will emphasize actions to correct and prevent stormwater related problems; implement management actions, such as invasive/exotic species management and problem wildlife management to restore degraded stream corridors and riparian areas; and restore aquatic habitats using living shorelines and other green infrastructure to improve resilience of both manmade and natural infrastructure. Fort Belvoir will consider the potential for impacts to WOUS when making land-use and operational decisions, and will continue to mitigate all unavoidable WOUS losses and impacts consistent with the requirements of the Chesapeake Bay Program, VDEQ, USACE, and USEPA.

Fort Belvoir will continue to provide the public opportunities to access installation waters for recreation and for conservation education and scientific research and study, consistent with resource conservation goals, military mission and operations and security requirements.



## 5.4.1 Water Resources Management Directives

- 1) Provide access to meet military training and testing requirements.
- 2) Protect against loss or degradation of native diversity of aquatic resources, as defined by Environmental Assessment (EA) (1999a, 2000); Ernst et al. (1995); Jones and Kelso, (1998, 1999), and Hobson (1996, 1997).
- 3) Conserve and enhance water resources that have been prioritized for conservation by the Chesapeake Bay Program, the Virginia Natural Heritage Program, and the American Heritage Rivers Program.
- 4) Protect, enhance, and restore native aquatic habitat by correcting existing stormwater or development-related problems, preventing future stormwater-related problems, and utilizing green infrastructure techniques, such as living shorelines to both restore aquatic habitats as well as increase climate resilience of Fort Belvoir.
- 5) Evaluate comparable improvements of water resources to determine impacts of management actions on conservation and restoration activities.
- 6) Create a Watershed Management Plan, which utilizes information from various resource and compliance departments to make management and restoration decisions.
- 7) Provide opportunities for public access for recreation and environmental education and study consistent with resource conservation and military mission.

## 5.5 WATER RESOURCES MANAGEMENT GOALS, STRATEGIES, AND OBJECTIVES

### 5.5.1 Projects

Proposed activities that are considered Projects in this INRMP are activities that may potentially impact the environment and would need to be evaluated for the appropriate level of NEPA documentation. The following goals contain Projects within their objectives or strategies:

**Goal 1:** Continue to obtain scientific information on installation water resources.

- **Objective:** Support our knowledge of biodiversity, to identify stressors and detect changes to biodiversity, and to evaluate the effectiveness of management actions.
- **Strategy:**
  - 1) Perform surveys of wetlands most likely to be impacted as well as a year round surveillance (i.e., close observation in lieu of studies or monitoring projects) of other wetlands to detect changes, and potential activities which could impact wetland conditions. Apart from obvious physical conditions (e.g., sediment build-up, beaver activity, human degradation etc.), stress and changes in biodiversity will be inferred from changes in vegetation conditions.

- 2) Develop and implement a program to monitor conditions within the high-rarity ranked wetland communities, as recommended by the Department of Conservation and Recreation-Natural Heritage Program (DCR-NHP). Coordinate with DCR-NHP to develop and implement the monitoring program.
- 3) Perform monitoring of a representative sample annually of in-stream fish and/or benthic communities consistent with the protocol established by the baseline aquatic inventory.
- 4) Perform year-round surveillance (i.e., close observation, in lieu of studies or monitoring projects) of aquatic systems to detect disruptions and/or locations where threats (e.g., sedimentation, invasive species) are affecting resource integrity.
- 5) Perform an annual survey (addressing sedimentation, erosion, water quality, etc.) of a representative sample of installation waterways to assess changes within the stream corridors, and evaluate the success of management/corrective actions required for the annual watershed monitoring report (Survey one restored stream and five unrestored streams per year).
- 6) Update and maintain baseline information in installation documents, records, databases, GIS, etc.
- 7) Identify opportunities for stream restoration, riparian buffer restoration/enhancement, wetland restoration/enhancement, etc.
- 8) Develop and implement protocols for localized and/or issue-specific water resources surveys and studies, as needed for specific projects such as new development, or for mission activities.

**Goal 2:** Establish baseline inventory of marine systems along the Fort Belvoir shoreline.

- **Objective:** Utilize scientific and industry accepted methodologies to collect and present relevant information on water resources.
- **Strategy:**
  - 1) Develop and implement a protocol for yearly assessments of the Accotink Bay, Gunston Cove, Dogue Creek, Potomac River and Pohick Bay.
  - 2) Utilize geospatial tools and resources, field surveys, sampling, and GIS data layer development to perform an inventory update and analysis on aquatic resources to include submerged aquatic vegetation, mollusks, anadromous fish, benthic organisms, water quality, etc.
  - 3) Perform comparisons of existing inventory reports to determine if changes in the water resources is responding to management actions.

**Goal 3:** Update the watershed planning level survey (PLS), to include an assessment of land use/cover and installation activities.

- **Objective:** Utilize a Watershed Inventory for Vulnerability Assessment (WIVA) or other industry accepted practices; WIVA is a GIS based integration of chosen natural resources characteristics and land use/cover for the watershed analysis.

- **Strategy:** Create metrics or variables that quantify health and stressors affecting the watersheds found on the installation.

**Goal 4:** Update the wetland PLS.

- **Objective:** Update and improve resolution of planning level wetlands data currently used in wetlands baseline survey, and revise wetland acreage, location and boundaries on Fort Belvoir.
- **Strategy:**
  - 1) Utilize geospatial platforms and GIS; Landsat data will be used in conjunction with Phased Array type L-Band Synthetic Aperture Radar (PALSAR) instrument on the Japan Aerospace Exploration Agency and Ministry of Economy, Trade and Industry Advanced Land Observing Satellite (ALOS) in order to distinguishing various wetland types. Alternative methodology may be used to improve accuracy of analysis.
  - 2) Perform comparison among wetland inventories to identify the percent and acreage changes in wetland resources every five years.
  - 3) Perform field surveys, field verifications, photo-interpretation, and wetland characterization to verify accuracy of 5-year wetland inventory update.
  - 4) Ensure the GIS wetland inventory update has an 85% match rate to field surveys, field verifications, photo-interpretation, and wetland characterization.
  - 5) Utilize historic aerial photography to date, and interpret the wetland boundaries for each decade to forecast future impacts on ecologically valuable ecosystems. A comparative analysis of the change in wetland location and type will be performed.

**Goal 5:** Continue to protect against loss of native diversity and ecosystem function of Fort Belvoir's water resources.

- **Objective:** Conserve areas of ecologically significant water resources as stipulated by regulatory requirement, mitigation commitment, or that have been prioritized for conservation, such as extensive wetland areas.
- **Strategy:** Identify areas of ecologically significant water resources, consistent with DoDI 4715.03 policy for designating specific areas of the installation that warrant special conservation as "Special Natural Areas" (see Section 9) if consistent with the military mission. Maintain designation of the five existing SNAs as environmentally constrained to development under the RPMP, and warranting conservation considerations in other installation plans and documents. Designate new SNAs where legally obligated to do so.

**Goal 6:** Continue the long-term stream corridor restoration projects listed in the RPMP.

- **Objective:** Restore natural conditions to streams that have been identified in the RPMP and its NEPA ROD for restoration.
- **Strategy:** Perform the necessary assessments, designs, permitting, and construction of stream restoration projects.

**Goal 7:** Continue to assess opportunities and, as possible and practicable, begin to restore aquatic habitat, WOUS, and other water resources.

- **Objective:** Utilize Nationwide Permits for wetland, stream, green infrastructure, and living shoreline restorations for possible TMDL credits.
- **Strategy:** Evaluate three water resources per year which could be considered for restoration.

**Goal 8:** Continue to improve the incorporation of the Chesapeake Bay Program and the Chesapeake Bay Act with existing water resources and wetland protection.

- **Objective:** Protect riparian buffer areas by directing water-based training activities (military and civilian) and water-based recreational activities to designated areas.
- **Strategy:**
  - 1) Create a Fort Belvoir Policy that defines the riparian buffer width for all installation waterways. Address the regulatory-driven RPA as well as Fort Belvoir's 35 foot buffer on intermittent streams.
  - 2) Continue to update Water Resources maps and information to include RPAs.
  - 3) Determine stream perenniality of 10 streams per year to keep RPA information updated and identify the limits of protection in the field.

## 5.5.2 Actions

Actions are those activities that do not require ground breaking or environmentally altering activities. The following goals include Actions in their objectives or strategies:

**Goal 9:** Continue to enforce federal and state laws and regulations applicable to Fort Belvoir, as well as DoD, DA, and Fort Belvoir natural resources policies.

- **Objective:** Ensure Fort Belvoir remains in compliance with all applicable water resources laws and policies.
- **Strategy:**
  - 1) Perform water resources compliance inspections on a regular schedule to ensure compliance.
  - 2) Perform inspections in support of enforcement actions

**Goal 10:** Assess potential changes to wetland and water resources from climate impacts.

- **Objective:** Utilize geospatial tools and GIS data to determine potential impacts as well as possible responses.
- **Strategy:** Create forecast trends and models to improve watershed management strategies (e.g., migration of wetlands due to changing sea level, effectiveness of green infrastructure in protecting wetlands and mitigating storm surges, impacts of development and invasive species on wetland resources).

**Goal 11:** Continue to incorporate water resources protection requirements into all mission actions.

- **Objective:** Assist in meeting mission requirements.
- **Strategy:**
  - 1) Use the installation's review processes (Section 3.6) to incorporate water resources protection requirements into all phases of facilities siting, construction, renovation, operation, maintenance and demolition activities; military training and testing activities; outdoor recreation; environmental education; scientific research and study; and all other types of land area access and use requests.
  - 2) Perform project reviews for all projects.
  - 3) Include water resources protection, in particular wetlands and WOUS, as part of the Excavation Permit and Demolition Permit review processes.
  - 4) Include water resources protection in all real estate actions (e.g., outgrants, leases, rights-of-entry), as appropriate.
  - 5) Coordinate with other entities performing aquatic studies and management actions in and around the Fort Belvoir area.
  - 6) Review and revise the Fort Belvoir environmental protection specifications applicable to construction projects to ensure that they include appropriate water resources protection, as needed.

**Goal 12:** Continue an educational outreach program to highlight the importance of water resources, including wetland ecosystems.

- **Objective:** Increase the education and awareness level for the on-post public.
- **Strategy:**
  - 1) Develop field educational materials and/or field trips similar to a living classroom that can be utilized by schools and other groups as appropriate, and to educate the general public.
  - 2) Identify and provide opportunities for specialized training in innovative water resources management techniques for garrison, partner, tenant and contractor personnel, as appropriate.
  - 3) Participate in educational and service events pertaining to watershed and water resources, such as the annual Potomac River shoreline clean-up.
  - 4) Write and publish articles on water resources.

**Goal 13:** Continue to manage natural resources information so it is accessible to, and can be used by, installation natural resource managers.

- **Objective:** Develop and implement a water resources database. Keep installation GIS up to date.
- **Strategy:**
  - 1) Develop a system for storing and managing data.
  - 2) Enter electronic data.
  - 3) Scan and upload paper records.

**Goal 14:** Continue to work with the installation GIS and IT offices to bring on-line the wetlands permit database.

- **Objective:** Update wetland database by scanning all relevant information on wetland resources currently stored in the Environmental Division library associated with wetland classification, jurisdictional determination, wetland permitting, and wetland mitigation.
- **Strategy:** Secure space on DPW server for dedicated wetlands database.

**Goal 15:** Create a revised comprehensive watershed management approach that integrates all components of water resources into one management tool capable of incorporating information from other resources areas, and that can be used to make future management decisions for entire watersheds. The watershed management approach will be an ongoing cycle of tasks that can include, but is not limited to, setting standards for surface water quality, taking measurements of watershed conditions, assessing various types of data, identifying impairments to establishing priorities, verifying pollution sources, developing plans for restoring water quality, and implementing pollution source controls.

- **Objective:** Decide on a layout and management policies to include and utilize the Unified Federal Policy for a Watershed Approach to Federal Land and Resource Management stipulated in the Federal Register.
- **Strategy:** Work with Conservation and Compliance branches of DPW Environmental Division to determine what factors should be considered for revised comprehensive watershed management approach.

**Goal 16:** Continue to provide technical assistance in emergency situations, such as fuel spills, that threaten wetland and other water resources.

- **Objective:** Ensure emergencies are responded to in a timely manner while meeting all regulatory requirements.
- **Strategy:** Inspect and provide guidance.

**Goal 17:** Continue to perform agency coordination, notification and permitting on installation actions within or potentially affecting wetlands.

- **Objective:** Provide support to investigation and enforcement of federal and state laws and regulations, as well as DoD, DA, and Fort Belvoir policies.
- **Strategy:**
  - 1) Coordinate with USACE and VDEQ for Clean Water Act Section 404 Permit actions, and for Rivers and Harbors Act Section 10 Permit actions.
  - 2) Coordinate with VMRC and the VDEQ for Virginia Subaqueous Bed Permit actions, and with the Water Control Board for Water Protection Permit actions.
  - 3) Coordinate with Fairfax County Wetlands Board for Fairfax County Wetlands Permit actions.
  - 4) Coordinate with USFWS, National Marine Fisheries Service, Virginia Department of Game and Inland Fisheries, and other agencies as appropriate, on all wetland permit actions.



- 5) Develop and implement mitigation projects required by wetland permits. Perform corrective actions, as needed. Perform all reporting to agencies, as required by permit.
- 6) Coordinate with VDGIF, DCR-NHP, Northern Virginia Soil and Water Conservation District, Chesapeake Bay Program Office, and other appropriate entities regarding stewardship recommendations for water resources.
- 7) Develop and participate in partnerships for water resources conservation with Fairfax County and other regional entities. Address watershed management, point and nonpoint source runoff, storm-water management, fisheries management, invasive/exotics management, public access, and environmental education. Assess opportunities for grey water use.

**Goal 18:** Continue to issue installation-specific policies and guidance documents.

- **Objective:** Provide direction and guidance for projects and activities that may impact water resources.
- **Strategy:** Develop and maintain policy memorandums regarding water resources, as needed. Maintain current guidance on wetland permitting and RPA/buffer protection. Develop a comprehensive riparian buffer policy.

## 6.0 VEGETATION

Vegetated areas perform a host of ecological functions and support multiple societal, economic, quality of life, and aesthetic values in addition to providing military mission support. Maintaining a healthy native vegetation cover is essential for ensuring the future availability of land and water resources for military training and testing, providing for sustained multiple uses of an area's natural resources (e.g., opportunities for outdoor recreation and scientific research and education), and ensuring a high quality of life for personnel. Maintaining a healthy native vegetation cover is also an integral part of protecting water quality, enhancing watersheds and fish and wildlife habitat, and is essential for conserving biodiversity.

Plant communities are dynamic systems, influenced by natural and human forces. Consequently, management actions must be based not only on knowledge of the plant species comprising the community, but also on an understanding of the physico-chemical factors and forces acting on the community (e.g., hydrology, soil chemistry) and the interrelationship of the plant communities with associated wildlife communities. Natural resource managers must be vigilant to detect changing conditions, and must be able to discern between plant community changes due to the natural dynamics of the system and changes due to disruptions in the natural dynamics. Because the ecological functions of plant communities are influenced by their positions within the larger landscape, natural resource managers must understand and consider the larger landscape context within which the communities are situated.

Fort Belvoir's surrounding local area (metropolitan Washington DC area) and regional area (Chesapeake Bay region) continue to experience rapid conversion of undeveloped natural areas to developed land uses. Throughout the local and regional areas, large tracts of native vegetation are being lost or fragmented, with the consequent impacts on watersheds, water quality, and fish and wildlife habitat. As development replaces open space, vegetation in the remaining undeveloped areas is increasingly subject to disruption by invasions of exotic vegetation, stormwater-related erosion and sedimentation, overuse by humans, and overbrowsing by wildlife.

A large portion (about 60%) of Fort Belvoir (Main Post and FBNA combined) is undeveloped and supports predominantly forest communities. The other major native vegetation community types are tidally flooded marsh and scrub-shrub communities. Within the metropolitan Washington DC area, Fort Belvoir represents a significant tract of native vegetation in terms of size, diversity, and position relative to the location of off-post tracts of native vegetation.

Within Fort Belvoir's Main Post, areas of native vegetation occur in large blocks, aligned from the northeast to the southwest. This linear configuration affords a contiguous band of wildlife habitat through the installation, and provides for

connection with wildlife habitat areas outside the installation. Vegetation cover in the remaining 40% of Fort Belvoir consists primarily of the improved grounds associated with the installation's developed land uses including administrative, housing and community service facilities, developed training areas, a golf course, and other recreational facilities. Management actions in the improved areas focus on maintaining aesthetics and function. Management generally includes landscaping, turf management, and urban tree management.

Urban forestry and the landscaping of developed areas can affect both the quality of life for Fort Belvoir residents and the quality of the natural resources on Fort Belvoir. On the installation, a campus quad appearance is maintained on the South Post Core Area, and clustered development on the Upper North Post is designed to preserve large areas of open space (Woolpert, 1995). While aesthetics are an important concern to this installation, it is desirable and possible to manage vegetation in developed areas with sound stewardship principles in mind. The management of developed areas on Fort Belvoir can result in energy conservation; preservation of historic and specimen trees; grounds maintenance cost savings; beautification and increased property values; improved living and working conditions; soil conservation; enhancement of water supplies, runoff and nonpoint sources of pollution control; and good land stewardship.

Natural plant communities that are located within the developed areas of Fort Belvoir provide numerous benefits to people and wildlife. They can serve as valuable islands of habitat for common wildlife associated with urban areas. In areas where plant communities are contiguous, they may serve as small corridors for migratory species that pass through developed areas. Vegetation in these areas helps reduce the ambient air temperature, thus reducing energy costs during the warmest months and providing a more pleasant living environment. Trees absorb sunlight, preventing the ground from excessively heating, and they cool the air directly through evapotranspiration. Vegetation is valuable within developed areas because of beneficial effects on pollution. Grassy areas can reduce and retain stormwater flow from impervious surfaces like roofs and parking lots, while also filtering out pollutants such as toxins and nutrients. Vegetation also provides cleaner air by absorbing carbon and some pollutants.

Native vegetation areas on developed land often require little or no management, and therefore can effectively reduce the amount of pesticides and herbicides applied. These areas can also provide varied opportunities for recreation, thus improving quality of life for residents and visitors. Fort Belvoir, like many other military installations nationwide, represents an area of ecologically significant native vegetation resources within an increasingly urban setting. The continued presence of such islands of natural habitat is critical to conservation of native plant species and communities at the local, regional, and even national levels.

The DoD and the Army acknowledge their responsibility for natural resources conservation in their policies and regulations (Section 9.1), and have successfully demonstrated that not only is it possible to conserve native

vegetation resources while performing the military mission, but that the ability to continue to provide realistic military training and testing in the future depends upon doing so.

## **6.1 VEGETATION POLICIES**

### **6.1.1 Federal Vegetation Policy**

There is no overarching federal law regarding protection of non-threatened or non-endangered vegetation. (Federal endangered and threatened species policy is addressed in Section 8.1) There are, however, a number of federal statutes and directives with requirements pertaining to vegetation. These include the following:

- ***The Sikes Act: (16 USC Section 670a, et seq.) as amended in the Sikes Act Improvement Act of 1997***

The Sikes Act Improvement Act *Chapter 5C-Conservation Programs on Government Lands* (16 USC 670a.) Section (a) (3) requires military installations to carry out a program, “consistent with the use of military installations ...to provide for (i) the conservation and rehabilitation of natural resources on such installations; (ii) the sustainable multipurpose use of the resources, which shall include hunting, fishing, trapping and non-consumptive uses; and, (iii) subject to safety requirements and military security, public access to military installations to facilitate the use.”

- ***The Federal Noxious Weed Act of 1974 (7 USC §§ 2801-2814)***

This act prohibits the import or movement of nonindigenous weeds that have the potential to interfere with the growth of useful plants, clog waterways, interfere with navigation, cause disease, and that generally are detrimental to agriculture, commerce, and public health, unless pursuant to a permit. The Act prohibits the sale, purchase, barter, exchange, taking, or giving of a noxious weed in violation of the Act. The Act also requires each federal agency to develop a management program to control undesirable plants on federal lands when a similar state program is in place. Where applicable, federal agencies are to enter into cooperative agreements with state agencies to coordinate the management of undesirable plant species on federal lands.

- ***Executive Order 13112, Invasive Species (February 3, 1999)***

Executive Order 13112 requires federal agencies to work to prevent introductions of invasive plants, control and monitor detected populations of invasives, restore native species and habitats affected by invasives, and promote public education on invasive species and their control.

- ***Presidential Memorandum, Environmentally and Economically Beneficial Practices on Federal Landscaped Grounds, dated April 26, 1994, and the related guidance (60 FR 40837, August 10, 1995)***

This guidance requires federal agencies to implement environmentally and economically beneficial landscaping practices, including the use of regionally native plants for landscaping and implementation of construction practices that minimize adverse effects on the natural habitat.

- ***Executive Order 13148, Greening the Government through Leadership in Environmental Management (April 22, 2000)***

This executive order provides a timeframe by which federal agencies must incorporate the *Guidance for Presidential Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds* (August 10, 1995) into landscaping programs, policies, and practices. This Order contains overarching direction regarding management of vegetation in developed areas. The order directs federal agencies to strive to promote the sustainable management of federal facility lands through the implementation of cost-effective, environmentally sound landscaping practices, and through programs to reduce adverse environmental impacts. The Order requires agencies to incorporate the *Guidance for the 1994 Presidential Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds* into landscaping programs, policies, and practices (60 Fed. Reg. 40837). This memorandum directs agencies to adopt the following principles where cost-effective and to the extent practicable:

- Use regionally native plants for landscaping.
- Design, use, or promote construction practices that minimize adverse effects on the natural habitat.
- Seek to prevent pollution by, among other things, reducing fertilizer and pesticide use, using integrated pest management techniques, recycling green waste, and minimizing runoff.
- Implement water-efficient practices, such as the use of mulches, efficient irrigation systems, audits to determine exact landscaping water-use needs, and recycled or reclaimed water and the selecting and siting of plants in a manner that conserves water and controls soil erosion. Landscaping practices, such as planting regionally native shade trees around buildings to reduce air conditioning demands, can also provide innovative measures to meet the energy consumption reduction goal established in Executive Order No. 12902, "Energy Efficiency and Water Conservation at Federal Facilities."
- Create outdoor demonstrations incorporating native plants, as well as pollution prevention and water conservation techniques, to promote awareness of the environmental and economic benefits of implementing this directive. Agencies are encouraged to develop

other methods for sharing information on landscaping advances with interested non-federal parties

- ***The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) (7 USC 136 et seq.)***  
This act affords vegetation protection by emphasizing pest management using biological, cultural, chemical, and physical tools in a manner that minimizes economic, health, and environmental risks.
- ***The Plant Quarantine Act (7 USC 15 1-164a, 167)***  
The Plant Quarantine Act calls for the Animal and Plant Health Inspection Service (APHIS) to regulate the importation and interstate movement of nursery stock and other plants that may carry harmful pests and diseases.
- ***The Federal Plant Pest Act (7 USC 150aa-150jj)***  
This act prohibits the movement of plant pests from a foreign country into and through the U.S., unless permitted by the Secretary of Agriculture. The APHIS has broad authority to inspect, seize, quarantine, and destroy potentially harmful plant and animal materials.
- ***The Organic Act of 1944 (7 USC 147a, 148, 148a-e)***  
This act authorizes the APHIS to detect, eradicate, suppress, control, prevent, or retard the spread of plant pests.
- ***The Plant Protection Act of 2000***  
This act consolidates and modernizes all major statutes pertaining to plant protection and quarantine (e.g., Federal Noxious Weed Act, Plant Quarantine Act) and permits APHIS to address all types of weed issues. It also authorized APHIS to take both emergency and extraordinary emergency actions to address incursions of noxious weeds.
- ***The National Historic Preservation Act of 1966 (54 USC 300101 et seq.) and 36 CFR Part 800***  
This act addresses the protection of historic properties, including historic landscapes. The maintenance and preservation standards of historic landscapes are determined by the Secretary of the Interior.

### **6.1.2 State Vegetation Policy**

Virginia has no overarching law regarding protection of non-threatened or non-endangered plant species and communities. (State endangered, threatened and rare species policy is addressed in Section 8.1). There are, however, a number of Virginia laws and policies addressing vegetation.



- ***The Virginia Noxious Weed Law (Code of Virginia, Title 3.1, Chapter 17.2)***

This law relates to plants and seeds used in restoration or landscaping. This law prohibits the movement, transport, delivery, shipment, or offering for shipment into or within Virginia of any noxious weed, without a permit from the Commissioner of Agriculture and Consumer Services. A number of related guidance documents and fact sheets have been issued by the Virginia Department of Conservation and Recreation – Natural Heritage Program (DCR-NHP); for example, Natural Heritage Technical Report 98-25, *Managing Invasive Alien Plants in Natural Areas, Parks, and Small Woodlands*; Virginia Natural Heritage Program Fact sheet, *What are Invasive Alien Plant Species and Why are They a Problem?*; and, Virginia Natural Heritage Program Fact sheet, *Invasive Alien Plants List*.

- ***The Virginia Pesticide Control Act (Code of Virginia, Title 3.1, Chapter 14.1)***

This act confers powers and authority on the Virginia Pest Control Board to develop regulations that restrict or prohibit the sale or use and disposal of any pesticide or pesticide container or residuals that are toxic or hazardous to humans or wildlife, or may adversely affect the environment.

- ***Fort Belvoir's VPDES Small MS4 Permit (VAR040093) dated 1 July 2013 – 30 June 2018***

This permit requires the development and implementation of turf and landscape nutrient management plans on all lands where nutrients are applied to a contiguous area of more than one acre (9VAC25-890-40, Section II.B.6.c. Turf and Landscape Management) under Minimum Control Measure #6, Pollution Prevention/Good Housekeeping for Municipal Operations. Nutrient management plans must be tailored to specific sites, and address the timing, amount, type, and method of fertilization to provide healthy turfgrass without contributing to eutrophication, groundwater contamination, and related pollution. Fort Belvoir has prepared Nutrient Management Plans for the Fort Belvoir golf course, most residential neighborhoods, and the Missile Defense Agency, with additional plans under development for the remaining neighborhoods, National Geospatial-Intelligence Agency, and the Defense Logistics Agency. They were developed by the Fort Belvoir Urban Forester, who is state-certified to prepare nutrient management plans.

- ***The Chesapeake Bay Preservation Area Designation and Management Regulations 9VAC25-830-10 and the Chesapeake Bay Preservation Act (Virginia Code §§ 62.1-44.15:67 through 62.1-44.15:79)***

These regulations state that all counties, cities and towns in Tidewater Virginia shall comply with regulations therein regarding RPAs. Fort Belvoir does abide as required by maintaining 100 foot RPA areas on post around perennial streams and adjacent wetlands. Development in these

areas is avoided and minimized. When impacts occur, an additional review is conducted to determine the extent of impact, as well as mitigation for the RPA infringement. Mitigation for RPA impacts typically includes the replanting of trees and or shrubs at a predetermined ratio or the enhancement of a degraded RPA elsewhere on post. RPAs are typically addressed during either the wetland permitting process or during Coastal Zone Management Act (CZMA) consistency determination.

### 6.1.3 Department of Defense Vegetation Policy

- ***Natural Resources Conservation Program (DoDI 4715.03)***

DoD's natural resources management policy instruction requires installations to follow an ecosystem-based approach to land management using adaptive management of natural resources, to inventory and protect important biological resources, and to promote biodiversity, while being able to provide continued access to installation air, water and land for realistic military training and testing. It addresses various aspects of land management including forestry and agricultural operations, management measures for the removal or control of exotic species, beneficial landscaping practices, and habitat restoration and rehabilitation. The instruction also allows for multiple uses of an installation's natural resources, and for public access to these resources for recreation, education, and scientific research and study, compatible with the installation's ecosystem management goals and military mission.

<p align="center"><b>Excerpts from DoDI 4715.03</b>  <b>Select Provision Applicable to Vegetation Management</b></p>
<ul style="list-style-type: none"> <li>• The principal purpose of DoD lands, water, airspace, and coastal resources is to support mission-related activities. All DoD natural resources conservation program activities shall work to guarantee DoD continued access to its land, air, and water resources for realistic military training, and testing, and to sustain the long-term ecological integrity of the resource base and the ecosystem services they provide.</li> <li>• DoD shall demonstrate stewardship of natural resources in its trust by protecting and enhancing those resources for mission support, biodiversity conservation, and maintenance of ecosystem services. (Policy)</li> <li>• DoD Components shall assess installation lands for forestry and agricultural outlease suitability. Any such uses shall support the military mission, be addressed in and compatible with the INRMP, and be consistent with long-term ecosystem-based management goals that place ecological sustainability objectives above revenue optimization goals. Forestry proceeds shall be distributed in accordance with section 2665 of Reference (v). (Enclosure 3, item 4a)</li> <li>• Agricultural and forest products shall not be given away, abandoned, carelessly destroyed, used to offset contract costs, or traded for services,</li> </ul>

**Excerpts from DoDI 4715.03**  
**Select Provision Applicable to Vegetation Management**

supplies, or products, or otherwise improperly removed. Rental payments may be applied consistent with applicable terms of agricultural leases for goods and services. (Enclosure 3, item 4a (1))

- Marketable forest products requiring removal, including those on lands designated for privatization, must be disposed of by the Military Service or the value of the forest products will be deposited into the Military Service forestry account. Marketable forest products shall not be abandoned, destroyed, or donated. Forest products may be sold for salvage when their condition or value is adversely affected by natural disaster, insect damage, or other events. Forest products include, but are limited to, standing timber/trees, downed trees, and pine straw. (Enclosure 3, item 4a (1)(a))
- Marketability must be appraised by the Military Service with input from a professional forester. Facilities proposing to remove forest products must consider the environmental consequences of removal, prepare appropriate documentation required by NEPA, and comply with appropriate and applicable Federal, State, and local environmental regulations including, but not limited to, sections 470-470x-6 of Reference (h) (also known and hereinafter referred to as the “National Historic Preservation Act of 1966, as amended (NHPA)”), National Pollutant Discharge Elimination System construction permits(s), and erosion sediment control plan(s). (Enclosure 3, item 4a (1) (b))
- Each agricultural outlease must require leasee adherence to a conservation plan and the installation Integrated Pest Management (IPM) plan that details the best management practices to sustain natural resources and protect Government interests pursuant to the lease consistent with Federal contracting guidelines and in accordance with section 2667 of Reference (v). Each agricultural outlease shall use organic methods or best management practices to limit use of pesticides whenever possible. (Enclosure 3, item 4a (1)(c))
- DoD Components shall use a watershed-based approach to manage operations, activities, and lands, to avoid or minimize impacts to wetlands, ground water, and surface waters on or adjacent to installations in accordance with the guidelines and goals established in the Unified Federal Policy for a Watershed Approach to Federal Land and Resource Management, pages 62565 through 62572 of Volume 65, FR (Reference (ae)) and E.O.13508 (Reference (ah)). Enclosure 3, item 4a (2) (b)
- Environmentally and economically beneficial landscaping practices shall be used on all DoD lands consistent with the Presidential memorandum (Reference (ak)). Each installation shall, to the extent practicable, conserve and protect water resources, use locally adapted native plants, avoid using invasive species, and minimize the use of pesticides and

<b>Excerpts from DoDI 4715.03</b> <b>Select Provision Applicable to Vegetation Management</b>	
supplemental watering in accordance with Reference (ak). Enclosure 3, item 4d	<ul style="list-style-type: none"> <li>• All DoD Components shall manage fuel loads, provide adequate planning for wildland fire management and implement prescribed burn programs where appropriate responses to wildfire shall be conducted in a manner that preserves health, safety, and air quality; protects facilities; and facilitates the health and maintenance of natural systems. This management shall reduce the potential for wildfires, function as an ecosystem-based management tool, integrate applicable State and local permit and reporting requirements, and be consistent with DoDI 6055.06 and the current Environmental Protection Agency Memorandum (References (al) and (am). Enclosure 3, item 4e</li> </ul>

- ***Department of Defense Pest Management Program (DoDI 4150.7)***  
This instruction includes policy language specific to pest management.

Memorandum of Understanding (MOUs) were established between DoD and the Department of Agriculture on November 8, 2006, and the Department of Agriculture and the Department of the Interior on December 13, 2013. The MOUs authorize execution of cooperative agreements for mutual conservation objectives. While the earlier MOU is more general in nature, addressing the relationship between DoD and the Department of Agriculture’s Natural Resources Conservation Service, the more recent MOU specifically involves the Sentinel Landscapes Partnership to “plan and execute mutually beneficial programs, projects, activities, and strategies.”

#### 6.1.4 Department of the Army Vegetation Policy

- ***Environmental Protection and Enhancement (AR 200-1)***  
DA’s natural resources management policy is contained within AR 200-1, *Environmental Protection and Enhancement*.

<b>Excerpts from AR 200-1</b> <b>Select Provisions Applicable to Vegetation</b>	
<ul style="list-style-type: none"> <li>• Provide for the conservation and rehabilitation of natural resources on Army lands. 4-3a (2)</li> <li>• The Army’s land resources management goals are to: <ul style="list-style-type: none"> <li>○ Integrate natural resources stewardship and compliance responsibilities with operational requirements to help achieve sustainable ranges, training areas, and other land assets.</li> <li>○ Develop, initiate, and maintain programs for the conservation, utilization, and rehabilitation of natural resources on Army land. 4-3c (2)</li> </ul> </li> </ul>	

## **Excerpts from AR 200-1**

### **Select Provisions Applicable to Vegetation**

- Provide access to training and testing ranges through sustainment of installation land resources and in compliance with natural resources laws, regulations ...and Army policies. 4-3 d (1) (f)
- To the extent appropriate and applicable, provide for no net loss in the capability of the installation lands to support the military mission. Identify and address threats to mission land use and give high priority to management objectives that protect mission capabilities of installation lands. 4-3 d (1) (g)
- Promote biodiversity and ecosystem sustainability on Army lands and waters consistent with mission and INRMP objectives. 4-3 d 4. (a)
- Manage flora and fauna consistent with accepted scientific principles and in accordance with applicable laws and regulation, and, where lands and waters are suitable, for conservation of indigenous flora and fauna. 4-3 d (4) (b)
- Manage flora and fauna consistent with Army goal to conserve, protect, and sustain biological diversity while supporting the accomplishment of the military mission. 4-3 d (4) (c)
- (7) Forest Management. Practice responsible stewardship of forested lands to support the mission 4-3d(7)
- (8) Conservation Reimbursable agricultural/grazing outleasing and forestry programs.
  - Conduct programs that are compatible with mission operations and that support conservation compliance, sustainability, and natural resources stewardship. 4-3d(8)(a)
- Prepare and implement an invasive species management component (ISMC) of the INRMP consistent with specific Federal or State initiatives. 4-3d(10)
- Installations with unimproved grounds that present a wildfire hazard and/or installations that utilize prescribed burns as a land management tool will develop and implement an integrated wildland fire management plan (IWFMP) that is compliant and integral with the INRMP, the installations' existing fire and emergency services program plan(s) and the ICRMP. 4-3d(12)(b)
- Protect real property and the health of soldier, civilians, and family members from pests through use of integrated pest management (IPM) strategies. 5-1 a
- Prepare an integrated pest management plan (IPMP) that defines pest management requirements, responsibilities, and resources needed to correct pest problems at each installation. Coordinate the IPMP with all affected parties. 5-4 a.



### 6.1.5 Fort Belvoir Vegetation Policy

Fort Belvoir has no overarching vegetation management policy, other than the policy specified in this INRMP. The installation does, however, have two garrison policy memorandums - *Tree Removal and Protection Policy* (Appendix C) and *Integrated Pest Management Policy* (Appendix C), and management plans, such as the *Integrated Pest Management Plan* (Appendix D), that relate to vegetation management.

- ***Fort Belvoir's Tree Removal and Protection Policy***

This policy promotes site planning techniques and construction practices that maximize retention and protection of existing trees before considering removal. The policy requires that all proposed tree and shrub removals, as well as construction and excavation activities that may impact the growth and survival of trees be approved by DPW. It also requires that two new trees are to be planted for each tree four inches and larger in- diameter-at-breast-height (DBH) removed through construction on Fort Belvoir, except in those instances when environmentally beneficial, out-of-kind, compensatory mitigation is pursued.

- ***Fort Belvoir's Integrated Pest Management Policy***

This policy requires planning that incorporates education, record keeping, and best management practices to prevent pests and diseases from damaging personnel and property. It also requires that all pest management operations on Fort Belvoir are carried out in accordance with the *Fort Belvoir Integrated Pest Management Plan* (Appendix D). The current *Fort Belvoir Integrated Pest Management Plan* was approved and signed by the Garrison Commander in 2016.

## 6.2 BASELINE VEGETATION CONDITIONS

Information on vegetation conditions at Fort Belvoir was obtained through various surveys and studies (Table 6-1). Comprehensive plant community descriptions and mapping were developed through a plant community survey of Main Post (Paciulli, Simmons and Associates, Ltd., 1998a; 1999a) and FBNA (Jacobs, 2010) and an ecological communities assessment of Fort Belvoir Main Post performed by DCR-NHP (McCoy and Fleming, 2000). A natural heritage inventory, which included the identification of rare plant species and communities, was completed in 1997 by DCR-NHP (Hobson, 1996; Hobson, 1997) for Main Post and FBNA. A floristic inventory was developed, listing the plant species on Fort Belvoir Main Post (Wells, 1999) (Appendix E). Important vegetation surveys of Fort Belvoir Main Post include the baseline invasive/exotic vegetation survey (Paciulli, Simmons and Associates, Ltd., 2000b) and the baseline grassland survey (Paciulli, Simmons and Associates, Ltd., 1996). Other important vegetation surveys of Main Post and FBNA include the Timber



Inventory (North American Resource Management, 1991), the Training Areas Forest Inventory (Beane, 2016), the Watershed Survey (Landgraf, 1999; Landgraf, 2000), and the forest pest surveys/monitoring. Additionally, installation natural resources staff maintain a variety of vegetation inventories in support of base operations and maintenance (e.g., replanting opportunities, hazardous tree inventory).

<b>Table 6-1: Sources of Fort Belvoir Vegetation Information</b>					
<b>Subject/Section</b>	<b>Author</b>	<b>Method</b>	<b>Coverage</b>	<b>Year</b>	<b>Product</b>
Plant Communities (Section 6.2.1)	Paciulli, Simmons & Associates, Ltd.	Photo interpretation and field survey	Installation- wide	1998	Community mapping, species list, and report
Plant Communities (Section 6.2.1)	Jacobs	Photo interpretation and field survey	Fort Belvoir North Area	2010	Community mapping, species list and report
Plant Species (i.e. floristic list) (Section 6.2.2)	George Washington University /Paciulli, Simmons & Associates, Ltd.	Field survey	Installation- wide, exclusive of cantonment areas and FBNA	1999	Floristic species list
Natural Heritage Inventory (including Rare Species) (Section 6.2.3)	Virginia Department of Conservation and Recreation, Division of Natural Heritage (Hobson)	Field survey	Installation- wide, exclusive of cantonment areas	1996, 1997	Species list, report, and maps

<b>Table 6-1: Sources of Fort Belvoir Vegetation Information</b>					
<b><i>Subject/Section</i></b>	<b><i>Author</i></b>	<b><i>Method</i></b>	<b><i>Coverage</i></b>	<b><i>Year</i></b>	<b><i>Product</i></b>
Ecological Communities (Section 6.2.4)	Virginia Department of Conservation and Recreation, Division of Natural Heritage (McCoy and Fleming)	Field survey	Installation-wide, exclusive of cantonment areas and FBNA	2000	Species list, map, and report; permanent monitoring plots
Timber (Section 6.2.5)	North American Resource Management, Inc.	Field survey	Installation wide, exclusive of the cantonment area and FBNA	1991	Forest inventory, report, and forest compartment maps
Timber (Section 6.2.5)	US Army Corps of Engineers, ERDC-EL (Beane)	Field survey	Southwest training area	2016	Forest inventory report, and forest compartment maps
Improved Grounds (Section 6.3.4)	Real Property Maintenance Contract	Field survey	All improved grounds maintained in accordance with contract	2000	Management units and maintenance activities

<b>Table 6-1: Sources of Fort Belvoir Vegetation Information</b>					
<b>Subject/Section</b>	<b>Author</b>	<b>Method</b>	<b>Coverage</b>	<b>Year</b>	<b>Product</b>
Invasive Exotic Vegetation (Section 6.2.6)	Paciulli, Simmons & Associates, Ltd.	Field survey	Installation-wide, exclusive of cantonment area and FBNA	2000	Species list, map, and management plan
Grasslands (Section 6.2.7)	Paciulli, Simmons & Associates, Ltd.	Field survey	Installation-wide, exclusive of cantonment areas and FBNA	1996	Map and management plan
Watersheds (Section 6.2.8)	Chris Landgraf (PGI, Inc.)	Field survey	Installation-wide	1999	Maps and management plan
Forest Pests (Section 6.2.9)	In-house	Field survey	In forested areas installation-wide	Annually	Survey results, management recommendations
On-going Surveys/Inventory Updates to Urban Street Tree Inventories, Hazard Tree Inventories, Landscape Plans	In-house	Field survey and landscape plans	Site- and area-specific surveys within the developed area of the installation	Annually, and throughout the year	Record of existing conditions, planting plans, design plans, tree mitigation areas & plans

<b>Table 6-1: Sources of Fort Belvoir Vegetation Information</b>					
<b><i>Subject/Section</i></b>	<b><i>Author</i></b>	<b><i>Method</i></b>	<b><i>Coverage</i></b>	<b><i>Year</i></b>	<b><i>Product</i></b>
Small whorled pogonia (Section 8.2.1)	DCR-NHP	Field Survey	300 Area, and select areas of main post	2012	Report, mapping
Sensitive Joint-Vetch (Section 6.2.3)	DCR-NHP	Field Survey	Tidal marshes	2011-2012	Report, mapping
Small whorled pogonia (Section 8.2.1)	Various agencies and contractors	Field Surveys	Installation wide	2012-current	Reports, mapping
Baseline wetlands inventory (Section 6.2.1)	Paciulli, Simmons & Associates, Ltd.	Photointerpretation and field surveys	Main Post	1997	Report, mapping
Baseline wetlands inventory (Section 6.2.1)	Paciulli, Simmons & Associates, Ltd.	Photointerpretation and field surveys	FBNA	1999	Report, mapping

## 6.2.1 Plant Community Surveys

A plant community survey of Fort Belvoir Main Post and FBNA was conducted using photointerpretation and limited field survey (Paciulli, Simmons and Associates, Ltd., 1998a; 1999a). This survey described and mapped 16 broad community types, covering all of the Fort Belvoir Main Post. As indicated in Figures 6.1-6.5 and Table 6.2, these types included categories such as natural and planted pine forests, various upland and palustrine hardwood stands, tidal and non-tidal wetlands, old field grasslands, and urban land. The plant community descriptions used for this survey were developed in coordination with DCR-NHP.<sup>1</sup> The plant community mapping is included within the installation GIS. A narrative description of each community type is contained within Appendix F.

<b>Table 6-2: Acreage and Distribution of Plant Community Types on Fort Belvoir</b>			
<b><i>Plant Community</i></b>	<b><i>Acreage</i></b>		<b><i>Distribution</i></b>
	<b><i>Main Post*</i></b>	<b><i>FBNA^</i></b>	
Oak/Ericad (Heath Family) Forest	1,253	83	Upland areas of gravelly ridges and dry slopes
Beech Mixed Oak Forest	1,146	6	Upland areas of gradual, well-drained ravine slopes
Tulip Poplar Mixed Hardwood Forest	987	187	Moist, fertile ravine slopes and ravine bottoms
Seep Forest	39	1	Groundwater-saturated flats and slopes
Mixed Pine Hardwood Forest	196	66	Previously disturbed areas in late succession
Virginia Pine Forests	425	105	Previously disturbed areas in mid-succession
Loblolly Pine Forest	245	7	Planted stands
White Pine Forest	6	0	Planted stands
Moderately Well-Drained Floodplain Hardwood Forest	173	4	Moderately well-drained to somewhat poorly-drained floodplain bottomland
Poorly-Drained Floodplain Hardwood Forest	422	0	Somewhat poorly-drained to very poorly-drained floodplain bottomlands and sloughs

<sup>1</sup> Descriptions used in this survey predated development of The Nature Conservancy's National Vegetation System (used for the later ecological communities assessment; Section 6.2.4).



**Table 6-2: Acreage and Distribution of Plant Community Types on Fort Belvoir**

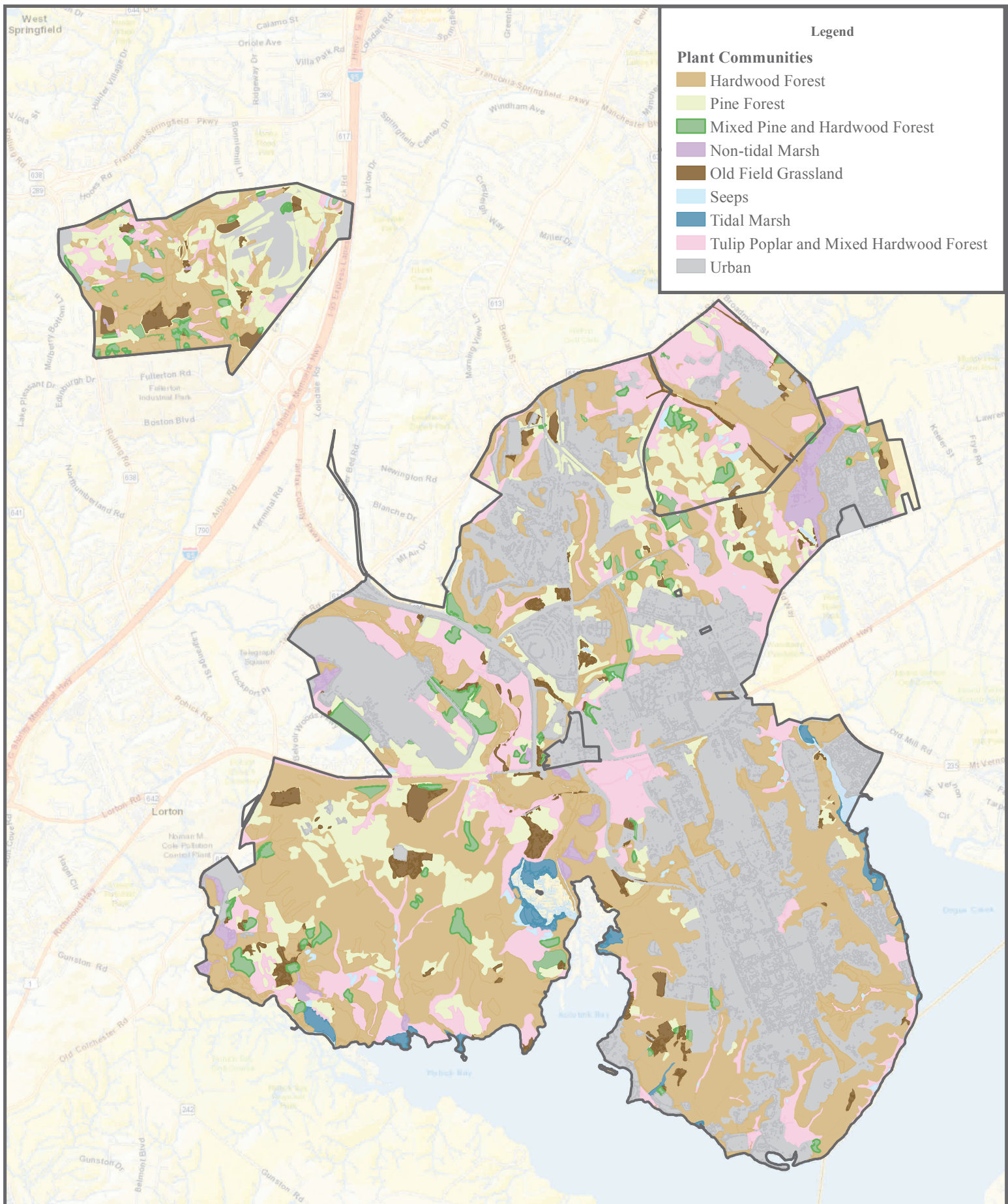
<i>Plant Community</i>	<i>Acreage</i>		<i>Distribution</i>
	<i>Main Post</i> <sup>*</sup>	<i>FBNA</i> <sup>^</sup>	
Non-Tidal Marsh/Beaver Pond	131	0	Above tidal limits of Accotink, Pohick, and Dogue Creeks
Tidal Marsh	96	0	Shallow tidal areas of Accotink and Pohick Creeks and at the mouths of several small streams.
Freshwater Tidal Swamp Forest	45	0	Tidally influenced palustrine areas.
Tidal Scrub/Shrub Wetland	16	0	Edges of tidal swamp forests near the transition to tidal marsh.
Old Field Grassland	233	19	Previously disturbed areas in early successional stages.
Urban Land	2,809	312	All developed areas including improved grounds.

<sup>\*</sup>Source: Paciulli, Simmons and Associates, Ltd., 1998a. The report did not have information on a few small areas but does include Humphreys Engineer Center; therefore, the total acreage of the plant communities differs from the total acreage of the Main Post.

<sup>^</sup>Source: Jacobs, 2010. The Accotink Creek Channel was not included in the vegetation community survey; therefore, total acreage of plant communities is less than the total acreage of FBNA.

## 6.2.2 Floristic Inventory

A floristic inventory of Fort Belvoir was developed by botanist Dr. Elizabeth Wells of George Washington University (1999). The inventory was developed through a detailed, multi-season field survey of representative locations of all native plant community types on post. A total of 483 plant species were identified in this inventory (Appendix E).



1 inch = 0.75 miles

0 0.25 0.5 1 Miles

## PLANT COMMUNITIES ON FORT BELVOIR

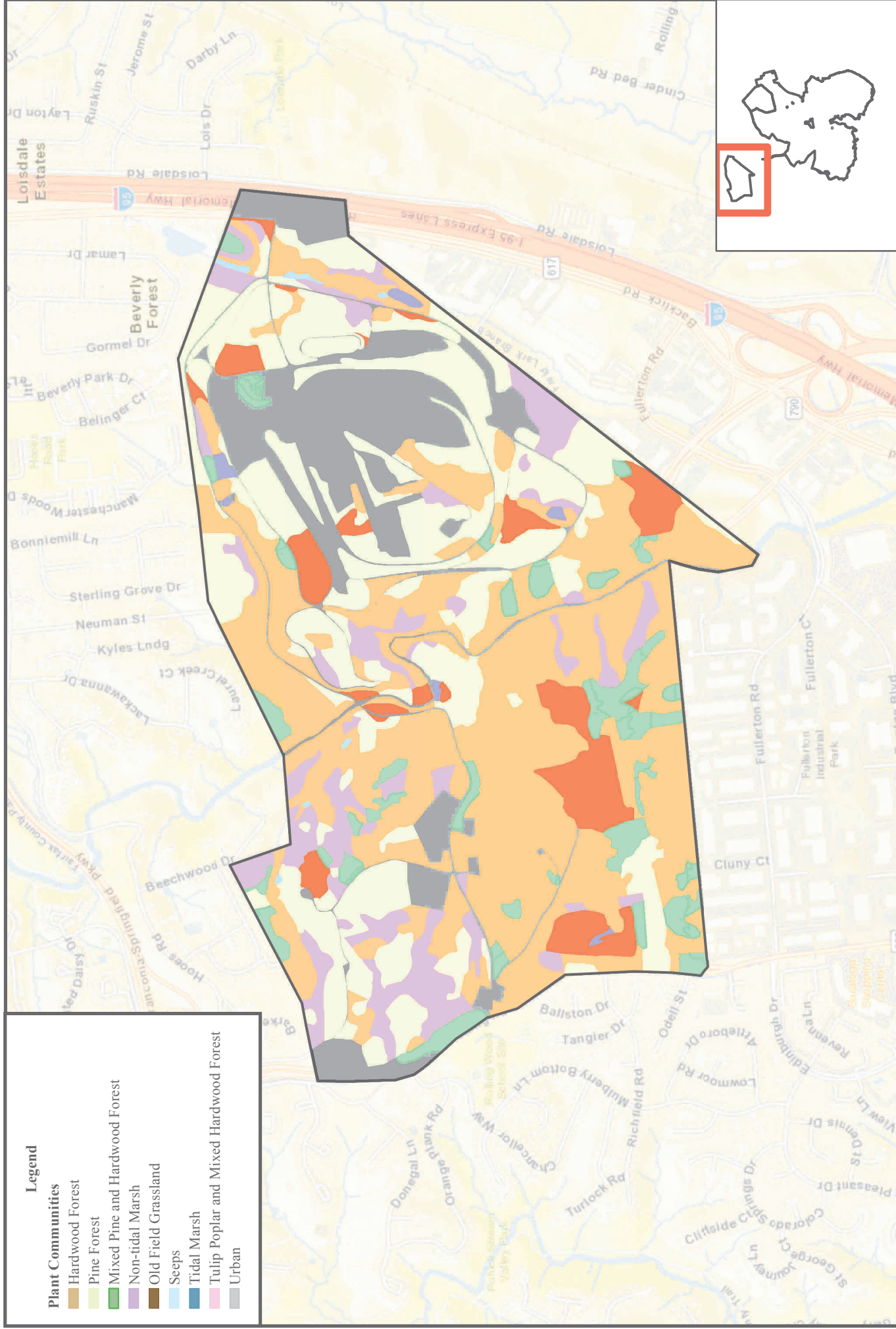
Unclassified // FOUO

**Figure 6.1**

Source: Composite image of 1997 planning level survey data and 2016 Fairfax County data derived from LIDAR, Google road maps

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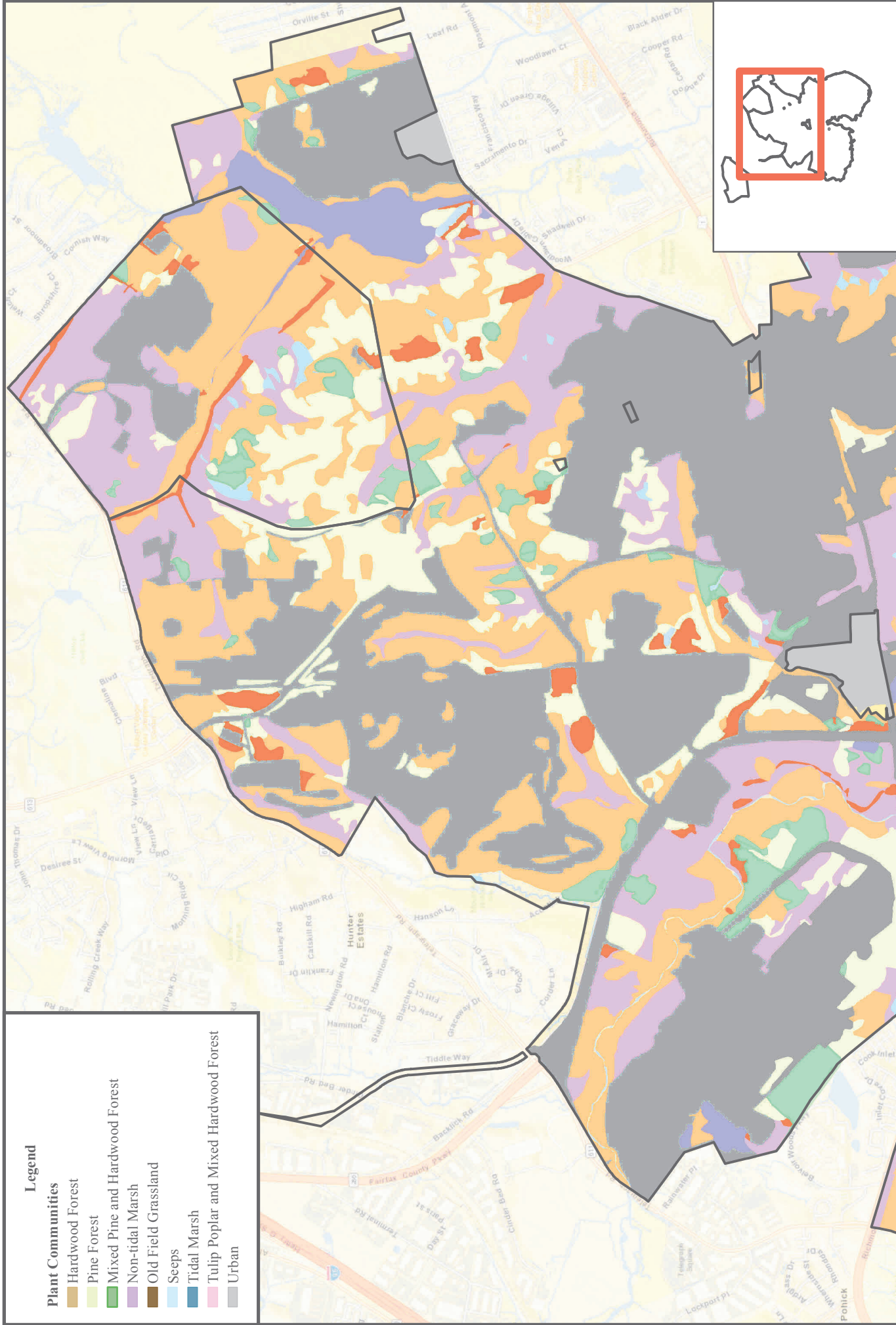




# PLANT COMMUNITIES ON FORT BELVOIR, NORTH AREA

Source: Composite image of 1997 planning level survey data and 2016 Fairfax County data derived from LIDAR, Google road maps

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# PLANT COMMUNITIES ON FORT BELVOIR,

**Figure 6.3**

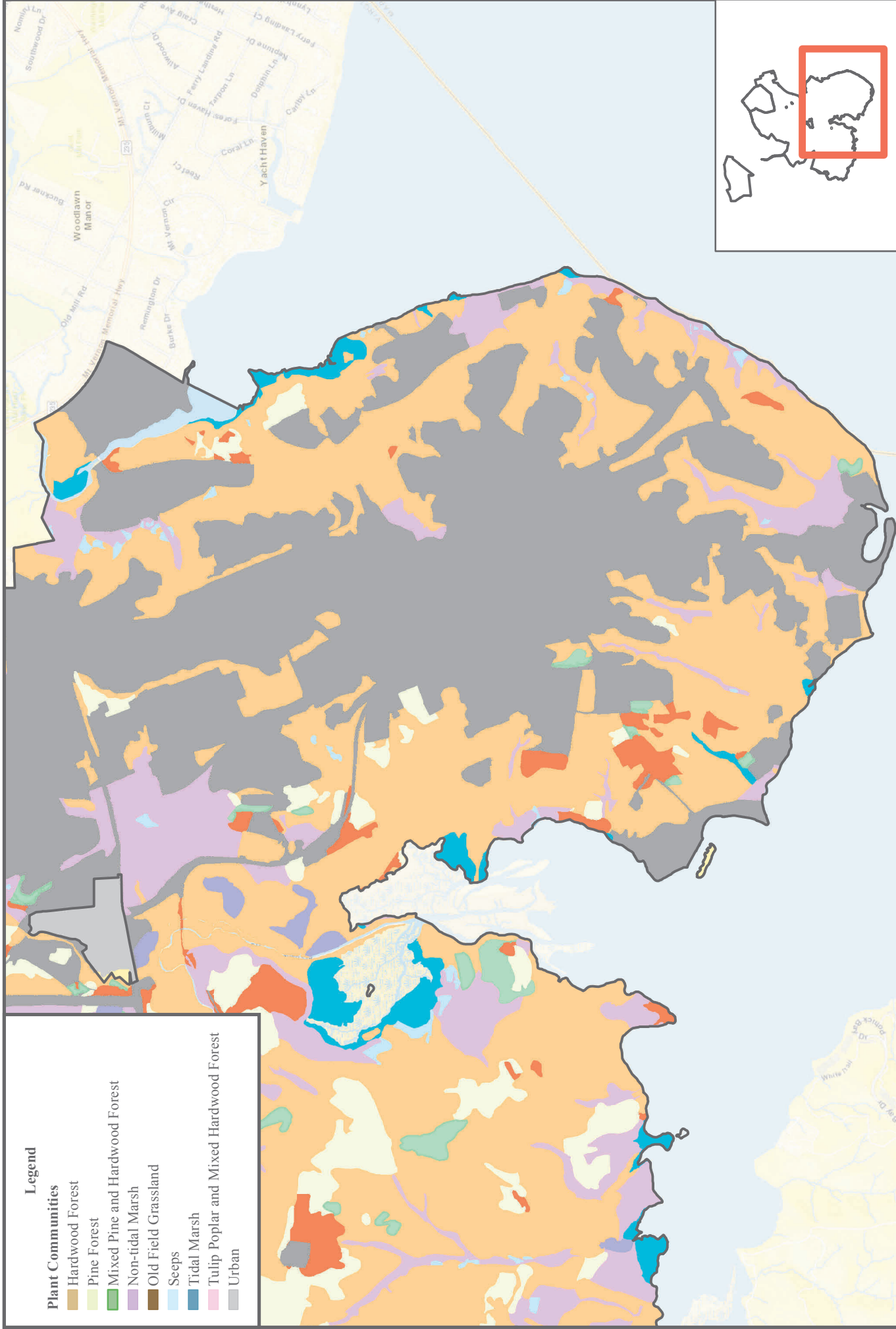
Source: Composite image of 1997 planning level survey data and 2016 Fairfax County data derived from LIDAR, Google road maps

**NORTH**

Unclassified // FOUO



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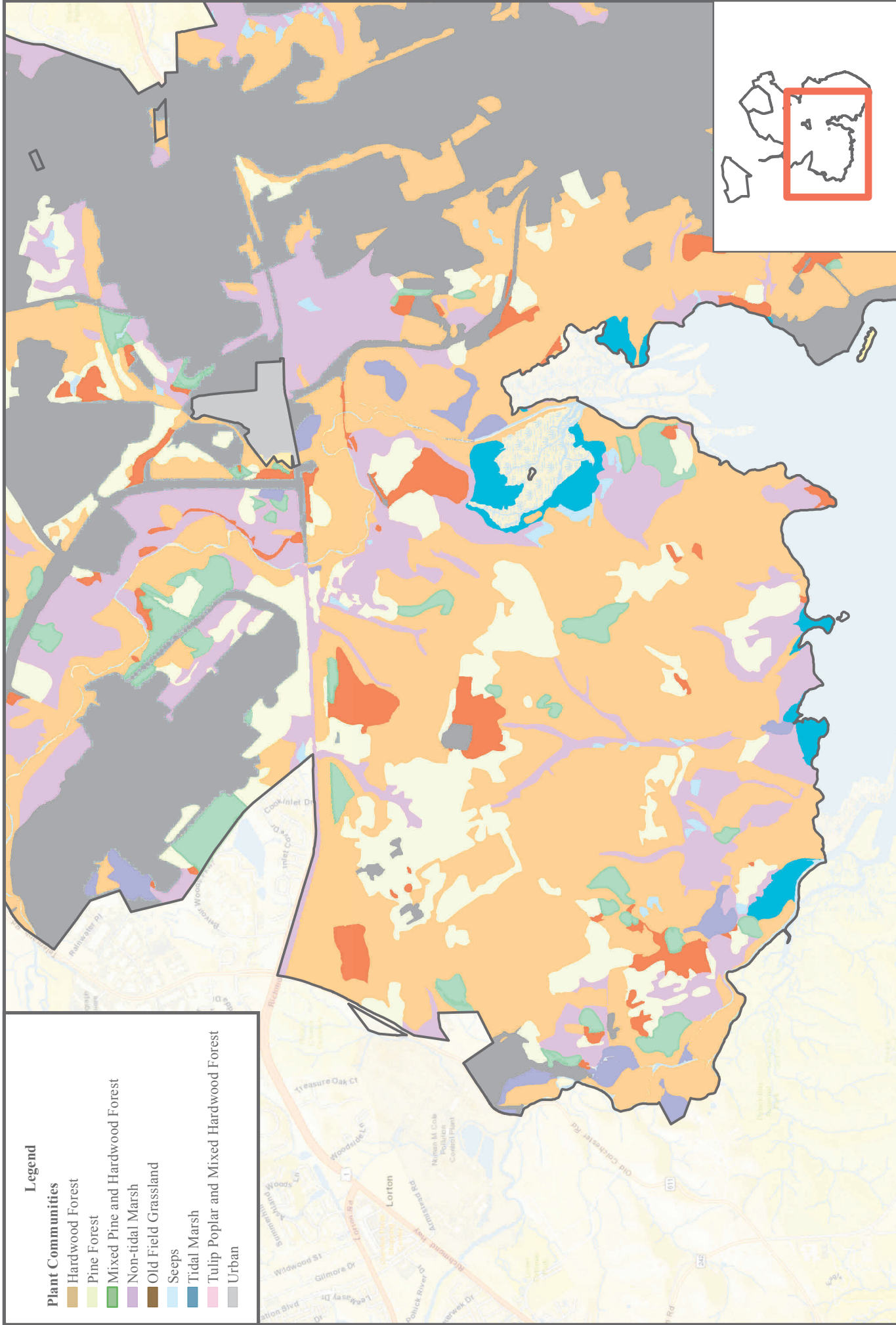
# PLANT COMMUNITIES ON FORT BELVOIR, SOUTH EAST

**Figure 6.4**

Source: Composite image of 1997 planning level survey data and 2016 Fairfax County data derived from LIDAR, Google road maps

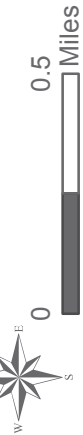
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**PLANT COMMUNITIES ON FORT BELVOIR, SOUTH WEST**

1 inch = 0.4 miles



Unclassified // FOUO

Source: Composite image of 1997 planning level survey data and 2016 Fairfax County data derived from LIDAR, Google road maps

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### 6.2.3 Natural Heritage Inventory

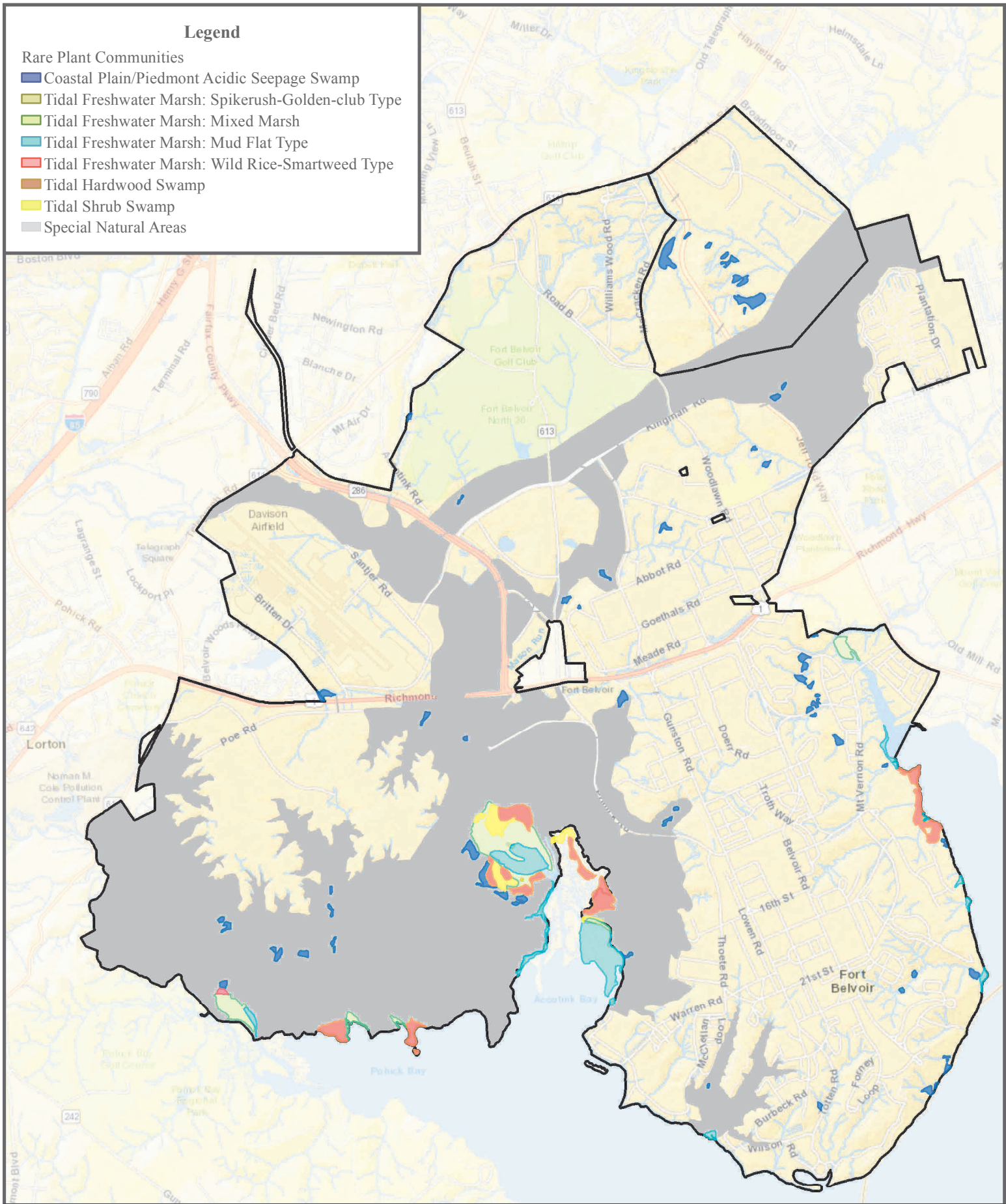
The baseline Natural Heritage Inventory of Fort Belvoir (Main Post and FBNA) was performed by DCR-NHP to address the biodiversity of the installation's natural resources in the late 1990's. This survey involved detailed, multi-season field survey over a two-year period (Hobson, 1996; Hobson, 1997). The purpose of the inventory was to systematically identify the installation's natural heritage resources (i.e., those sites supporting unique or exemplary natural communities, rare plants and rare animals, and other significant natural areas). The inventory identified four rare plant species and three watchlist plant species (Section 8.2.12).<sup>2</sup> The four rare plant species, velvety sedge (*Carex vestita*), vetchling (*Lathyrus palustris*), water plantain crowfoot (*Ranunculus ambigens*) and river bulrush (*Scirpus fluviatilis*) occur in the freshwater tidal marsh wetlands within the Accotink Bay Wildlife Refuge (ABWR) (Section 9.2.1.1). The locations of the three watchlist plant species, creeping spikerush (*Eleocharis smallii*), blueflag (*Iris versicolor*) and giant bur-reed (*Sparganium eurycarpum*) were not identified in the survey report, although all are wetland species. The inventory identified six locations of significant vegetation communities (all of which are wetlands): three associated with Accotink Bay wetlands within the ABWR, two within the lower parts of training areas T-7 and T-10, and one within Humphreys Engineering Center (HEC). The 1996 DCR-NHP inventory defined the boundaries of two recommended conservation areas to protect these resources. A third conservation area, located in the vicinity of training area T-17, was recommended based on the results of the 1997 DCR-NHP inventory (Figure 6.6). The recommended conservation areas are watershed-based and encompass large areas within Fort Belvoir. In 2012 and 2013, DCR-NHP re-surveyed portions of Fort Belvoir for small whorled pogonia (*Isotria medeoloides*) and sensitive joint vetch (*Aeschynomene virginica*). The survey was not able to verify presence of either species.

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<sup>2</sup> A fourth watchlist species, American frog's bit (*Limnobium spongia*), was identified on Fort Belvoir during the DCR-NHP survey, but has since been removed from the watchlist.



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1 inch = 0.6 miles

0 0.2 0.4 0.8 Miles

## RARE PLANT COMMUNITIES ON FORT BELVOIR

Unclassified // FOUO

## Figure 6.6

Source: Fort Belvoir GIS,  
Google road maps

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#### **6.2.4 Ecological Communities Assessment of Main Post**

The ecological communities assessment was conducted using photo interpretation of recent installation aerial photography and extensive multi-season field survey and sampling (McCoy and Fleming, 2000). The assessment was undertaken to provide a more-refined and expanded ecological analysis of the native plant communities on Fort Belvoir. The community descriptions used for this assessment were based upon The Nature Conservancy's (TNC's) National Vegetation Classification (which was not available at the time of the plant communities surveys). TNC's National Vegetation Classification is a nationwide effort for standard communities classification that addresses the vegetation cover conditions together with environmental conditions (e.g., hydrologic regime).

The ecological communities assessment identified and described 17 native plant community types on the undeveloped parts of Fort Belvoir Main Post (Table 6-3).<sup>3</sup> A total of 472 vascular plant taxa were recorded within the survey plots. As part of the community descriptions, DCR-NHP provided detailed ecological information including vegetation composition, soil chemistry, and physical parameters (e.g., pH, organic matter, moisture, texture, etc.). DCR-NHP assigned conservation priority rankings (i.e., rarity rankings) for each community on post. Representative plots of each ecological community type were permanently marked in the field and their locations were entered into the installation GIS, so that they may be used for future monitoring. The ecological community mapping information has been incorporated into the installation GIS.

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<sup>3</sup> McCoy and Fleming did not address planted pine stands, or early or transitional successional types addressed by the previous plant communities survey. The difference in the number of community types between this survey and the survey by Paciulli, Simmons and Associates, Ltd., is due to the more refined definitions of ecological communities.

<b>Table 6-3: Distribution of Ecological Community Types on Fort Belvoir</b>		
<b><i>Ecological Group</i></b>	<b><i>Community Type (State Conservation Rank)</i></b>	<b><i>Distribution on Fort Belvoir</i></b>
Upland Forests	Flatwoods Mesic Forest (S4?)	Level or nearly level topography at low elevations, bordering major streams and alluvial floodplains.
	Mesic Mixed Hardwood Forest (S5)	Elevations of 3 m to 33.5 m. Lower, middle, or upper slopes. Along stream bottoms and on level areas.
	Dry-Mesic Oak-Hickory Forest (S5)	Well-drained areas around elevation of 24.8 m. Topography ranges from floodplain to ridge crest.
	Mixed-Oak / Ericad Forest (S5)	Dry acid ridgetops and upper to middle slopes. Mean elevation is 30.5 m.
	Chestnut Oak / Ericad Forest (S4)	North-facing middle and upper slopes of the Coastal Plain and Piedmont. Mean elevation of 20.6 m.
Alluvial Forests and Seeps	Alluvial Mixed Hardwood Forest: Poorly-Drained Type (S4)	Low elevation (mean = 5.9 m) forested floodplains or lowlands with poor drainage.
	Alluvial Mixed Hardwood Forest: Well-Drained Type (S5)	Alluvial floodplains at low elevation (mean = 7.9 m). Well-drained soils.
	Coastal Plain / Piedmont Acidic Seepage Swamp (S2)	Groundwater-saturated stream headwaters, small seeps and runs, stream bottoms at base of slopes. Mean elevation of 9.1 m.
	Bottomland Hardwood Swamp (S4?)	Low elevation (0 to 6.1 m) floodplains. Somewhat poorly drained to poorly drained.
Swamp Forests and Marshes	Tidal Hardwood Swamp (S3?)	Tidally-flooded, freshwater forested floodplains of Coastal Plain estuarine rivers and creeks. Poorly-drained alluvial soils.
	Tidal Shrub Swamp (S2?)	Freshwater wetlands, usually in marginal zones flooded only irregularly by tides.



Table 6-3: Distribution of Ecological Community Types on Fort Belvoir		
Ecological Group	Community Type (State Conservation Rank)	Distribution on Fort Belvoir
	Beaver Marsh: Rush Sedge Type (SM)	Low elevation (mean = 6.1 m) wetlands of Coastal Plain and Piedmont. Common in disturbed, ponded habitats.
	Beaver Marsh Arrow-arum Type (SM)	Low elevation beaver wetlands (mean = 3.1 m) of Coastal Plain and Piedmont.
	Tidal Freshwater Marsh: Mixed Type (S1)	Drier portions of the marsh complex influenced by regular tides. Poorly drained soils.
	Marsh: Mud Flat Type (S3?)	Tidal freshwater river mud flats with high water levels (1 to 3 m deep). Submerged and exposed daily.
	Tidal Freshwater Marsh: Wild Rice Smartweed Type (S3?)	Tidally influenced river systems with daily tidal flooding but beyond influence of salinity.
	Tidal Freshwater Marsh: Spikerush Golden-club Type (S1)	Tidal marshes within influence of daily flooding but beyond effects of salinity.

Source: McCoy and Fleming, 2000 <sup>a</sup>State Conservation Rankings:

S1 Extremely rare, generally with five or less occurrences state-wide, and/or covering <50 ha (124 acres) in aggregate; or covering a larger area but highly threatened with destruction or modification.

S2 Very rare, generally with 6 to 20 occurrences state-wide, and/or covering <250 ha (618 acres) in aggregate; or covering a larger area but threatened with destruction or modification.

S3 Rare to uncommon, generally with 21 to 100 occurrences state-wide; or with a larger number of occurrences subject to relatively high levels of threat; may be of relatively frequent occurrence in specific localities or geographic parts of the state.

S4 Common, at least in certain regions of the state, and apparently secure.

S5 Very common and demonstrably secure.

S? Unranked

S\_? Rank uncertain or approximate.

SM Modified, as applied to early succession communities or beaver wetlands.



Of the Main Post's 17 native vegetation communities, DCR-NHP ranked the Coastal Plain/Piedmont acidic seepage swamp and the tidal shrub swamp as very rare, and the mixed type and spikerush golden-club type tidal freshwater marshes as extremely rare (McCoy and Fleming, 2000). These four communities are all wetland types (Section 5.2.3). DCR-NHP identified existing and potential threats to the ecological integrity of each community type on post. The most significant of these threats are (1) displacement by invasive/exotic species, and (2) stormwater-related problems (e.g., sedimentation).<sup>4</sup> A narrative description of each of the 17 DCR-NHP plant community types, including comments on disturbances or threats to each community is included in Appendix F.

### **6.2.5 Timber Inventories**

An area-specific forest inventory of the Southwest Training Area was completed in 2016, evaluating 1661.6 acres (Figure 6.7) (Beane, 2016). Prior to that, the last installation-wide timber inventory involving complete surveys was done in 1991 (North American Resource Management Inc., 1991) and updated via projection, aerial photography, and minimal ground truthing in 2001. These inventories include management recommendations, proposed harvest charts, and data summary tables.

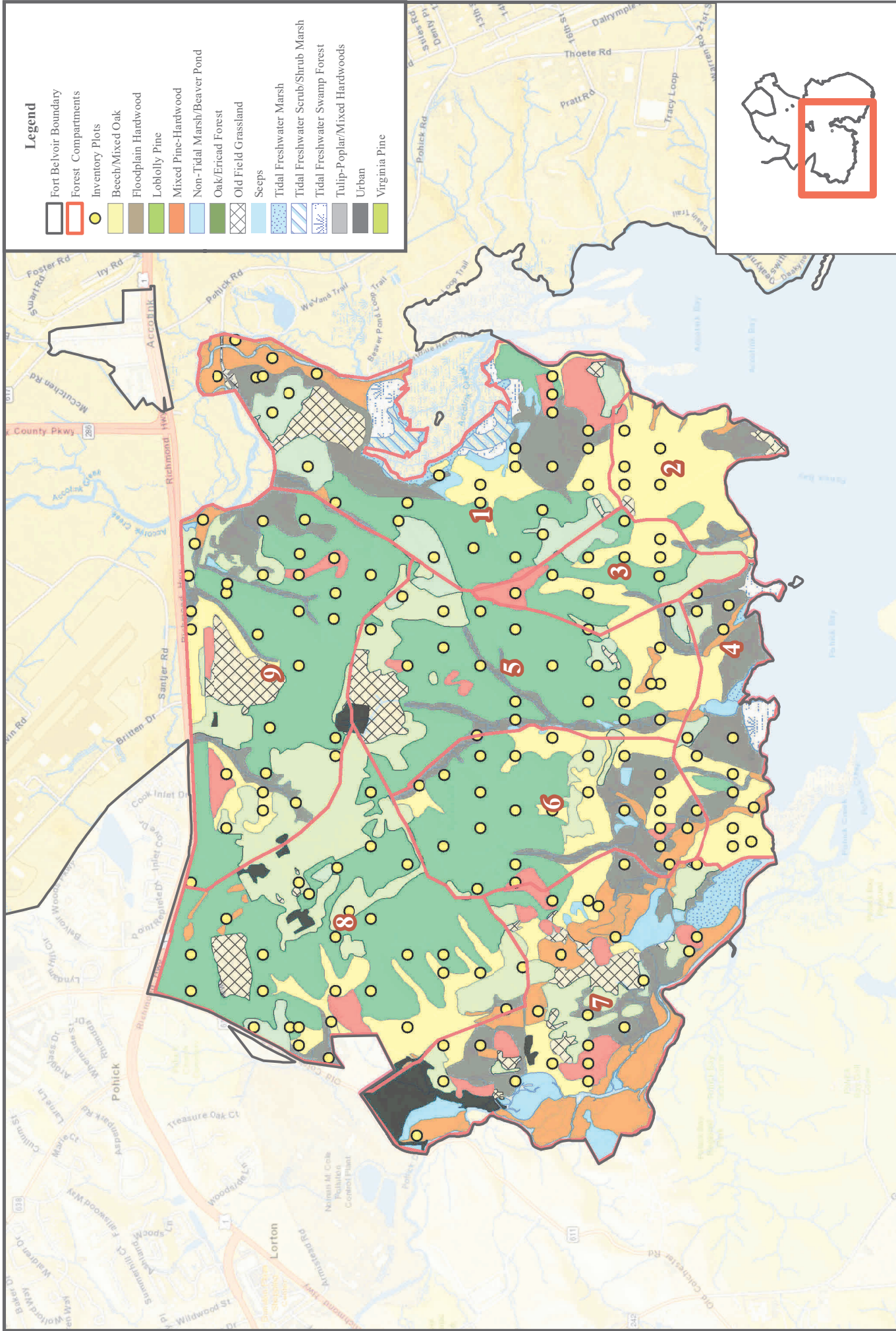
The 2016 inventory provides a baseline of forest resources within training areas designated for both pulpwood and sawtimber resources. The strata-based valuations provided by the inventory allow flexibility in terms of evaluating impacts via future development, which would shift compartment and stand boundaries, and identifying costs associated with such development. Additionally, the inventory provides information pertaining to habitat availability, species diversity, and snag availability, which facilitates wildlife management and habitat conservation and maintenance.

### **6.2.6 Invasive/Exotic Vegetation Survey**

The baseline survey of invasive/exotic vegetation of Fort Belvoir was developed through a multi-season field survey (Paciulli, Simmons and Associates, Ltd., 2000b). Additional surveys have been performed annually as part of the Fort Belvoir pest management program, and other installation natural resource management programs. Table 6-4 presents the invasive/exotic vegetation species identified at Fort Belvoir with significant occurrences such that they warrant consideration for control. Table 6-4 also summarizes the location and size of each occurrence, and the type of habitat in which the species typically exists.

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<sup>4</sup> DCR-NHP did not address the threat of land development.



# **FORT BELVOIR FOREST INVENTORY** Unclassified // FOUO

**Figure 6.7**

Source: Beane 2016, Google road maps

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Table 6-4: Invasive/Exotic Vegetation on Fort Belvoir Recommended for Control					
Scientific Name	Common Name	Size*	Habitat	Location	
<i>Ailanthus altissima</i>	Tree-of-heaven	L	G, F	Around north and east perimeter of recycling center site/compost yard, various landfills	
<i>Ampelopsis brevipedunculata</i>	Porcelain berry	S	F	Around the drainage culvert off of the perimeter road on the western portion of secure facility at Telegraph Road	
<i>Celastrus orbiculatus</i>	Oriental bittersweet	L	F	Along both sides of Accotink Creek starting at the footbridge and going south along Beaver Pond Nature Trail and Accotink Creek Trail	
		S-M		Scattered along roadsides throughout the post	
<i>Hedera helix</i>	English ivy	M		South side of Accotink Creek near the suspension (foot) bridge	
		M	F	In woods behind buildings on Jadwin Loop, north of the former sewage treatment facility	
<i>Hydrilla verticillata</i>	Hydrilla	S	W	In Mulligan Pond	
<i>Lespedeza cuneata</i>	Chinese lespedeza	S-L	G	Fields, open areas and roadsides throughout the post	
<i>Lythrum salicaria</i>	Purple loosestrife	S	W	Along the western bank of Dogue Creek, across from Dogue Creek Marina	
<i>Microstegium vimineum</i>	Japanese stiltgrass	L	F	Trails and old road beds	
<i>Miscanthus sinensis</i>	Eulalia	S		On the north side of Johnson Road near the pier	
		S	G	West of the intersection of Beulah Street with Woodlawn Road near old debris landfill	
		L		South side of Cissna Road (FBNA) before the bridge	
<i>Murdanna kesiak</i>	Marsh dewflower	M	W	Pohick Loop/Wetland Trail Pond	
<i>Optismenus hirtellus</i> ssp. <i>undulatifolius</i>	Wavyleaf basket grass	S	W	Beaver Pond	



Table 6-4: Invasive/Exotic Vegetation on Fort Belvoir Recommended for Control					
Scientific Name	Common Name	Size*	Habitat	Location	
<i>Phalaris arundinacea</i>	Reed canary grass	L	W	In and along the section of Pohick Creek that is adjacent to T-9	
		M	W	Along the western bank of Dogue Creek, across from the marina, near a utility line crossing	
		S		At the intersection of gravel roads, across from Dogue Creek Marina	
		S		In a swale along Poe Road adjacent to the landfill	
<i>Phragmites australis</i>	Common reed	S		In a ditch along Poe Road	
		L		In a wet depression, north of the archery range along the edge of grassland field	
		L		Along the nature trail, north of the archery range	
		M		In a ditch along Wilson Road, just north of R&D area basin	
		S		Along former Keene Road adjacent to building 2454	
		L		Accotink Bay, Pohick Bay, Gunston Cove, Eastern shoreline along Potomac River, Dogue Creek	
<i>Polygonum cuspidatum</i>	Japanese knotweed	S	G	Northwest corner of the ABWR parking lot	
		M		Along the south side of Meeres Road, just west of Pole Road	
		L		Subwatershed from Fairfax County Parkway to Accotink Creek	
<i>Polygonum perfoliatum</i>	Mile-a-minute	S	W	Between Woodlawn Road and the North Golf Course along the abandoned road that is behind the golf green	
		S		Along the unnamed abandoned road northwest of Kingman and Woodlawn Road intersection	
		M		In W-4 just north where Jeff Todd Way and unnamed road fork	
		L		Along a section of Pohick Creek that is adjacent to T-9	
		M		Northeast of the intersection of training roads in W-1 and T-6C	

Table 6-4: Invasive/Exotic Vegetation on Fort Belvoir Recommended for Control				
Scientific Name	Common Name	Size*	Habitat	Location
		L		Northeast of building 3065 on Poe Road, at an old well site
		M		East side of Warren Road opposite its intersection with Thayer Road
		M		West of the intersection of Beulah Street with Woodlawn Road at an old debris landfill
		L		Old home site located between the Potomac River and the Officers Club
<i>Pueraria lobata</i>	Kudzu	L	F	Down slope from building 2283 off of Fosters Road
		M		Surrounding portions of the coal storage area
		L		Along the access road to the former sewage treatment facility off of Jadwin Loop
<i>Sorghum halpense</i>	Johnson grass	M	G	Basin Trail
<i>Wisteria sinensis</i>	Chinese wisteria	L	G, F	In T-16, west of Jeff Todd Way just north of Pole Road where it intersects with Old Mill Road
		M		East of intersection of Beulah Street and Kingman Road in the FWC
		L		Northwest of a reforestation site, south of the pond on north golf course
		S		Along a railroad bed, west of Tracey Loop and Theote Road intersection
		M		Northern portion of T-16 on training roads inside of Kingman Gate
		S		North side of Warren Road, just north of Thayer Road
		L		From Woodlawn Road east to the western side of perimeter road
		M		North and scattered locations south of the bridge crossing Accotink Creek on Barta Road (FBNA)



Table 6-4: Invasive/Exotic Vegetation on Fort Belvoir Recommended for Control				
<i>Scientific Name</i>	<i>Common Name</i>	<i>Size*</i>	<i>Habitat</i>	<i>Location</i>
		S		Along former Keene Road east of parking lot for building 2444

Source: Fort Belvoir Integrated Pest Management Plan, 2016; Fort Belvoir Natural Resource Staff (revised annually); Paciulli, Simmons and Associates, Ltd., 2000b

\*Size Legend:

- S = Small, A single plant to an approximate 50 square foot area;
- M = Medium, Infestation is over 50 square feet but less than one-half acre;
- L = Large, Infestation is greater than one-half acre.

Habitat in this table refers to the area in which the species should be controlled on Fort Belvoir. Habitat Legend:

- G = Grassland;
- W = Wetland;
- F = Forest

### **6.2.7 Grassland Surveys**

The baseline grassland survey was undertaken to identify grassland areas that could be managed to enhance their wildlife habitat value (Paciulli, Simmons and Associates, Ltd., 1996).<sup>5</sup> The inventory used photo interpretation and field surveys to identify 51 grassland areas, ranging from less than 0.5 acre to 20 acres, for a total of 190 acres of grassland on Fort Belvoir. The locations of the inventoried grasslands have been incorporated into the installation GIS. Most of the grassland areas tend to be small and scattered. The larger grassland areas occur at Davison Army Airfield (DAAF) and on the installation's closed landfills, areas which have operational limitations on manipulating land cover.

The survey generated five general types of management recommendations for grassland areas that could be manipulated including the following: (1) enhance and maintain existing grass cover (the primary management recommendation in the plan); (2) reseed with native warm season grasses; (3) use plant species that have wildlife habitat benefits; (4) install nesting structures for wildlife; and, (5) control aggressive invading weeds.

Since this baseline grassland survey was done, Fort Belvoir has been emphasizing habitat enhancement for Partners in Flight (PIF) Species of Concern bird species. As a result, installation natural resources staff have been surveying and monitoring existing grasslands and early successional habitats, as well as some later successional habitats, for potential enhancement (Section 7.3.5).

### **6.2.8 Watershed Vegetation Survey**

Fort Belvoir completed an installation-wide watershed survey in 1999 (Landgraf, 1999). One of the parameters evaluated was the percent forest, wetland, and open area cover within watersheds and subwatersheds. The watershed survey showed significant variation in subwatershed vegetative cover; percent forested areas varied between 100 and 11, percent wetlands varied between 39 and 0.5, and percent open area varied between 65 and 0. The vegetation information from this survey, while not completely accurate for today's land cover (e.g., was gathered prior to the BRAC 2005 construction), still provides a general sense of conditions throughout the installation.

### **6.2.9 Forest Pest Surveys**

Fort Belvoir's gypsy moth (*Lymantria dispar*) populations have remained low over the past 20 years. There has been no significant defoliation or tree mortality since 1994. Gypsy moth nucleopolyhedrovirus, as well as favorable weather

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<sup>5</sup> Developed areas where the grass needs to be maintained, such as lawns, recreational fields, and utility rights-of-way, were excluded from this survey.

conditions for the fungus *Entomophaga maimaiga*, have held gypsy moth populations in check. No treatments have been recommended or performed over the past 20 years.

While Fort Belvoir did monitor and treat some areas for cankerworm (*Alsophila pometaria*, *Paleacrita vernata*) impacts to trees in the 1990s, these insects are no longer considered problematic or requiring treatment. Fort Belvoir has not experienced ecologically significant damage to vegetation from this seasonally present species, and recognizes the ecological function of cankerworms as an important food source for migrating birds.

As has occurred throughout the mid-Atlantic region in recent years, ash populations in Fort Belvoir's forest and urban areas have been decimated by the emerald ash borer (*Agrilus planipennis*). While ash species were not a major component of the forest canopy, their loss has been noteworthy throughout the installation, where ash had been frequently planted in the landscape. At this point, the most problematic aspect of this infestation has been the resultant decline in biodiversity stemming from the loss of these trees.

### **6.2.10 Urban Areas Surveys**

Fort Belvoir maintains a variety of ongoing surveys, mostly in the developed installation areas, as part of base operations and maintenance activities. These include the following:

- Hazard tree inventory
- Pest/disease monitoring (e.g., Dutch elm disease, emerald ash borer)
- Existing landscape beds
- Tree mitigation planting sites
- Test planting locations (e.g., test plantings of disease-resistant cultivars)

These inventories are generally site- or area-specific and are continually being updated. The results of the inventories are incorporated into annual work plans for base operations grounds maintenance work, coordinated with tenant organizations who perform their own grounds work, or used for developing projects for mitigation requirements.

### **6.2.11 Wetland Surveys**

As addressed in section 5.2.3, Fort Belvoir has done planning level surveys for wetlands, and continues to perform wetland surveys on a project-by-project basis. As surveys are performed, the information is incorporated in the post GIS data layers. Periodic updates are preferred to reflect changes in wetland acreage and composition. Typical vegetative communities found in wetlands on post

include Palustrine forested, Palustrine emergent, and aquatic. Additional information on wetlands can be found in section 5.2.2.

### **6.2.12 Wildlife Surveys**

As addressed in Section 7.2, Fort Belvoir has completed planning level surveys for fish and wildlife resources throughout the installation, and continues to do area-specific re-surveying and monitoring. Vegetation is an important component of wildlife habitat. It also influences fish habitat through watershed conditions. Various habitat projects have taken place (Table 7.2) that address the needs of specific fish and wildlife species. Some projects are designed to create new or benefit current vegetation types at the same time.

## **6.3 VEGETATION MANAGEMENT**

### **6.3.1 Management Recommendations and Requirements**

Vegetation management on Fort Belvoir must balance Sikes Act requirements to conserve sensitive natural resources and provide for public access to those resources, with the requirements to support installation mission and operations. Fort Belvoir has diverse and ecologically important vegetation resources (Section 6.2) and strong public interest in accessing those resources (Sections 9 and 10.0). Fort Belvoir's installation mission and operations requires management to serve military training and testing, and to serve developed land areas (e.g., administrative, housing, community service facilities).

### **6.3.2 Conservation Recommendations**

Baseline natural resources surveys indicate (as detailed in section 6.2) that Fort Belvoir has a large amount of undeveloped land (about 60% of the total land area) that supports significant native plant resources, and significant wildlife habitat with high conservation priority. Such resources include the following:

- Habitat for federally and state-listed threatened and endangered bat species
- Habitat for species under evaluation for federal listing
- Habitat for federal threatened (state endangered) small whorled pogonia
- Habitat for rare plant species
- Rare plant communities
- Wetlands
- Riparian forest
- Large tracts of forest, including a contiguous forested corridor through the installation

- Habitat for animal species of high conservation priority, including bald eagle (*Haliaeetus leucocephalus*), state-threatened wood turtle (*Glyptemys insculpta*), and PIF bird Species of Concern.

The survey results indicate that the installation's vegetation resources face current and future threats from such stressors as:

- Loss or fragmentation due to land development or timber harvesting
- Displacement of native species by invasive/exotic species
- Erosion/sedimentation from stormwater-related problems
- Damage/mortality by insects and disease; disturbance/destruction by wildlife (e.g., white-tailed deer (*Odocoileus virginianus*) overbrowse, beaver and woodchuck (*Marmota monax*) activity)
- Overuse by humans (e.g., recreational events in excess/inconsistent with resource conditions)

Conservation of the high-priority resources must include actions to (1) reduce the risk of threat by these stressors and (2) restore conditions where these threats have already had an impact on natural resources. Specific means for doing so will vary between projects and, therefore, will be evaluated on a case-by-case basis.

### **6.3.3 Military Activities**

Since the departure of the Engineer School in 1988, Fort Belvoir essentially has no land-disturbing training activities. Present-day military training activities consist mainly of troop field training activities (e.g., land navigation, rescue training, expert field medical badge training) and rotary aircraft training activities (e.g., helicopter touch-and-go, helicopter transport). Consequently, most of the installation's approximately 1,838 acres of training lands are in forest cover, with limited areas of more-open vegetation cover conditions. Military mission support requirements relative to vegetation management include such requirements as:

- Maintenance of large, uninterrupted areas of natural forest and open grassland cover to support troop field training activities, such as orienteering, and to support equipment testing activities
- Maintenance of open grassland areas to support field training of rotary wing aircraft and associated activities
- Maintenance of areas to support a variety of unit-based training, such as field medical response training
- Maintenance of vegetation cover conditions (e.g., tree height, grass cover, etc.) to minimize potential hazards to aircraft operations at Davison Army Airfield (DAAF) following the protocol specified in the DAAF Wildlife Hazard

Management Plan (WHMP) (Appendix G) and Federal Aviation Administration glideslope requirements.

- Maintenance of pastures and other open areas to support The Old Guard horse stables and Caisson Platoon training activities

### **6.3.4 Developed Areas**

The 2015 RPMP guides future development within the already-developed central core of the installation, and categorizes installation areas with ecologically significant resources (e.g., rare, threatened, endangered species habitats; wildlife migratory corridors, wetlands, riparian forests, etc.) as “least suitable for development”, and part of the “Environmental Constraints Complex” on post. The tree replacement requirement of Fort Belvoir’s *Tree Removal and Protection Policy* Memorandum aims to achieve a no net loss of tree cover due to development on post.

The siting, construction, and maintenance of installation facilities represents the most significant source of potential impact to native vegetation resources on Fort Belvoir. The installation has approximately 1,920 acres in developed use/considered developable, supporting approximately 145 tenant organizations, and this is projected to increase. In addition to standard requirements, such as landscape planting and maintenance; mowing; and, urban tree planting and care, there may be location/tenant-specific requirements, such as:

- Maintenance of historic landscapes within the Fort Belvoir Historic District (VDHR# 029-0209), which was designed and constructed under the Army's 1932 revised post plan, reflecting a design shift inspired by the Garden City Movement, featuring open spaces and urban planning.
- Maintenance of historic viewsheds, which involves not only the Fort Belvoir Historic District but also the Woodlawn Historic Overlay District, the Mount Air Historic Overlay District, and Pohick Church.
- Protection of archeological sites and cemeteries on and within the installation
- Avoidance of potentially hazardous plant species (e.g., berry producing shrubs) in landscaping Child Development Centers
- Rights-of-way clearances on existing utility corridors
- Force-protection clearances and set-backs

Government specifications in the Real Property Maintenance Contract prescribe standards for managing improved grounds (turf, trees, and landscape beds) on Fort Belvoir. Mowing and leaf removal specifications for improved areas reflect land use changes, current activities, and the protection and preservation of natural resources. The specifications include standards and criteria for mowing



height and frequency, turf repair and re-establishment, liming and fertilization, landscaping, and tree care.

A post-wide mowing reduction program has resulted in the removal of 70 acres from the intensive mowing and leaf removal schedule. Improved tree protection and health was a major factor in the decision to do so. Under the mowing reduction program, designated areas are either removed from mowing or are mowed only when site conditions warrant. All turf areas are reviewed annually for mowing and leaf removal modifications. In determining mowing modifications, the aesthetics, costs, area uses, environmental impacts, and equipment needs are factors that are considered.

Fort Belvoir's operational programs (e.g., grounds maintenance, stormwater management, pest management, etc.) incorporate the federal, state, and DoD and DA natural resource management policies:

- Placing specific requirements on vegetation management, including selection of appropriate plant species to avoid introduction of invasives, and to minimize water use and pesticide use requirements
- Designing planting schemes to reduce urban heat effects and support stormwater management and erosion control initiatives
- Following integrated pest management and nutrient management principles to reduce pesticide and nutrient runoff

### **6.3.5 Outdoor Recreation, Conservation Education, Scientific Study and Research Activities**

Fort Belvoir's Outdoor Recreation Program includes such activities as hunting and fishing; hiking; guided and self-directed nature walks; and, summer day camps.

Fort Belvoir's Conservation Education Program supports on-post organizations as well as outside organizations, such as local schools and universities, scientific institutions, and other government agencies (Section 9.0). Fort Belvoir also supports scientific study and research by individuals, universities and others (e.g., The Smithsonian Institution).

These activities require the following:

- Maintenance of sizable tracts of native vegetation cover, and avoidance of fragmentation or loss of the habitat needed to support self-sustaining populations of native wildlife
- Maintenance of vegetation cover conditions within watersheds and along riparian areas, sufficient to protect fish habitat from stormwater-related impacts, and support self-sustaining native fish populations

- Maintenance of large areas of healthy native plant communities to support scientific study, viewing (including artistic pursuits such as nature photography), and to provide for natural beauty
- Conservation of rare plant communities, and habitats for federal and state endangered or threatened species, to protect those species
- Maintenance of vegetation in high-use/high-traffic recreation areas (e.g., along shorelines) to provide a visually pleasing appearance, and to protect sensitive resources (e.g., use of plantings to direct foot traffic and protect against erosion)

Fort Belvoir controls the types, locations, and magnitude of recreational activities to ensure that such uses do not adversely affect native vegetation resources. As addressed in Section 9, Fort Belvoir requires all recreational and educational activities associated with natural resources to be coordinated with DPW Environmental Division for review and approval. Group events and activities (other than participating in the installation's existing hunting and fishing programs, or individual hikes on existing trails) are evaluated on a case-by-case basis for their potential to impact natural resources. Fort Belvoir has the following restrictions in place to protect sensitive natural resources:

- No All-Terrain Vehicles (ATVs)/Off-Road Vehicles (ORVs) on unpaved roads or trails
- No bicycles on unpaved roads or trails
- Non-motorized (or electric powered) personally owned watercraft must be launched from the Dogue Creek marina or the designated launch areas along Gunston Cove and Accotink Bay in Tompkins Basin (Figure 10.2 )
- Motorized (using fuel), personally-owned watercraft must be launched from the Dogue Creek marina. Waterfowl hunters under the installation hunting program may launch watercraft with electric motors only from the designated launch areas along Gunston Cove and Accotink Bay (see Figure 10.2).
- No cutting or harvesting, etc. of vegetation

### **6.3.6 Commercial Agricultural Production**

The installation's location within an urban setting, and its considerable distance from timber mills, results in very little commercial interest in forest products. Fort Belvoir has no agricultural production areas. The installation's urban setting results in no commercial interest in agricultural outleases. Therefore, Fort Belvoir has no agricultural outlease activity.

During the late 1990s, Fort Belvoir held small-scale timber sales, mostly selective thinning of planted loblolly pine (*Pinus taeda*) stands, and firewood sales. The most recent selective thinning to improve timber stands was undertaken in 1998. Prior to that, Fort Belvoir conducted regular commercial logging of its forested

areas, and more than 4,000 acres of the installation land area were under multiple use management, including commercial forest. No areas of the installation currently are managed as commercial timber for harvest and production. The vast majority of forested areas are located within the Fort Belvoir Forest and Wildlife Corridor (FWC), refuges, training areas, stream buffers, or steeply sloped areas where commercial logging is infeasible or undesirable.

### **6.3.7 Vegetation Management to Date**

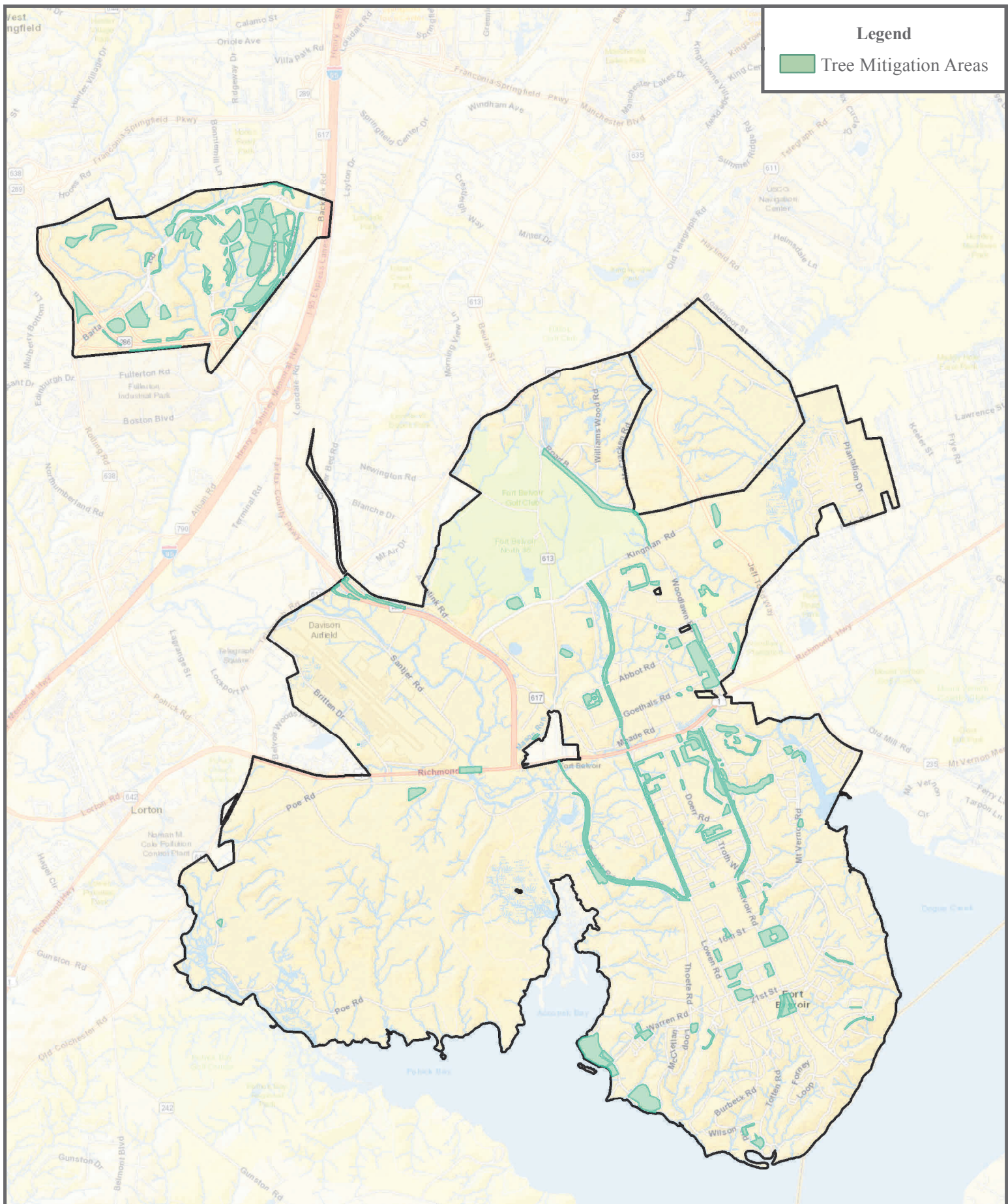
Fort Belvoir manages its vegetation resources in accordance with the resource conservation and multiple use requirements of DoDI 4715.03 and AR 200-1. To date, Fort Belvoir's natural resources management program has focused on balancing conservation of ecologically significant vegetation resources with providing for military mission support and sustained multiple use of vegetation resources. Conservation has emphasized sustaining and enhancing forest and grassland habitats; conserving habitats of rare plant species and rare plant communities; and, conserving wetland and riparian areas. Tree mitigation areas are displayed on Figures 6.8-6.12. The Fort Belvoir *Tree Removal and Protection Policy* (Appendix C) is the primary driver of mitigation plantings on Fort Belvoir, and stream restoration regulations and requirements have driven the planting of other mitigation trees (see Table 5-10). Such plantings may be funded by MILCON or other construction project costs.

### **6.3.8 Conservation**

#### ***Special Natural Area Designation***

Fort Belvoir has designated five installation areas for conservation (as "Special Natural Areas" in accordance with DODI 4715.03: ABWR (1940 acres mostly within Southwest Training Area), Jackson Miles Abbott Wetland Refuge (191 acres in North Post), T-17 Refuge (70 acres along Gunston Cove in South Post), the Fort Belvoir Forest and Wildlife Corridor (FWC) (980 acres (exclusive of where it overlaps with the refuge areas) for forest extending from northeast to southwest across the installation, and Accotink Creek Conservation Corridor (191 acres of riparian area in FBNA). These areas encompass the majority of the installation's natural resources of high conservation priority (Section 9.0). The 2015 RPMP includes these areas in the "Environmental Constraints Complex", as areas "least suitable for development".



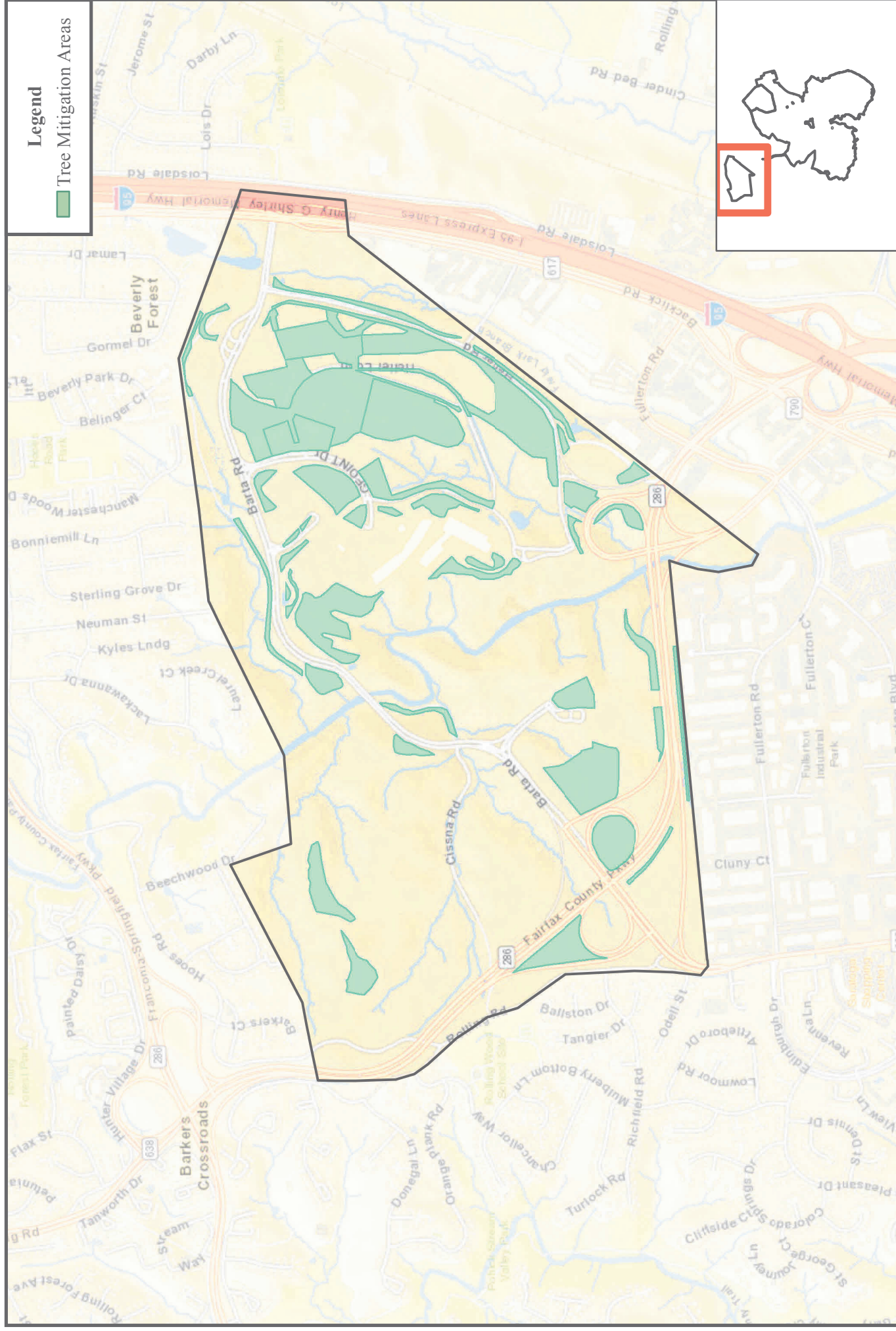


**Figure 6.8**

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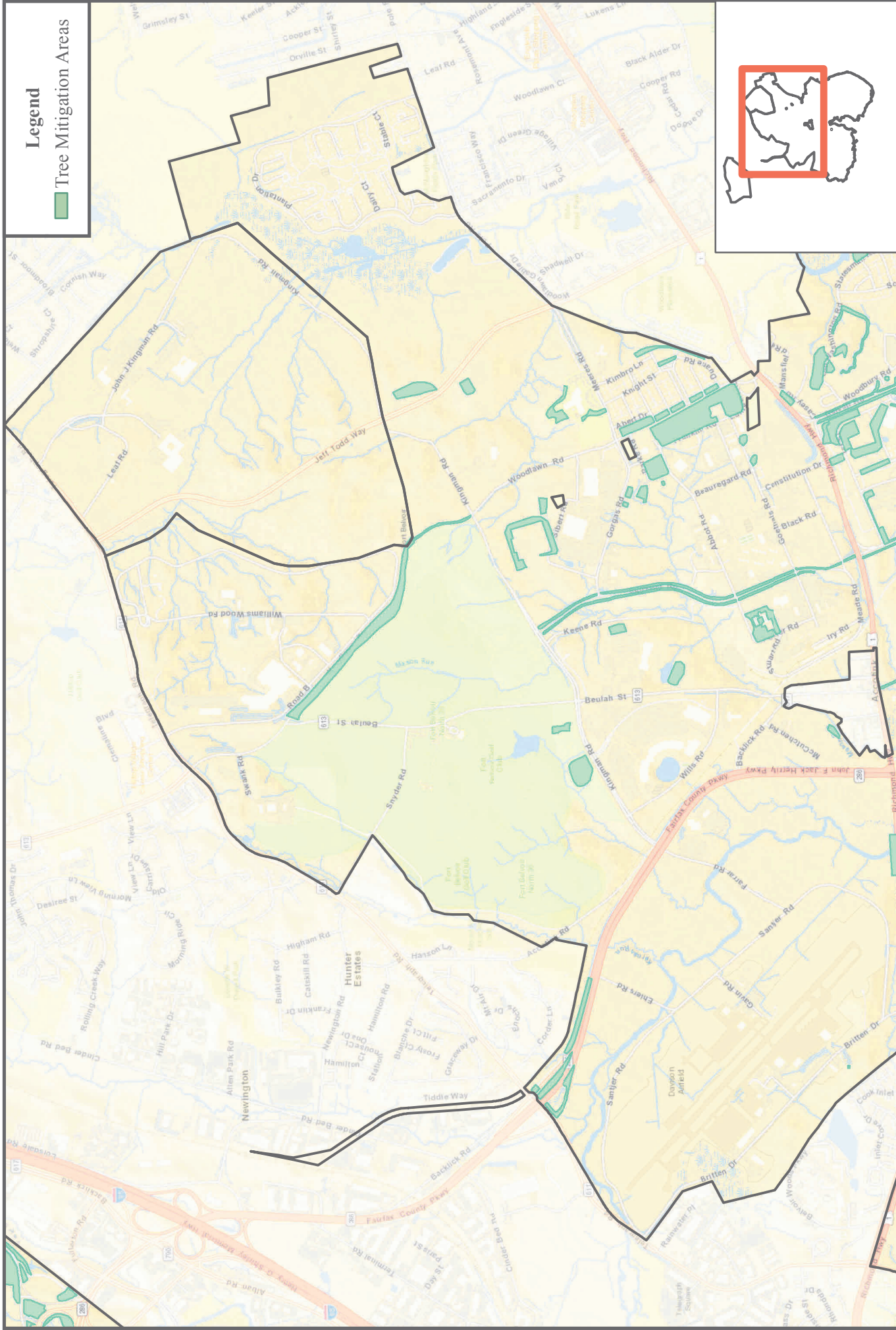
## Figure 6.9

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# MITIGATION TREE PLANTING ON FORT BEVOIR, NORTH

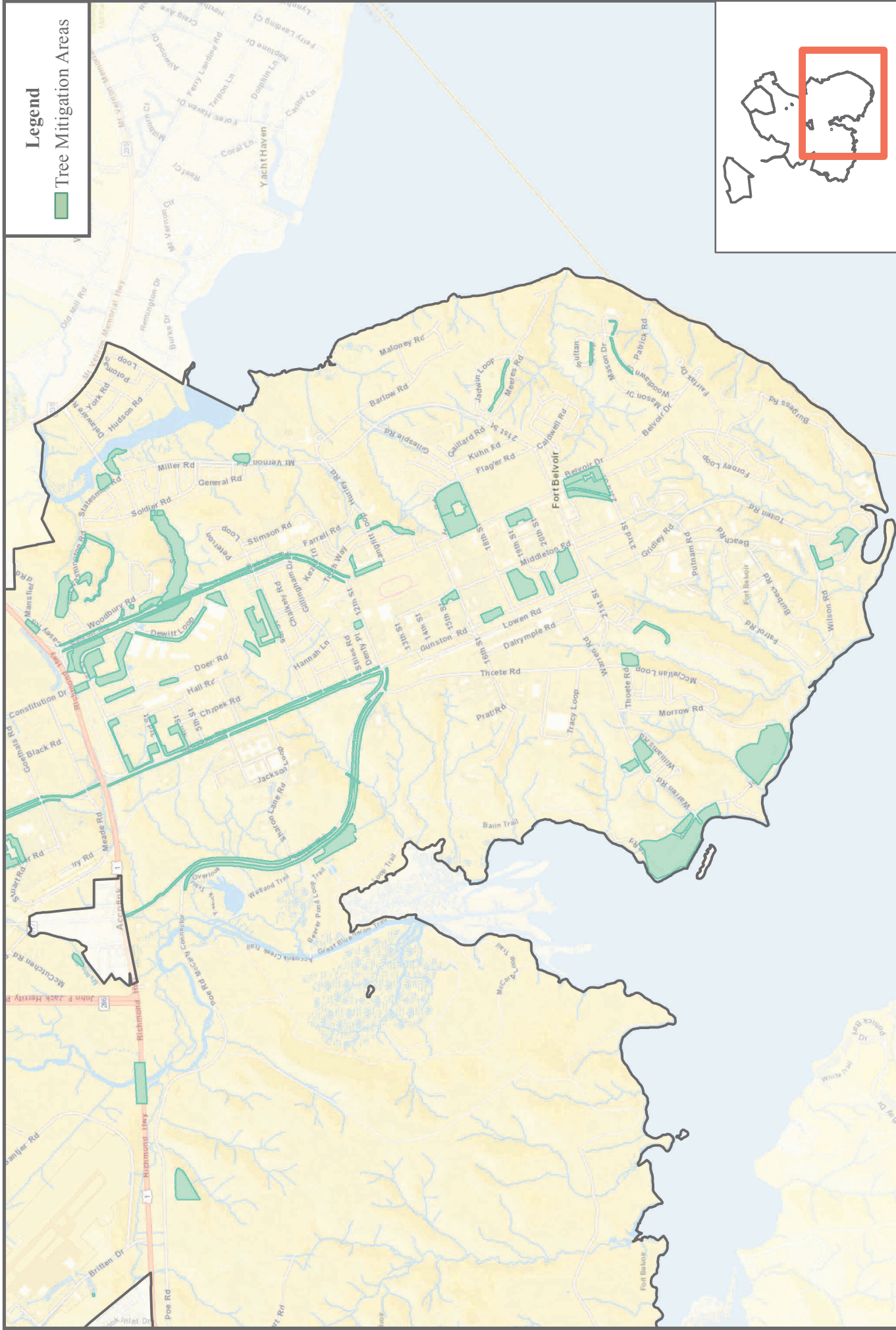
Figure 6.10

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# MITIGATION TREE PLANTING ON FORT BELVOIR, SOUTH EAST

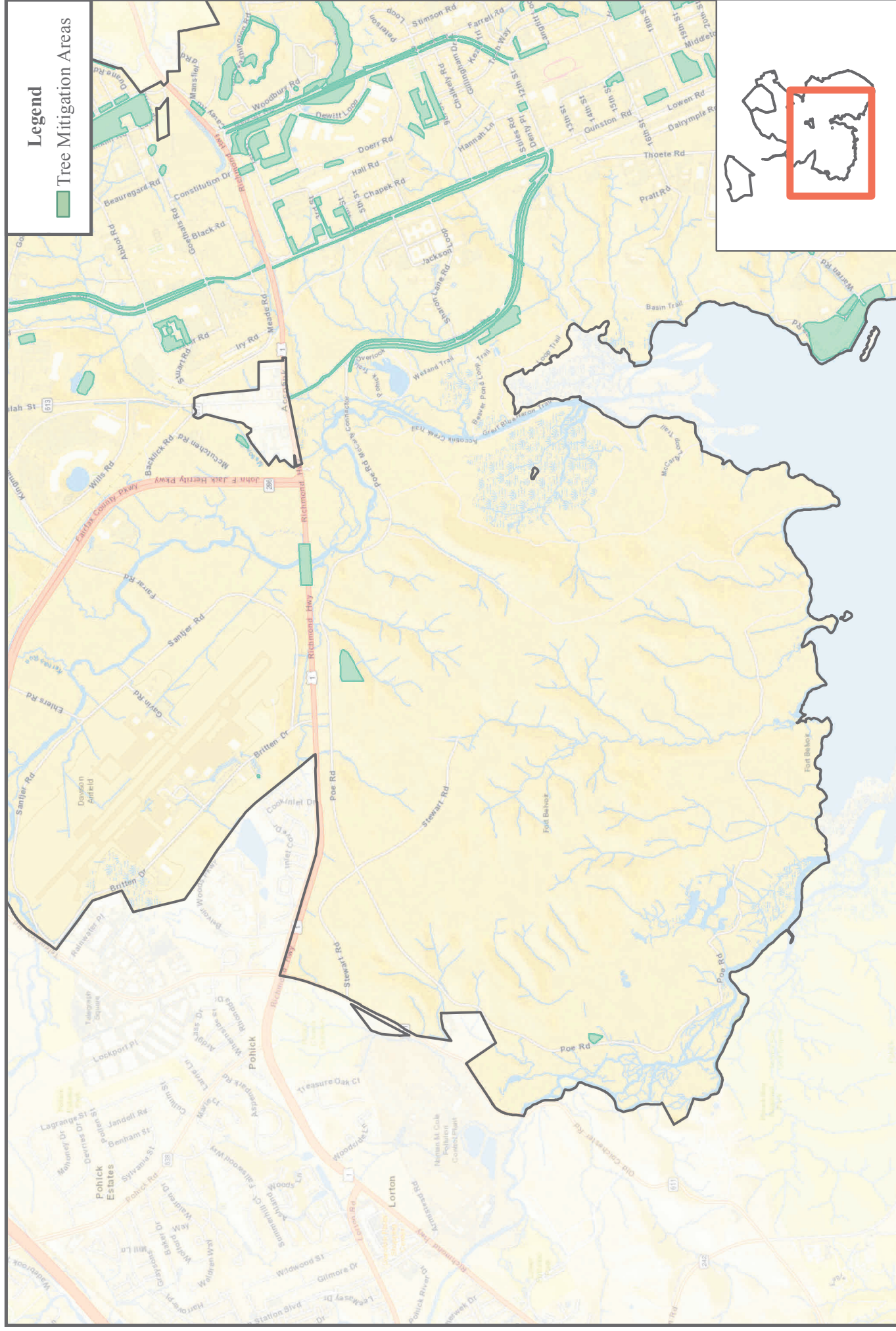
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## Figure 6.12

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### **6.3.8.1 Habitat Enhancement and Vegetation Restoration**

Fort Belvoir has incorporated conservation practices into standard installation operations as follows:

- Using wildlife seed mixes when replanting specific disturbed areas, where appropriate
- Alteration of mowing regimes to reduce overall mowed acreage, wherever practicable, and reducing height and intensity of mowing during periods of high heat and drought stress
- Requiring two for one replacement of all trees (at least four inches DBH) that are lost to construction
- Avoid clear cutting of utility right-of-ways by leaving small, native trees (e.g., flowering dogwood (*Cornus florida*), eastern redbud (*Cercis canadensis*) and stabilizing the soil with native seed mixes
- Requiring that mulching blades with blocked discharges be included on turf mowers
- Working with tenants who do fertilize their turf on developing and implementing nutrient management plans
- Using vertical mulching and products to inhibit crown growth while promoting root growth in order to preserve mature trees
- Selecting native plants that do not require supplemental watering outside of their establishment period

Fort Belvoir has undertaken numerous projects to re-forest areas, improve riparian vegetation, and to enhance habitat for wildlife of management priority, including the following:

- Removal of invasives and replanting of a portion of the Tompkins Basin shoreline on Gunston Cove
- Re-forestation of multiple areas within the FWC
- Selective pine thinning from too-dense planted loblolly stands, to improve wildlife habitat
- Selective cutting of areas within ABWR (e.g., W-1 and T-9) and FBNA, and vegetation planting/enhancements in T-6B, W-1 and W-3, to enhance wildlife habitat
- Tree planting within an open riparian area along Dogue Creek at the bridge
- Tree planting/re-forestation, as mitigation replacements under the Tree Removal and Protection Policy, at multiple locations throughout the installation (e.g., housing areas where construction projects had reduced the canopy, Cullum Landfill soil borrow area, along Fairfax County Parkway, Fort Belvoir Elementary School, Recreational Vehicle (RV) Travel Camp, Anderson Park)

### **6.3.8.2 Invasive/Exotic Species Management**

Fort Belvoir controls the risk of introductions of invasive/exotic plant species by (1) maintaining recommended plant species lists and recommended seed mixtures, and (2) by reviewing all proposed planting plans.

Fort Belvoir performs regular surveillance throughout the installation to monitor known locations of invasive/exotic vegetation and to identify new outbreaks. As resources become available, Fort Belvoir has executed invasive/exotic vegetation control projects, such as:

- Cutting back kudzu (*Pueraria lobata*) along the Potomac River shoreline at the Officers Club
- Treating Japanese bamboo (*Phyllostachys* spp.) at various locations (e.g., ABWR entrance)
- Treating common reed (*Phragmites australis*) at a number of sites bordering Accotink Bay and Dogue Creek
- Removing purple loosestrife (*Lythrum salicaria*) at Tully Gate, the Youth Center, and other locations in the improved area.
- Treating Beaver Pond Trail area (ABWR) for marsh dewflower (*Murdannia keisak*) and wavyleaf basketgrass (*Oplismenus undulatifolius*) infestations
- Removing Johnson grass (*Sorghum halepense*) and Japanese stiltgrass (*Microstegium vimineum*) along trails within ABWR
- Removing Japanese honeysuckle (*Lonicera japonica*) and Amur honeysuckle (*Lonicera maackii*) along Gunston Cove shoreline at Tompkins Basin.

### **6.3.8.3 Problem Wildlife Management**

The primary sources of wildlife impact to Fort Belvoir's vegetation resources are deer overbrowsing and beaver activities (e.g., tree gnawing and dam construction). Deer management consists primarily of population control, which is a long-term program (Section 7.3.2). Beaver management is undertaken on a case-by-case basis, and consists of installation of beaver guards (e.g., fencing around trunk of trees) to protect individual trees. Fort Belvoir uses tree shelters (i.e., tree tubes) to protect newly planted trees from damage by deer and rodents.

## **6.4 CONTINUING AND FUTURE VEGETATION MANAGEMENT**

Fort Belvoir intends to continue the management emphasis and actions addressed in Section 6.3. Simply put, this will be to conserve and enhance native vegetation resources, while providing balance among the multiple legitimate uses of installation natural resources. Continued support of military training and

testing will take priority. Once those priorities are addressed, management emphasis will be on conservation and enhancement of vegetation resources in accordance with established DoD and DA natural resources management policies, and DoD and DA commitments to natural resource stewardship programs.

Fort Belvoir will continue to provide the public opportunities to access installation and areas for recreation and for conservation education and scientific research and study, consistent with resource conservation objectives, military mission and consistent with operations and security requirements.

## **6.5 VEGETATION MANAGEMENT GOALS, OBJECTIVES, AND STRATEGIES**

### **6.5.1 Projects**

Proposed activities that are considered Projects in this INRMP are activities that may potentially impact the environment and would need to be evaluated for the appropriate level of NEPA documentation. The following goals contain Projects within their objectives or strategies:

**Goal 1:** Continue to protect against loss of native diversity and ecosystem function of Fort Belvoir's vegetation resources.

- **Objective:** Conserve and enhance areas of ecologically significant vegetation resources as stipulated by regulatory requirement, mitigation commitment, or that have been prioritized for conservation, such as:
  - Endangered, threatened, or rare plant species and their habitats
  - State rare plant communities
  - Wetlands
  - Riparian forests
  - Contiguous forest corridor
- **Strategy:** Identify areas of ecologically significant vegetation resources, consistent with DoDI 4715.03 policy for designating specific areas of the installation that warrant special conservation as "Special Natural Areas" (see Section 9) if consistent with military mission. Maintain designation of the five existing Special Natural Areas as environmentally constrained to development under the RPMP and as warranting conservation considerations in other installation plans and documents. Designate new Special Natural Areas where legally obligated to do so.

**Goal 2:** Continue to maintain a riparian forest buffer along all installation waterways and shorelines.

- **Objective:** Maintain consistency with the Chesapeake Bay Program Riparian Buffer Directive.

- **Strategy:**

- 1) Re-plant, or enhance, native vegetation within riparian areas.

Examples of possible projects include the following:

- a) Reforestation of a minimum 200-foot wide riparian zone on the former petroleum, oil, and lubricant site along Gunston Cove
  - b) Riparian plantings along the Tompkins Basin shoreline, consistent with the planning for a multi-purpose recreation area at that site
  - c) Enhanced riparian planting along Dogue Creek in the area of the Mount Vernon Road Bridge, in association with the planned replacement of that bridge
  - d) Additional planting projects will be identified and undertaken as land-use changes (e.g., as old areas are vacated and structures are removed) allow.
- 2) Identify, design, and implement stream restoration projects. These projects include stabilization and restoration of riparian vegetation.
  - 3) Protect riparian buffer areas by directing water-based training activities to designated shoreline training areas and recreational activities to designated shoreline recreational areas.
  - 4) Incorporate Resources Protection Area (RPA) requirements (100-foot buffer on each side) along perennial streams as defined by the Chesapeake Bay Preservation Act and the Fort Belvoir-defined Riparian Buffer Area (35 feet to each side) on intermittent and ephemeral streams on all facility planning and site designs (Section 5.1.4).
    - a) Identify the RPAs on post
    - b) Incorporate RPAs, and riparian planting and stream restoration project sites in the installation GIS

**Goal 3:** Continue to maintain a forested corridor through the installation to provide for wildlife migration within, and through, Fort Belvoir

- **Objective:** Reduce forest fragmentation and restore contiguous forest cover within the FWC.
- **Strategy:** Prioritize siting construction outside the FWC. Prioritize the FWC for re-planting and re-forestation projects. Minimize clearing needed for infrastructure, as practicable. Revegetate previously disturbed areas, as practicable.

**Goal 4:** Continue to obtain scientific information on installation vegetation resources.

- **Objective:** Support our knowledge of biodiversity, to identify stressors and detect changes to biodiversity, and to evaluate the effectiveness of management actions.
- **Strategy:**
  - 1) Update Planning Level Surveys (PLS) relevant to vegetation management:

- a) Update the plant community inventory. Complete an inventory of FBNA. The inventory will entail field survey, photointerpretation, community characterization, and GIS data layer development. The inventory update will map plant community boundaries and will inventory the locations and acreages of each plant community type in a way that will allow for a comparison among prior inventories to identify changes.
  - b) Update the ecological communities inventory, similar to the plant community inventory work.
  - c) Perform floristic surveys throughout the installation to update the Fort Belvoir plant species list. Complete a floristic inventory of FBNA, prioritizing the Accotink Creek Conservation Corridor.
  - d) Complete an installation-wide update of the DCR-NHP Natural Heritage Inventory. Complete the Natural Heritage Inventory for FBNA with emphasis on the Accotink Creek Conservation Corridor.
  - e) Update the soils PLS by reviewing the most recent Soil Survey for Fairfax County.
  - f) Incorporate all PLS updates into the installation GIS.
- 2) Perform year-round surveillance (i.e., close observation in lieu of studies or monitoring projects) of vegetation conditions throughout the installation. This could include close observation, or monitoring, in lieu of detailed field survey.
    - a) Develop and implement a protocol to monitor vegetation resources to detect disruptions and/or locations where threats (e.g., problem wildlife, erosion, sedimentation) are affecting resource integrity. Address areas for potential enhancement of vegetation conditions, potential mitigation sites for tree planting/re-forestation, etc.
    - b) Develop and implement a protocol to monitor conditions within the previously identified rare plant communities on post
  - 3) Develop and implement protocols for localized and/or issue-specific vegetation surveys and studies (e.g., plant regeneration studies), as needed to support resource management, or for specific installation projects, such as new development or mission activities.
  - 4) Coordinate with DCR-NHP and other entities involved with plant conservation regarding stewardship of vegetation resources.
  - 5) Incorporate the location of habitat enhancement projects in the installation GIS
  - 6) Perform year-round surveillance (i.e., close observation in lieu of studies or monitoring projects) to detect changes and activities potentially impacting vegetation.
  - 7) Perform an annual survey of a representative sample of vegetation areas to assess changes, and to assess the success of management actions.
  - 8) Update and maintain baseline vegetation resource information in installation documents, records, databases, GIS, etc.



- 9) Identify opportunities for planting, reforestation, and enhancement projects.

**Goal 5:** Continue to control invasive/exotic species.

- **Objective:** Consistency with the requirements of Executive Order 13112 to control threats to native plant community integrity.
- **Strategy:** Develop and implement an annual plan to survey and treat for invasive/exotic vegetation. Include the following in the plan:
  - 1) Monitor known populations of invasive/exotic plant species as recommended by Paciulli, Simmons and Associates, Ltd. (2000b) and DCR-NHP (McCoy and Fleming, 2000), and as documented through recent invasive plant surveys.
  - 2) Perform surveillance (i.e., close observation in lieu of studies or monitoring projects of known areas of invasive/exotic vegetation, and look for new outbreaks and species.
  - 3) Develop and implement projects to control invasive/exotic vegetation. Priority areas for control include locations where invasive species have invaded stream restoration or wetland mitigation sites; occur near active bald eagle nests or other wildlife areas of high conservation priority; or, where they have a high potential for spread/dispersal. Examples of locations to prioritize for treatment include: marsh dewflower eradication at a stream restoration site; kudzu removal along Potomac River shoreline; *Phragmites australis* removal from shorelines and marshes; Chinese wisteria and other invasive vine removal from riparian areas; and, tree of heaven and princess tree removal from woodlot adjacent to the installation compost facility.
  - 4) Monitor treated areas for success of treatment and assess the need for re-treatment
  - 5) Develop and publish planting guidance to inform installation personnel regarding invasive/exotic species, and to reduce the risk of release on post.
    - a) Devise and prepare a policy memorandum on invasive species for command approval.
    - b) Maintain the Fort Belvoir Approved Plant List and the Recommended Seed Mixture List
    - c) Review and revise the Fort Belvoir Installation Planning Standards in the Fort Belvoir RPMP
    - d) Develop and publish informational articles, pamphlets, etc. (including articles in the Belvoir Eagle and posted to the Fort Belvoir website and social media) regarding invasive/exotic vegetation, why it is a problem, and how persons on the installation can reduce the risk of it harming sensitive natural resources on post
  - 6) Review all proposed planting and seeding plans, and prohibit the use of invasive/exotic species.

- 7) Establish/participate in regional programs and projects for invasive/exotic vegetation control.
- 8) Incorporate all information on known sites of invasive/exotic vegetation, as well as treatment areas, in the installation GIS.

**Goal 6:** Continue forest management practices to reduce risk to forest integrity.

- **Objective:** Review installation activities for potential effect to forest conditions and make recommendations to avoid forest loss or fragmentation
- **Strategy:** Update the forest inventory for the remainder of the forested land on post, using the same protocol as used by Beane, 2016
  - 1) Develop and implement a protocol for surveillance and treatment for forest pests. Determine action threshold for treatment. Address regional coordination. Continue to focus on detecting occurrences of new forest pests, such as Asian long-horned beetle (*Anoplophora glabripennis*) or beech bark disease (*Neonectria* spp.).
  - 2) Support the Fort Belvoir Wildland Fire Management Program.
    - a) Assist the Fort Belvoir Fire Department in reviewing and updating the installation's Integrated Wildland Fire Management Plan as necessary.
    - b) Maintain regular coordination with the Fort Belvoir Fire Department regarding Wildland Fire Management
    - c) Provide guidance to the Fort Belvoir Fire Department regarding land restoration following any incident of wildland fire
    - d) Coordinate with the Virginia Department of Forestry for information on fire indices, potentially hazardous fuel loads, and fire prevention measures.
    - e) Provide technical assistance for emergency situations, such as uncontrolled fires, that threaten vegetation resources.
  - 3) Mitigate for trees lost to construction by the following:
    - a) Identify areas on post where tree planting/re-forestation could occur
    - b) Develop and implement planting/re-forestation projects
    - c) Assess the success of planting/re-forestation projects, and maintain sites as necessary (e.g., tree tube straightening removal; reevaluating failed plantings in terms of using different species)
    - d) Incorporate the locations of tree planting/re-forestation projects within the Mitigation datalayer of the installation GIS

**Goal 7:** Continue to implement watershed conservation and restoration actions

- **Objective:** Control and correct stormwater-related threats to vegetation resources, consistent with the Chesapeake Bay Program initiatives.

- **Strategy:**
  - 1) Support the DPW Stormwater Management Program in identifying and executing projects to replant and restore native vegetation cover, as possible and practical, throughout installation watersheds. Projects could include the restoration and replanting of existing disturbed areas, and the identification and removal of abandoned/excess pavement to reduce impervious surfaces.
  - 2) Support the DPW Stormwater Management Program in identifying and executing projects to correct existing stormwater management problems that are damaging stream channels and riparian areas. Projects could include siting of new stormwater management facilities, corrections/retrofits to existing stormwater management facilities, and actions to stabilize utility crossings of streams.
  - 3) Support the DPW Stormwater Management Program in incorporating stormwater management actions, including BMPs, on new development
  - 4) Develop and implement a protocol to survey and monitor vegetation conditions to assess the effect of stormwater, and evaluate the effectiveness of existing stormwater management facilities

## 6.5.2 Actions

Actions are those activities that do not require ground breaking or environmentally altering activities. The following goals are considered to contain Actions in their objectives or strategies:

**Goal 8:** Continue to conserve and enhance the installation's natural beauty.

- **Objective:** Integrate natural resource conservation requirements into facility construction, and operations and maintenance. Provide land cover conditions to meet military training and testing requirements. Provide land cover conditions consistent with developed land use requirements.
- **Strategy:**
  - 1) Use appropriate planting and maintenance based on site conditions and use
  - 2) Use conservation landscaping practices that result in energy savings, preservation of historic and specimen trees, management of stormwater and non-point sources of runoff, and reduced grounds maintenance costs
  - 3) Strive for no net loss of urban tree cover to enhance and meet ecological, aesthetic, and conservation needs and objectives
  - 4) Follow integrated pest management, nutrient management and best management practices to enhance and meet ecological, aesthetic, and conservation needs and objectives while maintaining and enhancing the health and value of landscape/urban trees

- 5) Provide opportunities for public access for recreation and for environmental education and study, consistent with resource conservation objectives, and with military mission and operations and security requirements.

**Goal 9:** Continue to incorporate conservation practices into routine grounds maintenance, and to perform vegetation restoration, enhancement and modification projects to support native wildlife habitat.

- **Objective:** Incorporate wildlife beneficial measures into routine/ongoing grounds maintenance actions. Continue to maintain and restore riparian forest buffer conditions along all installation waterways and shorelines consistent with the Chesapeake Bay Program initiatives.
- **Strategy:**
  - 1) Use wildlife seed mixes recommended by VDGIF when re-planting disturbed areas, where appropriate (e.g., following utility line rights-of-way clearance). Use wildlife beneficial plantings, where appropriate, when re-planting, re-foresting disturbed areas
  - 2) Use a mowing/maintenance strategy (e.g., seasonal schedule) at the closed installation landfills and other installation areas that must remain in an open condition, that avoids mowing during ground nesting bird breeding seasons, and that reduces propagation of invasive vegetation, such as lespedeza (e.g., using soil amendments and strip mowing and seeding)
  - 3) Perform turf management at levels and intensities necessary to meet the designated use, and to support the elements of the military mission, including:
    - a) Review turf mowing levels and areas annually to update specific site requirements, efficiency, and compatibility with area use and natural resources. Note sites where mowing should be reduced or eliminated and make appropriate adjustments to GIS maps and real property maintenance. Identify contract specifications. Specify that best management practices, rather than set schedules, will be followed for maintenance.
    - b) For Davison Army Airfield, follow mowing and vegetation management protocols and standards specified in the DAAF WHMP.
  - 4) Follow environmentally and economically beneficial landscaping practices, including:
    - a) Use conservation landscaping practices, and planting of native plant species for the majority of new plantings. When selecting plant species, consider water requirements, soils, and other existing site conditions that relate to plant survival and site compatibility.
    - b) Identify annual requirements for landscape plantings as well as tree and shrub seedlings for site reclamation and restoration of

native habitat. This includes terminated training areas, building demonstration sites, utility rights-of-way, and other areas suitable for habitat restoration.

- 5) Employ practices of Integrated Pest Management (IPM) and Nutrient Management in installation grounds maintenance in order to minimize pesticide and nutrient use, and the potential for runoff of pesticides and fertilizers. These include the following:
  - a) Perform an annual review and update of the Fort Belvoir Integrated Pest Management Plan (IPMP)
  - b) Incorporate IPM practices and techniques into the Real Property Maintenance Contract technical specifications, and communicate the IPM requirements to facilities managers and private partners who have their own grounds maintenance contractors/ operations.
  - c) Prepare a Nutrient Management Plan for each installation area that requires one. Perform an annual review of each plan.
  - d) Educate and inform installation facility managers on the requirements and practices of IPM and Nutrient Management
  - e) Perform regular compliance inspections and reporting for IPM and Nutrient Management, as required
  - f) Identify the areas requiring Nutrient Management Plans in the installation GIS

**Goal 10:** Continue to manage the populations and actions of wildlife having deleterious effects on installation vegetation resources and associated wildlife habitats.

- **Objective:** Control threats to vegetation resource integrity.

- **Strategy:**

- 1) Control the deer population through the Fort Belvoir hunting program.
- 2) Monitor beaver and woodchuck activity to detect impact to vegetation resources. Establish impact thresholds that trigger control action. Develop and implement protection measures if impact thresholds have been exceeded, as recommended by DCR-NHP (Hobson, 1996; McCoy and Fleming, 2000).

**Goal 11:** Continue to facilitate coordination of projects involving vegetation with tenants, partners, contractors, and military units.

- **Objective:** Assist in meeting mission requirements.

- **Strategy:**

- 1) Review and respond to military (e.g., Directorate of Plans, Training, Mobilization, and Security; Davison Army Airfield; Reserves, etc.) requirements for vegetation management (e.g., vegetation hazard control).
- 2) Review and respond to Fort Belvoir Outdoor Recreation Office requests for access to/use of vegetation resources.

- 3) Review and respond to requests for access to vegetation resources for Conservation Education Program events, and for scientific research and study.
- 4) Review and respond to requests from facility managers for vegetation management.
- 5) Participate in the installation's review processes to incorporate vegetation conservation requirements into all phases of facilities planning, siting, construction, renovation, operation, maintenance, and demolition activities; in reviewing and supporting military training and testing activities; and, in reviewing and responding to outdoor recreation, environmental education, scientific research and study, all other types of land area access and use requests.
- 6) Re-assess the potential for active commercial timber management and timber sales in conjunction with tree removal necessitated by construction projects, in accordance with the requirements of DoDI 44515.03 and AR 200-1
- 7) Review and revise as needed the environmental protection specifications applicable to construction contracts to ensure that they include appropriate vegetation protection provisions.
- 8) Review and revise as needed Fort Belvoir Policy Memorandum # 28, *Environmental Policy* (Appendix C), as applicable to construction projects to ensure that they include vegetation protection. Develop recommendations to revise the Fort Belvoir installation design guide to address vegetation considerations.

**Goal 12:** Continue to issue installation-specific policies and guidance documents.

- **Objective:** Provide direction and guidance for projects and activities that may impact vegetation
- **Strategy:** Maintain the *Fort Belvoir Tree Removal and Protection Policy* Memorandum to stress preservation of trees, and replacement of unavoidable loss of trees due to construction. Maintain guidance documents, such as recommended seed mixes and recommended plants.

**Goal 13:** Continue an educational outreach program to highlight the importance of forest, riparian areas, native vegetation, conservation landscaping, etc.

- **Objective:** Increase the level of education and awareness for the on-post public
- **Strategy:**
  - 1) Develop field educational materials and/or field trips similar to a living classroom that can be used by schools and other groups, as appropriate, and to educate the general public
  - 2) Identify and provide opportunities for specialized training in conservation and innovative planting/landscaping/grounds



- maintenance techniques for garrison, partner, tenant and contractor personnel, as appropriate.
- 3) Participate in educational and service events pertaining to native plants, riparian forests, landscaping, grounds maintenance, etc.
  - 4) Write and publish articles on vegetation resources.

**Goal 14:** Continue to manage natural resources information so it is accessible to, and can be used by, installation natural resource managers.

- **Objective:** Develop and implement a vegetation resources database.
- **Strategy:**
  - 1) Develop a system for storing and managing data.
  - 2) Enter electronic data.
  - 3) Scan and upload paper records.

**Goal 15:** Continue to enforce federal and state laws and regulations applicable to Fort Belvoir, as well as DoD, DA and Fort Belvoir natural resources policies.

- **Objective:** Ensure Fort Belvoir remains in compliance with all applicable vegetation resources laws and policies.
- **Strategy:**
  - 1) Perform vegetation resources compliance inspections
  - 2) Perform inspections in support of enforcement actions.

**Goal 16:** Continue to provide technical assistance in emergency situations, such as wildland fires.

- **Objective:** Ensure emergencies are responded to while meeting regulatory requirements.
- **Strategy:** Inspect and provide guidance.

## 7.0 FISH & WILDLIFE

The importance of military installations as fish and wildlife habitat has long been recognized. Military lands are largely protected from development and represent diverse habitat types containing a wealth of plant and animal life. They preserve ecologically important native habitats that can be havens for numerous, and sometimes rare and unique, plant and animal species. The Sikes Act, enacted in 1960 and amended in 1997, acknowledges the military's role in conserving fish and wildlife resources, and in providing public access to those resources consistent with the military mission.

Fort Belvoir provides four general habitat types: forested wetland, upland forest, open grassland, and early successional scrub-shrub. These four habitats are home to 43 species of mammals, 278 species of birds, 32 species of reptiles, and 27 species of amphibians. In addition, the waters of Fort Belvoir provide habitat for 65 species of fish.

Since the 1990's, fish and wildlife managers on federal, state, and private lands have converted from single species management to habitat management of ecosystems that benefit an array of species. In accordance with the Department of Defense Natural Resources Managers Handbook, *Conserving Biodiversity on Military Lands* (Leslie et al, 1996), Fort Belvoir has focused fish and wildlife conservation efforts on habitat management for all species based on the use of indicator species with conservation importance.

Identifying and monitoring indicator species is a practical method of measuring environmental conditions. An indicator species is a key organism, plant, or animal that is sensitive to particular environmental factors, so its presence, absence, or abundance in an area can provide information about ecological conditions. Indicator species are associated with specific habitat types, and management is implemented on those key habitats where these species occur. The ecological foundation for this approach assumes that the maintenance of the indicator species at desired levels concurrently means that the habitat integrity has been preserved. (*Wildlife Ecology and Management*, Second Edition, William L. Robinson and Eric G. Bolen, 1989) This method eliminates the need to monitor animals with widespread distribution or those not declining in numbers, and thus allows for efficient use of program resources.

Fort Belvoir's selection of indicator species was based upon (1) the recognized rarity of the species at the local, regional and national levels; (2) the availability of information regarding the species, its life history and the processes/forces influencing its rarity; (3) its susceptibility to, and immediacy of, threats and stressors; and (4) the potential for conservation actions to be successful. Emphasis was placed on indicator species with narrow environmental tolerances, and hence most susceptible to ecological disturbances. Using these

criteria, Fort Belvoir selected four species of birds with conservation importance to serve as "indicator species" for its fish and wildlife conservation efforts: prothonotary warbler (*Protonotaria citrea*), wood thrush (*Hylocichla mustelina*), grasshopper sparrow (*Ammodramus savannarum*), and prairie warbler (*Setophaga discolor*). Because these species are typically the most sensitive to habitat conditions, improving habitats for these species will likely benefit habitat conditions for other species as well. These indicator species may change based on adaptive management or through the development of a wildlife management plan. Fort Belvoir does not designate a specific aquatic indicator species because of the extensive variation in aquatic habitats and conditions. Current detection of aquatic species such as macroinvertebrates, fish, and mussels through surveys and monitoring are used as an indicator of habitat and water quality based upon those species tolerances of perturbations.

In addition to the four habitat indicator species, there is one-federal threatened species (northern long-eared bat (*Myotis septentrionalis*)); two state endangered species (little brown bat (*Myotis lucifugus*) and tricolored bat (*Perimyotis subflavis*)); and three state threatened species (northern long-eared bat, wood turtle (*Glyptemys insculpta*), and peregrine falcon (*Falco peregrinus*)). These species share habitat requirements with the four indicator species. Management of these five listed species can be found in Section 8. Additional species that are on the USFWS National Listing Workplan (NLW) also share habitat with the four indicator species on Fort Belvoir. The NLW is a prioritized listing of species that the USFWS is currently reviewing and considering for, or plans to review and consider for, endangered or threatened status.

The four indicator species selected by Fort Belvoir are bird species identified by the Partners in Flight (PIF) program. The PIF program is an international-level conservation initiative and network of more than 150 partner organizations, to which DoD and DA are signatories. USFWS, as well as state wildlife agencies, including VDGIF through the state nongame program, are partners in this program. Designation of PIF Species of Concern is the result of a cooperative/coordinated effort among various federal, state and private organizations. The PIF Program strives to address the problems facing neotropical migratory birds through science, research, planning, and policy development, as well as land management, monitoring, and outreach. As part of the PIF Program, DoD installations are encouraged to incorporate elements of both the PIF Bird Conservation Strategy and the DoD PIF Bird Conservation Strategic Plan into their INRMPs. Such elements include identifying species and habitats most in need of conservation; establishing population and habitat conservation objectives; creating a Bird Conservation Plan to meet established objectives; implementing the plan; and monitoring progress.

There are practical reasons for selecting birds as indicator species – the large number of people observing birds and the large amount of data available

regarding them. Numerous amateur and professional birders are capable of observing, identifying, and reporting through various data collecting outlets. Christmas Bird Counts and breeding bird censuses have been carried out for many decades, are standardized, and provide excellent long-term records. The patterns of distribution and abundance indicated by these records can be used to determine habitat project needs.

The four indicator species selected for conservation priority use a variety of habitat types throughout Fort Belvoir for foraging and breeding. These species share habitat requirements with many, if not all, wildlife species on Fort Belvoir. Because of their shared habitat requirements, conservation actions for the nine species (i.e., the four indicator and five federal and state endangered or threatened species) will likely benefit the installation's other fish and wildlife species.

Table 7-1 presents the four general habitat types on Fort Belvoir, the associated indicator species, and examples of species that share each of the habitats. Ecological management of each habitat will benefit the indicator species as well as other species found in that habitat.

Habitat for all of these species are continuously susceptible to destruction, fragmentation, pollution, and threats from introduced species. This requires active management of the indicator species habitat to ensure the health of the overall ecosystem and the diversity of species on Fort Belvoir. Active management includes monitoring of all indicator species, routine surveillance (i.e., close observation) and response to changes in habitat conditions, habitat management, buffering or accommodating development using BMPs, and controlling public access to habitat areas for recreation.

Table 7-1: Habitat, Indicator Species, and Examples of Species Sharing Habitat				
Forested Wetland Habitats	Upland Forest Habitats	Open Grassland Habitats	Early-Successional/ Scrub-Shrub Habitat	
Habitat Indicator Species				
Prothonotary warbler <i>Protonotaria citrea</i>	Wood thrush <i>Hylocichla mustelina</i>	Grasshopper sparrow <i>Ammodramus savannarum</i>	Prairie warbler <i>Setophaga discolor</i>	
Example Species that Benefit from Managed Indicator Species Habitat				
Northern cricket frog (f, b, h) <i>Acris crepitans</i>	Northern spring peeper (f, b, h) <i>Pseudacris c. crucifer</i>	American toad (f, b, h) <i>Bufo a. americanus</i>	Northern fence lizard (f, b, h) <i>Sceloporus undulatus hyacinthinus</i>	
Wood turtle (f, b, h) <i>Glypemys insculpta</i>	Northern ringneck snake (f, b, h) <i>Diadophis punctatus edwardsi</i>	Eastern hognose snake (f, b, h) <i>Heterodon platyrhinos</i>	Northern black racer (f, b, h) <i>Coluberc. constrictor</i>	
Spotted turtle (f, b, h) <i>Clemmys guttata</i>	Marbled salamander (f, b, h) <i>Ambystoma opacum</i>	Meadow vole (f, b, h) <i>Microtus pennsylvanicus</i>	Least shrew (f, b, h) <i>Cryptotis parva</i>	
Ribbon snake (f, b, h) <i>Thamnopsis sauritus</i>	Deer mouse (f, b, h) <i>Peromyscus maniculatus</i>	Red Bat (f, b, h) <i>Lasiurus borealis</i>	American woodcock (f, b, h) <i>Philohela minor</i>	
Star-nosed mole (f, b, h) <i>Condylura cristata</i>	Southern flying squirrel (f, b, h) <i>Glaucomys volans</i>	Northern bobwhite (f, b, h) <i>Colinus virginianus</i>	White-tailed deer (f, b, h) <i>Odocoileus virginiana</i>	
Tricolored bat (f, b) <i>Perimyotis subflavus</i>	Wild turkey (f, b, h) <i>Meleagris gallopavo</i>	American kestrel (f, b) <i>Falco sparverius</i>	Hoary bat (f, b) <i>Lasiurus cinereus</i>	
Bald eagle (f, b, h) <i>Haliaeetus leucocephalus</i>	Northern long-eared bat (f, b) <u><i>Myotis septentrionalis</i></u>	Rusty patched bumble bee (f, b, h) <u><i>Bombus affinis</i></u>	Monarch (f, b, h) <u><i>Danaus plexippus</i></u>	

**Note:**

- These species do occur in other habitats, but are listed in their primary habitat and need these specific habitats to maintain populations. The use of the habitat area is annotated by:  
f = foraging; b = breeding; and h = hibernation or wintering habitat.
- **Bold text** indicates primary indicator species.
- Underlined text indicates federal/state threatened or endangered species or National Listing Workplan species.

## 7.1 FISH AND WILDLIFE POLICIES

### 7.1.1 Federal Fish & Wildlife Policies

- ***The Sikes Act (16 USC Section 670a, et seq.) as amended in the Sikes Act Improvement Act of 1997***

This act directly requires conservation and management of fish and wildlife on DoD installations. The Sikes Act authorizes the Secretary of Defense to (1) carry out a program for the conservation and rehabilitation of natural resources on military installations, and (2) prepare an INRMP in cooperation with the USFWS and state fish and wildlife agencies. The Sikes Act requires the INRMP to reflect the mutual agreement of the parties [USFWS and state fish and wildlife agencies] concerning conservation, protection, and management of fish and wildlife resources. Section (a) (3) requires military installations to carry out a program, “consistent with the use of military installations ...to provide for (i) the conservation and rehabilitation of natural resources on such installations; (ii) the sustainable multipurpose use of the resources, which shall include hunting, fishing, trapping and non-consumptive uses; and, (iii) subject to safety requirements and military security, public access to military installations to facilitate the use.”

- ***Migratory Bird Treaty Act (MBTA) (16 USC §§703-712)***

This is a federal statute that implements four treaties with the U.S. and Canada, Mexico, Japan, and Russia on the conservation and protection of migratory birds. The MBTA states that it is illegal to pursue, hunt, take, capture, kill, or sell “migratory” birds or sell any of their parts (e.g., feathers, eggs, nests), alive or dead, as defined in 16 USC §§ 703-712. Further, the regulatory definition of “migratory bird” as applied in this context and detailed in 50 CFR §§10.13, is broad, and includes most native birds found in the United States – including species that do not migrate. The regulation prohibits the taking, selling, transporting, and importing of migratory bird species and includes any part, egg, or nest of such bird (50 CFR §§10.12 and 10.13).

- ***Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, 2001 (66 FR 3853 [January 10, 2001])***

On July 31, 2006, DoD and the USFWS entered into a MOU to *Promote the Conservation of Migratory Birds*, in accordance with Executive Order 13186. The MOU does not address or authorize migratory bird take. Instead, it identifies activities where cooperation between DoD and the USFWS will contribute substantially to the conservation of migratory birds and their habitats. A 2014 MOU between DoD and the USFWS describes specific actions that DoD should take to advance migratory bird conservation, reasonably avoid or minimize the take of migratory birds,



and ensure DoD activities (excluding military readiness) comply with the MBTA in ways that are “consistent with imperatives of safety and security.” In addition, Military Services must ensure that its operations are consistent with the MBTA and, in ways that help sustain the use of military managed lands and airspace for testing, training, and operations, should avoid or minimize the take of migratory birds and advance migratory bird conservation through its natural resources management activities.

- ***DoD Migratory Bird Readiness Rule (50 CFR Part 21)***

Section 315 of the 2003 National Defense Authorization Act and the Migratory Bird Military Readiness Rule (50 CFR Part 21) implementing Section 315 authorize, with certain limitations, the incidental take of migratory birds during military readiness activities. Some confusion has arisen over whether the Armed Forces must give appropriate consideration to the protection of migratory birds only for military readiness activities that may result in a significant adverse effect on a population of migratory birds, or for all military readiness activities. Under the Migratory Bird Readiness Rule, installations must identify and consider ways to minimize or mitigate the take of migratory birds during all military readiness activities. Nevertheless, it is important to understand that for military readiness activities that are not expected to have a significant adverse effect on a population of migratory birds, an installation need only identify and consider ways to minimize or mitigate the take of migratory birds (typically, in its INRMP or in project-specific National Environmental Policy Act (NEPA) documents). Installations are not obligated to implement any measures that would diminish the effectiveness of the military readiness activities under consideration. On the other hand, for military readiness activities that may have a significant adverse effect at the population level, an installation must confer with the USFWS to develop and implement appropriate conservation measures to minimize or mitigate any significant adverse effects.

- ***Bald and Golden Eagle Protection Act (16 USC 668-668d)***

This act prohibits the pursuing, shooting, shooting at, poisoning, wounding, killing, capturing, trapping, collecting, molesting, disturbing, purchase, or sale of bald and golden eagles. The act also prohibits the barter, transport, export, or import at any time or in any manner a bald or golden eagle, dead or alive; or any part, nest, or egg of these eagles, without a permit issued by the Secretary of the Interior.

- ***The Fish and Wildlife Coordination Act (16 USC 661 et seq.)***

- ***Fish and Wildlife Conservation Act (16 USC 2901-2911)***

- ***Lacey Act (16 USC §701) and Lacey Act Amendments of 1981 (16 USC §§3371-3378)***

- ***The Migratory Bird Hunting and Conservation Stamp Act (16 USC 718-718j)***
- ***Airborne Hunting Act (16 USC 742j-1)***
- ***Executive Order 13112 – Invasive Species, February 3, 1999***
- ***The Animal Damage Control Act (7 USC 426)***

### **7.1.2 State Fish & Wildlife Policies**

VDGIF is the policy-making entity responsible for conserving, protecting, and replenishing the supply of game, nongame wildlife, and fish of the Commonwealth of Virginia (Virginia Administrative Code, 4 VAC15). Under the wildlife permit program (Code of Virginia §29.1-417), VDGIF must be consulted regarding capture, hold, propagation, and disposal of wildlife. Virginia law includes a number of provisions regarding the conservation and protection of wildlife. The Federal Government assimilates applicable State laws:

- ***The Wildlife and Fish Laws (Code of Virginia § 29.1)***
- ***Virginia’s 2015 Wildlife Action Plan***

In accordance with the Sikes Act, Military installations use State Wildlife Management Plans to inform installation fish and wildlife management strategies.

### **7.1.3 Department of Defense Fish & Wildlife Policy**

- ***Natural Resources Conservation Program (DoDI 4715.03)***  
DoD’s natural resources management policy and instruction requires installations to follow an ecosystem-based approach to natural resources management using adaptive management strategies, to inventory and protect important biological resources, and to promote biodiversity, while being able to provide continued access to installation air, water and land for realistic military training and testing. The instruction also allows for multiple uses of an installation’s natural resources, and for public access to these resources for recreation, education, and scientific research and study, compatible with the installation’s ecosystem management goals and military mission. DoD policy regarding endangered, threatened, and rare species is discussed in Section 8.1.

#### 7.1.4 Department of the Army Fish & Wildlife Policy

- ***Environmental Protection and Enhancement (AR 200-1)***

Army Regulation 200-1 covers environmental protection and enhancement and provides the framework for the Army Environmental Management System. AR 200-1 implements Federal, State, and local environmental laws and DoD policies for preserving, protecting, conserving, and restoring the quality of the environment. Excerpts from AR 200-1 are as follows:

<b>Excerpts from AR 200-1 Applicable to Fish and Wildlife Resources</b>
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Garrison commanders

- Ensure that Base Support activities support military training and readiness operations, enhance mission accomplishment, and are conducted in a manner conducive to environmental stewardship.
- Comply with applicable Federal, State, and local environmental laws, regulations, internal directives and goals.
- Ensure that the installation Master Plan incorporates environmental considerations.
- Maintain an efficient and well-trained environmental staff.
- Approve INRMP's Land Resources
- Land resources are the ranges, cantonment areas, and associated natural resources (to include soils and the biota they support).
- Provide for the conservation and rehabilitation of natural resources on Army lands.
- Implement the INRMP by (a) actively requesting, receiving, and using funds for priority projects and activities, (b) ensure that sufficient number of professionally trained natural resource management personnel are available to perform the tasks required by the INRMP.
- Prepare INRMP that includes components addressing specific natural resources.
- Review the INRMP on a regular basis, but not less than every 5 years and update as appropriate.
- Assure NEPA requirements are satisfied when preparing the INRMP.
- Integrate the INRMP with installation Master Plan and other appropriate plans to ensure consistency.
- Conduct Planning Level Surveys (PLS) to include but not limited to topography, wetlands, surface waters, soils, flora, vegetation communities, threatened and endangered species and fauna.
- Promote biodiversity and ecosystem sustainability on Army lands and waters consistent with the mission and INRMP objectives.
- Manage flora and fauna consistent with accepted scientific principles and in accordance with (IAW) applicable laws and regulations, and,

### Excerpts from AR 200-1 Applicable to Fish and Wildlife Resources

where lands and waters are suitable, for conservation of indigenous flora and fauna.

- Manage habitat to conserve and enhance existing flora and fauna consistent with the Army goal to conserve, protect, and sustain biological diversity while supporting the accomplishment of the military mission.
- Integrate endangered species management and installation planning functions to ensure compliance.
- Conduct biological assessments for activities that may have an effect on listed species or critical habitat where they are present or may be present in the action area.
- Use formal and informal consultation with the USFWS and NOAA-Fisheries regarding endangered species when applicable.
- Manage species at risk and habitats to prevent listing that could affect military readiness.
- Collect fees for hunting, fishing, and trapping and deposit into the Army Fish and Wildlife Conservation Fund (21X5095).
- Provide for controlled recreational access where feasible at Army installations containing land and water areas suitable for recreational use.
- Prepare and implement an invasive species management component of the INRMP.
- Obtain appropriate authorization (take permit) from the USFWS before intentionally and directly taking any migratory bird species and establish procedures to avoid the unintentional take of migratory birds, including nests and eggs.

#### 7.1.5 Fort Belvoir Fish & Wildlife Policy

Fort Belvoir has no over-arching fish and wildlife management policy other than the policy specified in this INRMP. The installation has several policy documents: *Fort Belvoir Conservation of Migratory Birds Policy Memorandum*; *Watercraft Recreation, Hunting and Fishing Policy Memorandum*; *Animal Control Regulation*; and *Pet Control on Post Policy* (Appendix C).

- ***Fort Belvoir's Conservation of Migratory Birds Policy Memorandum***  
This policy memorandum provides guidance to conserve (avoid, minimize, and manage) migratory bird populations as long as it does not impact the military mission. Guidance is provided during all proposed activities to include but not limited to tree removals, chimney maintenance, demolition, and semi-improved mowing that may impact migratory birds during the nesting season.

- ***Fort Belvoir's Regulation 40-905, Animal Control***

This regulation addresses the release of domesticated wildlife on installation property. The policy prohibits the release of domestic animals on post and establishes guidelines for capturing and removing feral animals. The regulation applies to all persons residing on, employed by, serving on, or visiting Fort Belvoir. It enables Fort Belvoir to enforce the policies established within the regulation.

- ***Fort Belvoir's Pet Control on Post Memorandum***

This memorandum aims to maintain a safe and healthy living environment by making pet owners responsible for their pet's actions while on post. The regulation states that any pet: (1) not registered with the Fort Belvoir Veterinary Treatment Facility, (2) involved with an act of aggression, or (3) found unleashed or unaccompanied by a responsible party, can be ordered removed from the installation boundaries. Owners are accountable for their pet at all times.

## **7.2 BASELINE FISH & WILDLIFE CONDITIONS**

Fort Belvoir has conducted a number of wildlife surveys for inventory and monitoring purposes (Table 7-2). As of 2017, comprehensive installation-wide inventories of all fish and wildlife, except for invertebrates, have been completed. Various additional wildlife survey efforts have been done or are underway. These are discussed below grouped by wildlife type. Surveys for federal and state endangered and threatened species (i.e., northern long-eared bat, wood turtle, and peregrine falcon) are addressed in Section 8.0. Surveys for aquatic resources are presented in Section 5.2.2.

Table 7-2: Sources of Fort Belvoir Wildlife Information					
Subject	Author	Method	Coverage	Year	Product
Rare species	Virginia Department of Conservation and Recreation DCR-NHP, Division of Natural Heritage	Field survey	Installation-wide exclusive of cantonment areas	1994-1995; 1996, 2003, 2013	Species lists, report, and maps
Wildlife Use of Underpass Structures in FWC	George Mason University	Field survey	3 locations in corridor	Year-round 1995-1998	Movement counts by species, report
Wildlife Use of Underpass Structures	ERDC	Field Survey and trail cameras	All designated wildlife crossing structures	2015-2017	Movement counts by species, maps, report pending
Wildlife Use of Underpass Structures	Virginia Department of Transportation	Field Survey and trail cameras	2 locations in corridor	2006	Movement counts by species, report
Wildlife Use of Underpass Structures	In-house	Field Survey and trail cameras	1 location (Gunston Rd) in corridor	2005, 2010	Movement counts by species, summary
Shellfish and Submerged Aquatic Vegetation Survey	SES Construction and Fuel Services, LLC	Field Survey	Pohick Bay, Accotink Bay, Gunston Cove, Dogue Creek	2015-2016	Species list, maps, report
Small Mammals	George Mason University	Field survey	Select locations	1988, 1994	Species lists, reports
Deer Census	In-house, contractors, and volunteers	Spotlight survey	Installation-wide route	1988-2005, 2008-present	Installation population estimate, population trends
Deer Population Characteristics	In-house, contractors, and volunteers	Measurements	All harvested deer	1995-present	Total harvest, age, sex ratio, weight data
Deer Health Check	Virginia Department of	Necropsy	Select sample	1987, 1999	Report



<b>Table 7-2: Sources of Fort Belvoir Wildlife Information</b>					
<b>Subject</b>	<b>Author</b>	<b>Method</b>	<b>Coverage</b>	<b>Year</b>	<b>Product</b>
	Game and Inland Fisheries, in-house, and Vista Technologies				
Bald Eagle	In-house	Visual	Installation wide	Annually	In-house report
Year-Round Land Bird Counts	Waterways Experiment Station (WES) and in-house (WES is now known as ERDC)	Point count, incidental	Installation-wide, excluding cantonment areas	Annual, one week each season 1998-current	Bird counts by species and report
Shorebirds	In-house	Point count	One location on Accotink Bay	Weekly July 15-October 15; March 15-May 15 1998 – 2006	Bird counts by species, report
Waterfowl	In-house and Vista Technologies, Inc.	Point count	Shorelines/tidal marsh areas	Irregular October-April 1997-2006	Bird counts by species, report
Neotropical Migratory Bird	Institute for Bird Populations	Monitoring Avian Productivity and Survivorship (MAPS) program protocol	Two sites in Training Area 16/HEC	Annually, May-June 1995-2002	Population data, report
Christmas Bird Count	Audubon Society and in-house	Audubon Society protocol	Installation-wide	Annually (December or January), 1911-present	Bird counts by species, report
Northern Virginia Bird Survey	Audubon Society and in-house	Audubon Society protocol	Installation-wide exclusive of cantonment area	Annual (June) have data from 1995-present	Bird counts by species, report

<b>Table 7-2: Sources of Fort Belvoir Wildlife Information</b>					
<b>Subject</b>	<b>Author</b>	<b>Method</b>	<b>Coverage</b>	<b>Year</b>	<b>Product</b>
Reptiles and Amphibians	George Mason University	Field survey	Corridor area	1987, 1994	Species lists and reports
Reptiles and Amphibians	In-house	Field survey	Corridor area	1988-1994	Counts by species
Amphibians	Dr. Joseph Mitchell	Field survey	South Post training area	1995, 1997	Species list, report
Reptiles and Amphibians Survey	Paciulli-Simmons and Associates Ltd.	Field Survey	Installation-Wide	2002, 2010-present	Species list, Maps, Report
Chimney Swift Survey	In-house and contractors	Field Survey	Select locations in cantonment area	2001-2005, 2013-present	Report
Nocturnal Breeding Bird Survey	In-house and contractors	Field Survey	Select locations	2001-2007, 2012-present	Species list, maps, report
Marsh Breeding Bird Survey	In-house and contractors	Field Survey	Select locations	2001-2007, 2012-present	Species list, maps, report
Bat Survey	In-house, contractors, WES, and DCR	Field Survey	Select locations	2001-2005, 2011-present	Species list, maps, reports
Anadromous Fish Survey	George Mason University	Field Survey	Pohick and Accotink Creeks	Late 1990s-present	Species list, maps, reports
Nest Box Monitoring (multiple species)	In-house and volunteers	Field Survey	Select locations	1990s-present	Species list, maps, reports
Amphipod	GeoConcepts Engineering, Inc.	Field Survey	Select locations	2013	Maps, report
American Shad Restoration Program	Virginia Department of Game and Inland Fisheries, USFWS, NMFC, contractors	Field Survey	Potomac River	Late 1990s-present	Not applicable – no report provided to Fort Belvoir.
Wild Turkey Survey	In-house and contractors	Track count (winter),	Select locations	2001-2005	Species count, maps, report

Table 7-2: Sources of Fort Belvoir Wildlife Information					
Subject	Author	Method	Coverage	Year	Product
		auditory (spring)			
Smithsonian Geolocator Birds	Smithsonian Institute	Audio calls, mist-netting, leg-banding	Southwest Training Area	2010, 2011	No report provided to Fort Belvoir.
Baseline Aquatic Inventory	EA Engineering, Science, and Technology, Inc.	Field Survey	Accotink Creek, Dogue Creek, Mason Run, UN-1, UN-2	1999, 2000	Benthic macroinvertebrates, fish species, habitat, water quality, report
Aquatic survey and habitat assessment	George Mason University	Field Survey	Accotink Creek, Pohick Creek, Dogue Creek	1995-1999	Benthic macroinvertebrates, plankton, fish, habitat, water quality, report
Fish Survey	VDGIF	Electrofishing	Mulligan Pond	1999	Unpublished, field investigation only
Aquatic Survey	George Mason University	Field Survey	Accotink Creek, Pohick Creek, Gunston Cove, Dogue Creek	1984-present	Climate, water quality, plankton, fish, benthic organisms, report
Fish Survey	Ernst et al.	Field Survey	Accotink Creek, Pohick Creek, Dogue Creek below Mulligan Pond, Pohick Bay shoreline, Accotink Bay, Gunston Cove, and Potomac River.	1994	Report

### 7.2.1 Mammals

Mammal species occupying Fort Belvoir are fairly well documented. The mammal surveys are sufficient to provide an inventory of mammal species occurring on post. None of the surveys were designed to assess population levels and trends; the results provide general information regarding the abundance and habitat usage of each species on post.

Forty-three species of mammals have been identified as occurring, or potentially occurring on Fort Belvoir (Appendix I). The resident mammal species appear to be what one would expect to occur in the mix and quality of on-post habitat types. The northern short-tailed shrew (*Blarina brevicauda*) is probably the most abundant mammal on post, occurring in a wide variety of terrestrial habitats. The Mammals of Fort Belvoir, Virginia report (Ernst et al., 1997b) identified several species of regionally rare mammals through the field surveys. Appendix I presents more-specific information on the abundance of Fort Belvoir mammals.

Fort Belvoir possesses fairly extensive areas of undisturbed mature forest. These areas provide habitat that supports a variety of small ground-dwelling mammals such as eastern chipmunk (*Tamias striatus*), white-footed mouse (*Peromyscus leucopus*) and woodland vole (*Microtus pineotrum*), as well as the arboreal squirrel (eastern gray squirrel [*Sciurus carolinensis*] and southern flying squirrel (*Glaucomys volans*). Forest areas with shade, vegetative ground cover, and woody debris provide habitat conditions for such species as striped skunk (*Mephites mephites*), which occurs in the more upland settings, and Virginia opossum (*Didelphis virginiana*), which occurs in the more lowland settings.

Significant areas of grassy old-field habitat occur on Fort Belvoir at three closed landfills, along roadway and utility corridors, and in training areas. These areas provide habitat conditions for such species as the meadow vole (*Microtus pennsylvanicus*) and eastern mole (*Scalopus aquaticus*).

At Fort Belvoir, many mid-sized terrestrial mammals, such as the eastern cottontail rabbit (*Sylvilagus floridana*), woodchuck (*Marmota monax*), and long-tailed weasel (*Mustela frenata*) inhabit the transition areas between forest and old field habitats (i.e., edge areas) where there is both grass cover and tangled underbrush. These species can also be encountered in a wide variety of other habitat types on post.

The extensive stream, marsh, and riparian habitats on post support the water-dependent mammal species, such as beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), river otter (*Lutra canadensis*), mink (*Mustela vison*) and star-nosed mole (*Condylura cristata*). Beaver are of management interest on Fort Belvoir not only from a problem standpoint, but because they can significantly alter habitat conditions through tree removal and dam building. Beaver

impoundments appear to be responsible for creating extensive areas of palustrine wetland along Dogue Creek and within drainages to Accotink and Pohick Creeks.

The river otter is another species of management interest. In addition to trapping for the fur trade, which has not occurred at Fort Belvoir in the past several decades, habitat loss and water pollution are the major threats to this species' survival. Although the river otter has not been sighted frequently on Fort Belvoir, there is evidence of recent increases in this species' abundance along Fort Belvoir waterways through incidental observations of tracks and scat samples.

Fort Belvoir's largest mammal, the white-tailed deer (*Odocoileus virginianus*), can be found throughout the installation, from deep woods to wetlands to housing areas, although its preferred habitats are old-field and second-growth forest. The absence of natural predators at Fort Belvoir and throughout the region had contributed to a steadily increasing regional deer population. This population increase raised significant management concerns not only regarding the detrimental effect of overpopulation on herd health, but also on wildlife habitat (i.e., habitat loss through overbrowsing). Since 1988, the population has been declining (-74%) through liberal hunting seasons and bag limits established by the VDGIF. The creation of the Fairfax County Deer Management Archery Program in 2011, as well as the use of sharpshooters in various locations in Fairfax County outside Fort Belvoir, has also contributed significantly to the decline. The County's program currently allows hunting in the following areas that border Fort Belvoir: Huntley Meadows Park, Accotink Stream Valley Park, Pohick Bay Regional Park, and the Noman M. Cole Jr. Pollution Control Plant.

Fort Belvoir has never officially documented black bears (*Ursus americanus*), however there have been unconfirmed sightings and/or misidentifications on the installation. VDGIF has confirmed sightings of black bears within a 20 mile radius (Burke, Clifton and Tyson's Corner, VA). With the expansion of the black bear into Prince William and Fairfax Counties, the potential exists for future sightings on Fort Belvoir.

The raccoon (*Procyon lotor*) is the most abundant predator on Fort Belvoir. Other predators include the striped skunk, red fox (*Vulpes vulpes*), and eastern coyote (*Canis latrans*). These species tend to hunt edge and corridor areas, and move throughout the installation along drainages. Their populations are influenced by cycles of disease such as canine distemper and rabies. These cycles, in turn, greatly influence population cycles of the smaller mammals, as well as reptiles and amphibians. The bobcat (*Lynx rufus*), which may occur on Fort Belvoir, has been reported on the Mason Neck peninsula, where tracks have been reported in installation drainages. In addition to disease and predation, the other major source of mortality among Fort Belvoir mammals is motor vehicle impact.

Since the 2001 INRMP, bat species have been monitored annually to establish baseline conditions and more recently because of the decline in some species and the change of federal and/or state status. These surveys identified the big brown bat (*Eptesicus fuscus*), a year-round resident that occupies structures; the red bat (*Lasiurus borealis*) and state endangered tricolored bat (*Perimyotis subflavus*), both year-round residents of open woodland settings, as having been the three most common species occurring on Fort Belvoir to date. The surveys have also identified the migratory silver-haired bat (*Lasionycteris noctivagans*). Other bats that have been documented on Fort Belvoir include the state endangered little brown bat (*Myotis lucifugus*) and the federal and state threatened northern long-eared bat (*Myotis septentrionalis*), which occupy structures and forage over water and in forests, respectively; the hoary bat (*Lasiurus cinereus*), a migratory species; and the evening bat (*Nycticeius humeralis*), a woodland species. Though not recorded in the area, the federal endangered Indiana bat (*Myotis sodalis*) may also occur in the region.

The house mouse (*Mus musculus*) and the Norway rat (*Rattus norvegicus*), non-native mammals, are documented on post. These animals, along with the woodchuck, can cause damage in the cantonment area. Other problematic mammal species include feral dogs and feral cats. Feral cats are of particular concern because of the risk of disease (e.g., rabies) they pose to humans and pets, and because of their documented devastation of ground nesting birds and small mammals. Fort Belvoir Regulation 40-905, *Animal Control* (U.S. Army, 2000c), prohibits the abandonment of any animal on the installation and outlines procedures if stray animals are found.

## **7.2.2 Birds**

The birds of Fort Belvoir are very well documented. Information on the species and abundance of birds on post has been collected through a number of surveys and monitoring efforts undertaken by the installation, as well as by various birding organizations and individuals (Table 7-2).

Since 1998 multiple surveys have been conducted to include winter, spring migration, summer breeding and fall migration for landbirds, and surveys for waterfowl, shorebirds, marsh-birds, and nightjars. These major survey efforts were designed and implemented not only to develop a comprehensive species list, but also to assess the relative abundance of bird species, determine the association of species with habitat types, identify trends in populations and distribution over time, and for habitat management. The data from these surveys have been incorporated into the installation GIS. Fort Belvoir plans to continue to conduct the winter, spring migration, summer breeding, marsh-bird, and nightjar surveys as funding and personnel are available.



Other major long-term annual survey events at Fort Belvoir include the Christmas Bird Count (since 1911) and the Northern Virginia Bird Survey (since 1995). The Christmas Bird Count is organized by the National Audubon Society with installation staff participation. In 1998, the Northern Virginia Bird Survey, which was originally initiated by the Audubon Society of Northern Virginia (ASNV), was incorporated into Fort Belvoir's land bird survey, and is now being performed by Fort Belvoir staff. Data from these surveys are being incorporated into the installation GIS and provided to ASNV.

As a result of the many surveys and observations over the years, a total of 278 bird species have been identified on Fort Belvoir. Appendix I presents the species identified on post, together with information on their seasonal abundance. Appendix J presents the Fort Belvoir bird checklist, which provides more detailed information on the seasonal relative abundance. This large number of bird species on Fort Belvoir reflects the variety and quality of natural habitats at the installation.

Thirty-two percent (88 species) of Fort Belvoir bird species are year-round residents, twenty-six percent (71 species) are neotropical migrants, and thirty-six percent (101 species) are temperate migrants. The most abundant resident landbirds on Fort Belvoir are the red-bellied woodpecker (*Melanerpes carolinus*), American crow (*Corvus brachyrhynchos*), tufted titmouse (*Parus bicolor*), and Northern cardinal (*Cardinalis cardinalis*). The most abundant resident waterbirds are the great blue heron (*Ardea herodias*), Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), and wood duck (*Aix sponsa*). During the winter, common temperate migrants include the American robin (*Turdus migratorius*), dark-eyed junco (*Junco hyemalis*), ring-billed gull (*Larus delawarensis*), and white-throated sparrow (*Zonotrichia albicollis*). Abundant neotropical migrants that use the installation as stopover habitat during migration include the black-throated blue warbler (*Dendroica caerulescens*), black-throated green warbler (*Dendroica virens*), blackpoll warbler (*Dendroica striata*), and American redstart (*Setophaga ruticilla*). The most abundant neotropical migrants breeding on Fort Belvoir include the red-eyed vireo (*Vireo olivaceus*), Acadian flycatcher (*Empidonax virescens*), ovenbird (*Seiurus aurocapillus*), wood thrush (*Hylocichla mustelina*) and indigo bunting (*Passerina cyanea*).

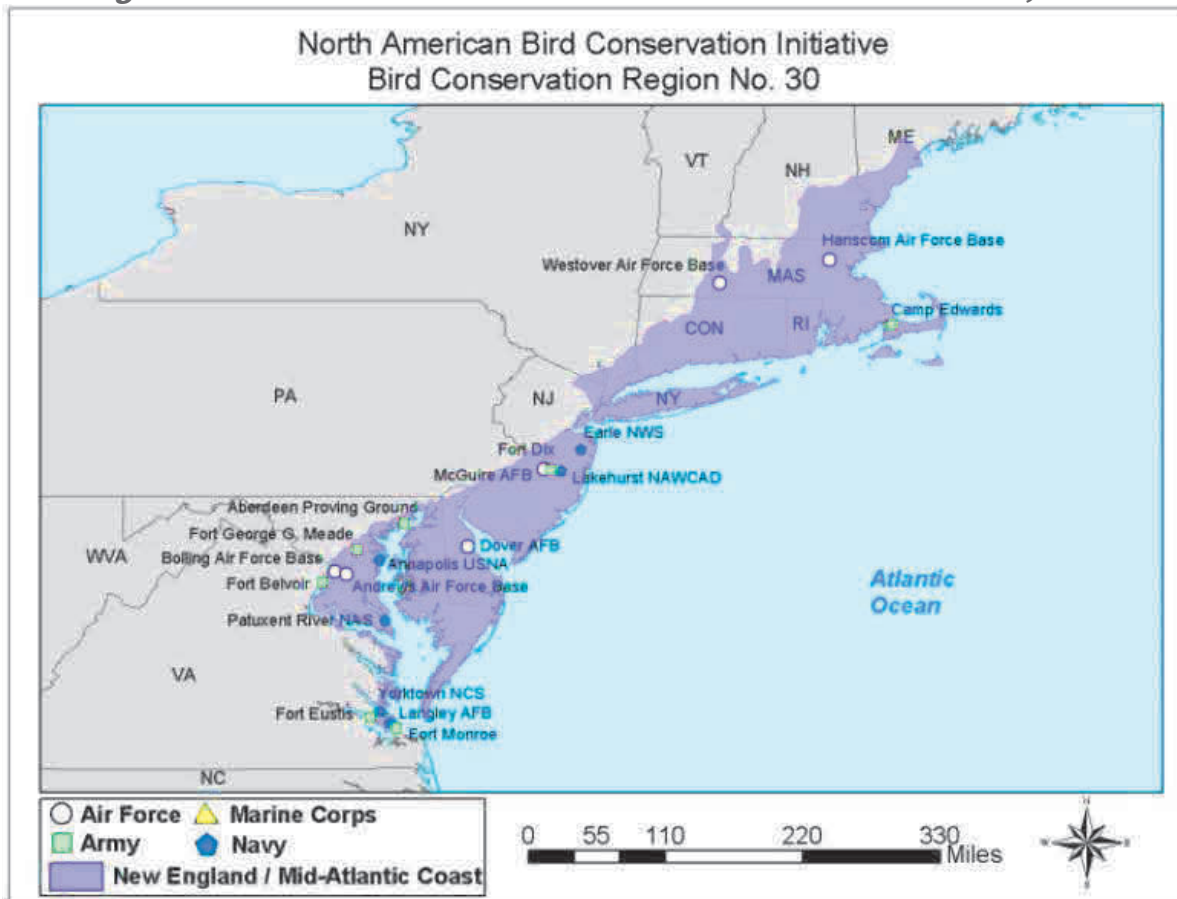
Thirty-six percent (99 species) are known to be common or abundant at the times they occur on post (Fleming, 2005). This indicates that Fort Belvoir affords large areas of suitable habitat for a significant percentage of the installation bird species. Key habitat features on Fort Belvoir include the large contiguous areas of undeveloped land, the landscape of varied ecological communities (e.g., freshwater tidal marsh that is used by killdeer (*Charadrius vociferus*), greater yellowlegs (*Tringa melanoleuca*) and lesser yellowlegs (*Tringa flavipes*), spotted sandpiper (*Actitis macularia*), and least sandpiper (*Calidris minutilla*)); the early

successional old-field habitats used by prairie warblers and field sparrows (*Spizella pusilla*); the later successional old-field habitats used by yellow-breasted chat (*Icteria virens*), white-eyed vireo (*Vireo griseus*), and eastern towhee (*Pipilo erythrophthalmus*); the forested wetland/riparian forest used by the prothonotary warbler, Acadian flycatcher, yellow-throated vireo (*Vireo flavifrons*), Carolina chickadee (*Poecile carolinensis*), and Louisiana waterthrush (*Parkesia motacilla*); the upland hardwood forest used by the wood thrush, worm-eating warbler (*Helmitheros vermivorous*), eastern wood-pewee (*Contopus virens*), scarlet tanager (*Piranga olivacea*), and summer tanager (*Piranga rubra*); and the abundance of food sources (e.g., soft-bodied insects, seeds, berries, aquatic invertebrates). These habitats, together with Fort Belvoir's position along the Potomac River corridor, enhance the installation's attraction for both resident and migrant species.

The USFWS Information, Planning, and Conservation System (IPaC) tool (accessed 4/27/2017) identified 11 species on the Birds of Conservation Concern list in the vicinity of Fort Belvoir. The USFWS Birds of Conservation Concern (2008) report identifies species, subspecies, and populations of all migratory nongame birds that are of conservation or management concern due to low numbers, declining population trends, or recent delisting. For the Fort Belvoir area of Virginia this list includes the species listed in Table 7-3. The last column in the table addresses the occurrence of each species on Fort Belvoir based on ecological requirements, habitat available, and survey data.

PIF utilizes the best, most up-to-date science to assess the vulnerability of all landbirds. The PIF 2016 Species of Concern "Watch List" identifies 86 species of highest conservation concern. All of these birds will require immediate and coordinated actions across their full range and life cycles to reduce threats, reverse declines, and prevent future extinctions. The North American Bird Conservation Initiative (NABCI) established Bird Conservation Regions (BCRs) as ecologically distinct regions in North America with similar bird communities, habitats, and resource management issues. PIF utilizes these BCRs to identify and prioritize management of these species. Fort Belvoir falls within BCR 30, New England/Mid-Atlantic Coast (Figure 7.1). The six birds on the PIF Species of Concern Watch List that occur within BCR 30 are listed in Table 7-3. Fort Belvoir is using three of the species – prairie warbler, prothonotary warbler, and wood thrush – as indicator species in the installation's wildlife management program.

**Figure 7.1: North American Bird Conservation Initiative, BCR 30**



The DoD has intrinsic mission and conservation issues, both of which require due diligence to laws and regulations to promote mission capabilities. Thus DoD Partners in Flight created its own list of *Mission Sensitive Species (MSS)* to provide focus on those species most relevant to protecting the DoD missions. This list highlights bird species that occur on DoD lands and are at risk of becoming listed as threatened or endangered under the federal Endangered Species Act. The purpose of this list is to help DoD resource managers better prioritize monitoring and management efforts on those species (and their habitats) having the highest potential to impact the military mission should they become federally listed. The list helps installations prioritize monitoring programs and NEPA documents, and guides the development of conservation actions to support Executive Order 13186 (*Responsibilities of Federal Agencies To Protect Migratory Birds*), the associated Memorandum of Understanding with USFWS, and the Final Migratory Bird (“Readiness”) Rule. Table 7-3 lists the ten mission sensitive species that occur on Fort Belvoir.

Table 7-3: Fort Belvoir Birds of Management Concern						
Common Name	Scientific Name	USFWS <sup>1</sup> BCC	PIF <sup>2</sup> SOC	DoD <sup>3</sup> MSS	Season	Occurrence <sup>4</sup>
Bald Eagle	<i>Haliaeetus leucocephalus</i>	*			Year-round	Common
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	*	*	*	Breeding	One record in 20 years
Blue-winged Warbler	<i>Vermivora pinus</i>	*		*	Breeding	Not likely, annual migrant
Cerulean Warbler	<i>Dendroica cerulea</i>			*	Breeding	Not likely, near annual migrant
Fox Sparrow	<i>Passerella iliaca</i>	*			Wintering	Annual
Kentucky Warbler	<i>Oporornis formosus</i>	*	*	*	Breeding	Ten records in 20 years
Least Bittern	<i>Ixobrychus exilis</i>	*			Breeding	Two records in 30 years
Peregrine Falcon	<i>Falco peregrinus</i>	*			Wintering	Near annual
Prairie Warbler	<i>Setophaga discolor</i>	*	*	*	Breeding	Annual but declining
Prothonotary Warbler	<i>Protonotaria citrea</i>	*	*	*	Breeding	Annual but declining
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	*		*	Year-round	One breeding record, near annual winter resident
Rusty Blackbird	<i>Euphagus carolinus</i>	*		*	Wintering	Near annual
Short-eared Owl	<i>Asio flammeus</i>	*			Wintering	Not likely, possible in county
Willow Flycatcher	<i>Empidonax traillii</i>	*			Breeding	Possible, known in county
Wood Thrush	<i>Hylocichla mustelina</i>	*	*	*	Breeding	Common
Worm Eating Warbler	<i>Helmitheros vermivorum</i>	*			Breeding	Annual
Grasshopper Sparrow	<i>Ammodramus savannarum</i>			*	Breeding	Annual
Eastern Whip-poor-will	<i>Caprimulgus vociferus</i>		*		Breeding	Historic annual breeder but not in last nine years

<sup>1</sup>USFWS BCC = U.S. Fish and Wildlife Service, Birds of Conservation Concern 2008. Note – Bird list generated from IPaC 2017.

<sup>2</sup>PIF SOC = Partners In Flight, Species of Concern, Bird Conservation Region 30, 2016.

<sup>3</sup>DoD MSS = Department of Defense PIF Mission Sensitive Species DRAFT 2017.

<sup>4</sup>Occurrence = Derived from Fort Belvoir migratory bird survey data.

Figure 7.2 Fort Belvoir Breeding Birds of Management Concern, depicts those species documented during the breeding season that are on each of the following lists: USFWS Birds of Conservation Concern (BCC), PIF Species of Concern (SOC) BCR30, DoD PIF Mission Sensitive Species (MSS) as well as Fort Belvoir Habitat Indicator Species. A 500 foot buffer is established by the Fort Belvoir GIS and used to indicate the locations where the species have been documented and the potential for nesting and foraging areas. These buffers indicate suitable breeding habitat for the documented species and avoidance and/or mitigation for removal of habitat during mission activities (e.g., construction) is recommended. Some buffers have been altered or adjusted to incorporate habitat changes or less desirable habitat conditions.

In addition, PIF has identified monitoring and management recommendations for several species of common birds that are in steep decline. The following birds that have been found on Fort Belvoir fall into this category for BCR 30: chuck-will's-widow (*Caprimulgus carolinensis*), chimney swift (*Chaetura pelagica*), field sparrow (*Spizella pusilla*), northern bobwhite (*Colinus virginianus*), yellow-billed cuckoo (*Coccyzus americanus*), and common grackle (*Quiscalus quiscula*).

### **7.2.3 Reptiles**

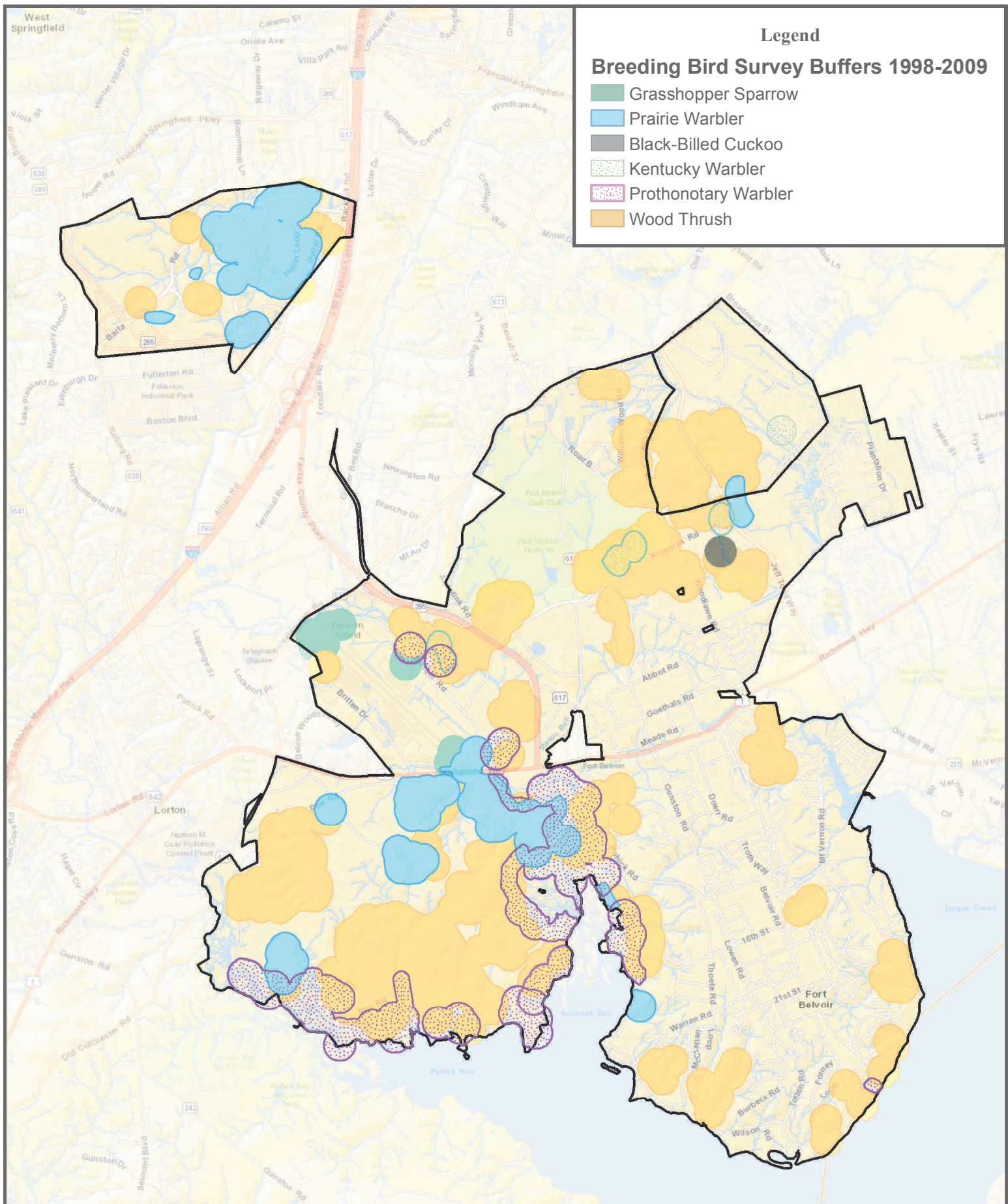
The reptile species present at Fort Belvoir have been well-documented through various field surveys (Table 7-2). The data provide an inventory of reptile species occurring or potentially occurring on the installation; however, study limitations preclude detailed abundance and distribution analysis. Data from these surveys have been incorporated into the installation GIS.

Thirty-four species of reptiles have been identified as occurring or likely to occur, on Fort Belvoir: 12 turtles, 18 snakes and four lizards. These species are all typical of the northern Virginia upper Coastal Plain, although several are at the limits of their ranges. Appendix I presents more specific information on the abundance of Fort Belvoir reptiles. The only venomous snake endemic to Fort Belvoir is the northern copperhead (*Agkistrodon contortix*), which occurs most often in moist deciduous/mixed woods, but is a habitat generalist.

The wood turtle, a state-listed threatened species, occurs at Fort Belvoir (Section 8.2.6). Several individuals of this species have been observed at various locations along the Dogue Creek and Accotink Creek drainages, indicating an on-post population. The spotted turtle, while abundant on Fort Belvoir, is decreasing throughout its range and as of April 2017 has been added to the National Listing Workplan to evaluate the species' need for federal protection.

Field observations indicate that turtles experience high mortality on post from motor vehicle impact and from predation. Raccoons, foxes, skunks, and snakes all prey upon turtle eggs. Young turtles are preyed upon by these animals, as



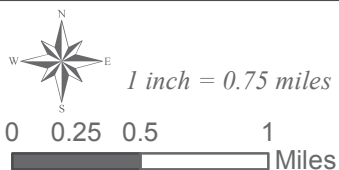


# **BREEDING BIRDS OF MANAGEMENT CONCERN ON FORT BELVOIR**

**Figure 7.2**

Source: Fort Belvoir GIS,  
Google road maps

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well as by predatory fishes and various birds. Turtles of all ages appear to be a major prey of raptors such as bald eagles.

#### **7.2.4 Amphibians**

The amphibian species present at Fort Belvoir have been well documented (Table 7-2). These studies have provided information on populations and distribution. Amphibian data have been incorporated into the installation GIS.

Twenty-seven species of amphibians have been identified as occurring, or potentially occurring, on Fort Belvoir: 12 frogs, three toads and 12 salamanders. Appendix I, presents more-specific information on the abundance of Fort Belvoir amphibians.

Amphibians have complex habitat requirements because of their dual life histories, living part of their lives in aquatic environments and part of their lives in terrestrial environments. The natural mosaic of aquatic and woodland habitats at Fort Belvoir, including the extensive wetland areas, woodlands traversed by extensive drainage systems, and ephemeral ponds (including man-made depressions, such as ditches and tire ruts along the unpaved training area roads) provide extensive areas of suitable amphibian habitat. Microhabitat conditions (e.g., extensive leaf litter, woodland debris, such as fallen logs, and undercut banks in the natural areas on-post) enhance the quality of this habitat. Fort Belvoir's relatively rich amphibian population is vulnerable to losses from predation, disease, climatic and/or physical land surface changes (e.g., development, loss of cover) that cause loss of surface waters or loss of natural ground-level humidity at the forest floor, fragmentation of habitat, and disruption of natural travel corridors.

#### **7.2.5 Fish**

A total of 65 species of fish have been identified using baseline fish surveys. The predominant groups of fish in Fort Belvoir waterways, both in numbers of species and in abundance are cyprinids (minnows) and centrarchids (sunfish). These two groups typically dominate eastern North American waterways (Ernst et al., 1995). Other dominant fish species in Fort Belvoir waterways are banded killifish (*Fundulus diaphanus*), yellow perch (*Perca flavescens*), white perch (*Morone americana*), and American eel (*Anguilla rostrata*). Minnows comprise the majority of the fish in all installation waterways during spring and summer, while killifish dominate in the fall. Sunfish, perch and American eel are abundant year-round, as are blacknose dace (*Rhinichthys atratulus*), rosyside dace (*Clinostomus funduloides*), creek chub (*Semotilus atromaculatus*) and tessellated darter (*Etheostoma olmstedii*). Shiners - spottail shiner (*Notropis hudsonius*) and spotfin shiner (*Cyprinella spiloptera*) are among the abundant fish species during the summer (EA, 1998; 1999b, c; 2000).

Two species of river herring - alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*) are documented to migrate up Accotink Creek and Dogue Creek during the spawning season although they do not appear to travel far up installation creeks (EA, 1999a; 2000). Alewives are the most abundant. Blueback herring were documented using installation creeks for the first time in 1999 (EA, 1999a). (Both are documented spawners in Gunston Cove [Jones and Kelso, 1998].) American and hickory shad (*Alosa sapidissima* and *Alosa mediocris*), while identified locally in the Potomac River, are more deep-water spawners and are not expected to occur in Fort Belvoir waterways. Gizzard shad (*Dorosoma cepedianum*), a semi-anadromous species, is another common spawner within Fort Belvoir waterways.

Long-term monitoring of Gunston Cove reveals the most abundant spawners to be river herring (alewife, blueback herring), gizzard shad, the semi-anadromous white perch and various sunfish (Jones and Kelso, 1998). Gunston Cove is recognized as a rich nursery area for these species. White perch is the dominant fish species of Gunston Cove over much of the year. Other abundant species within Gunston Cove include channel catfish (*Ictalurus punctatus*), spottail shiner, bay anchovy (*Anchoa mitchilli*), brown bullhead (*Ameiurus nebulosus*), pumpkinseed (*Lepomis gibbosus*), tessellated darter, yellow perch, inland silverside (*Menidia beryllina*), mummichog (*Fundulus heteroclitus*), and golden shiner (*Notemigonus crysoleucas*) (Jones and Kelso, 1998).

The fish community in Fort Belvoir waterways is a diverse assemblage, which is characteristic of Coastal Plain streams. The species of fish identified in the Fort Belvoir waterways and in Gunston Cove are typical in this region. Natural conditions dictate that the species must be tolerant of warm water, low baseline flow, silty/sandy substrate, instream snags/debris, and other conditions common to large, slow moving upper Coastal Plain streams that are fed by a network of small, short reaching tributaries. Fishes in these waterways must also be tolerant of conditions (e.g., dramatic, ongoing in-stream and bank erosion, siltation, sedimentation, etc.) caused by excessive/un-moderated stormwater flows from developed land areas both on and off the installation, as well as chemical inputs from surrounding urban development. Pohick Creek, in particular, is strongly influenced by the discharge of the Noman M. Cole, Jr. Pollution Control Plant located just outside the installation boundary. The fishes in these waterways are also subject to habitat changes caused by beaver activity. Nonetheless, the surveys did report that several species typical to Piedmont streams do occur in Accotink and Dogue Creek.

The smaller tributary streams surveyed during the baseline inventory reported a less diverse fish assemblage than that of the main installation waterways (EA, 2000). This is probably related to limitations in habitat availability (e.g., very small streams, lack of pools) in these small waterways, although there may be potential water quality problems influenced by stormwater or other inputs from

the installation. The results of the baseline inventory indicated the occurrence of a viable and substantial anadromous fish migration (especially the herring and perches) up both Accotink and Dogue Creeks (EA, 1999a; 2000).

There are no dams or obstructions within the three main creeks through Fort Belvoir that prohibit anadromous fish passage up Pohick, Accotink and Dogue Creeks through the installation (Figure 5.4). However a small concrete structure located along Dogue Creek just upstream of the U.S. Route 1 creek crossing (outside of Fort Belvoir boundary) does impede anadromous fish passage. The small size and the intermittent flow conditions of most of the small tributaries on Fort Belvoir preclude all but the smallest fish species. At several locations on the tributary waterways, excessive sedimentation at the mouth of the tributary, or culvert blockages, appear to preclude all fish passage (EA, 2000).

Sub-watershed 48 (also known as stream UN-1) (Figure 5.2) located in the southwest training area is unique for Fort Belvoir. This stream traverses a large undeveloped portion of Fort Belvoir and is not severely influenced by stormwater or other anthropogenic factors. The fish fauna of UN-1 contain healthy populations of American brook lamprey (*Lampetra appendix*). UN-1 is the only stream on post to yield eastern mudminnows (*Umbra pygmaea*) (EA, 1998; 1999b,c; 2000). Both of these species are indicators of good water quality and unaltered channels.

Fort Belvoir has very little permanent pond habitat. The only ponds (excluding beaver ponds) on post considered capable of supporting fish are (1) the less than one-acre pond at the North Post golf course; (2) the less than one-acre stormwater management pond at INSCOM; and (3) the two-acre Mulligan Pond at JMAWR. Ernst et al. (1995) reported that these ponds had been stocked in the past with sunfish, perch, or largemouth bass (*Micropterus salmoides*). An early spring fish survey of Mulligan Pond conducted in 1999 by the VDGIF found gizzard shad, largemouth bass, black crappie (*Pomoxis nigromaculatus*), common carp (*Cyprinus carpio*), and various sunfish (unpublished data). Neither of the other ponds have been surveyed within the past 25 years. However, in the summer of 2015 the INSCOM pond was drained for dam renovations. The renovation revealed a large number of sunfish and largemouth bass as well as channel catfish. The pond was seined to remove as many fish as possible and all fish were stocked into Mulligan Pond.

None of the fish identified in Fort Belvoir waterways or ponds have federal or state threatened or endangered designations. The only such species identified in this region is the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) and shortnose sturgeon (*Acipenser brevirostrum*), which occur in the deeper waters of the Potomac River. These species are not expected to occur within Fort Belvoir waters. One state species of concern, the bridge shiner (*Notropis bifrenatus*), has been identified in several locations in Accotink and Dogue Creeks. The bridge

shiner was more abundant in Accotink Creek where it was collected in various types of habitat (EA, 2000). This species is found in slow moving streams and creeks and it rarely enters tidal or brackish water.

In 2004 the invasive-exotic northern snakehead (*Channa argus*) was discovered in Virginia and is found in the Potomac River from the Great Falls area downstream to the Chesapeake Bay. Snakeheads have been found in all three main tributaries of Fort Belvoir (Accotink, Pohick, and Dogue Creeks). Data collected in 2014 suggests relative abundance had stabilized and even declined slightly in waters where populations have been established the longest. Through continued sampling and efforts to learn more about the ecology and biology, attempts are being made to determine what impacts, if any, are occurring to aquatic communities as a result of colonization (VA DGIF 2017a).

## **7.3 FISH AND WILDLIFE MANAGEMENT**

### **7.3.1 Wildlife Management Focus**

Fort Belvoir manages its fish and wildlife resources in accordance with the resource conservation and multiple use requirements of the Sikes Act, DoDI 4715.03, and AR 200-1 as well as the plans identified in the *Virginia Wildlife Action Plan of 2015* (VDGIF, 2015). Management actions to date have prioritized conservation of ecologically significant fish and wildlife resources, while supporting the military mission and providing public access to installation fish and wildlife resources (as long as the access is consistent with natural resource management objectives, military mission and operations and security requirements).

The *Virginia Wildlife Action Plan of 2015* identifies species that are critically imperiled or in decline in Virginia, and identifies strategies to conserve and restore these species. In addition to a statewide overview, the plan describes strategies for 21 planning regions that identify: local wildlife priorities, the habitats those species rely upon, threats impacting these species and their habitats, and conservation actions that can be taken to address those threats. For each planning region it also identifies priorities set for either conservation or restoration; programs working to address threats or define best management practices; and, data that could be used to document and evaluate the success of conservation actions. Lastly, the plan describes climate trends that have been projected for Virginia and identifies actions that can be taken to conserve wildlife under changing climatic conditions.

Fort Belvoir follows an ecosystem-based approach to fish and wildlife management. In establishing fish and wildlife management policies and identifying and selecting management actions, Fort Belvoir addresses the installation's biological resources in terms of their landscape setting (local,

regional, and national). Fort Belvoir's overall fish and wildlife management policies are to conserve and enhance healthy native fish and wildlife communities, rather than emphasizing single-species or game species management or production.

Fort Belvoir's management program recognizes the importance of understanding native habitats, and managing or responding to the forces that influence those habitats. Fort Belvoir's management program focuses on (1) conserving natural habitats in the size and configuration that best supports native fish and wildlife populations; (2) eliminating, minimizing, or offsetting habitat disruptions such as forest fragmentation, and damage by overabundant species; (3) enhancing habitat conditions for species and suites of species having recognized conservation priority, such as threatened, endangered, and species of concern; and (4) using indicator species to evaluate and set priorities for manipulation of habitat conditions.

Fort Belvoir's fish and wildlife management program stresses balancing public access to and use of fish and wildlife resources with preservation of functional ecosystems and the maintenance of military training and testing capacity. Public access to fish and wildlife habitats is provided in the three installation refuges and along much of the approximately 12 miles of the installation's shoreline. Fort Belvoir allows public access to these areas for a variety of non-consumptive recreational uses, such as wildlife viewing, hiking, and nature photography, as well as consumptive uses such as hunting and fishing (Sections 9 and 10).

### **7.3.2 Fish, Wildlife, and Habitat Management Actions to Date**

The following sections present specific information on Fort Belvoir's fish, wildlife, and habitat management actions to date (Table 7-4). Management actions for endangered and threatened species are addressed in Section 8. Figure 7.3 has the location of the PIF mitigation sites and Table 7-4 identifies the habitat, size, and whether the project was a NEPA mitigation or stewardship project. Management actions for the installation refuges and corridors are addressed in Section 9.0.



Table 7-4: Wildlife and Habitat Management Actions to Date							
Project	Location	Year	Species Benefitted	Acres Affected	Mitigation Stewardship/ Action	Mission Benefit	
Early Successional habitat creation	T-9 ABWR	2007, 2015	PIF-SOC, Early Successional wildlife, reptiles/amphibians	12 (2007) 35 (2015)	Mitigation-BRAC 2005, RPMP	Long Range antennae communication testing, Landing Zone Clearance	
Pine Thinning	T-8	2017	PIF-SOC, reptiles/amphibians	5.5	Stewardship	Land Navigation Course	
Early Successional habitat creation	FBNA	2017	PIF-SOC, reptiles/amphibians	10	Stewardship	Increasing Early Successional Habitat to meet INRMP goals	
Early Successional habitat creation	T6-B and W-1 ABWR	2010	PIF-SOC, early successional wildlife, pollinators	13	Mitigation-BRAC 2005	Maintenance of early successional habitat to meet INRMP goals	
Tree thinning, shrub and wildflower planting	W-1 ABWR	2005	PIF-SOC, early successional wildlife, pollinators	8	Stewardship-Legacy National Public Lands Day	Early successional habitat to meet INRMP goals	
Enlarged Culvert Installation	Pohick Road and Gunston Road FWC	2011	Large/ small mammals, reptiles/amphibians	N/A	Mitigation-BRAC 2005	Reduce wildlife/vehicle collision in support of INRMP goals	
Enlarged Culvert Installation	Jeff Todd Way (Mulligan Rd)	2013	Large/ small mammals, reptiles/amphibians	N/A	Mitigation-construction of Jeff Todd Way (Mulligan Rd)	Reduce wildlife/vehicle collision in support of INRMP goals	

<b>Table 7-4: Wildlife and Habitat Management Actions to Date</b>						
<b>Project</b>	<b>Location</b>	<b>Year</b>	<b>Species Benefitted</b>	<b>Acres Affected</b>	<b>Mitigation Stewardship/ Action</b>	<b>Mission Benefit</b>
Wildlife Crossing Structures	U.S. Route 1 and FWC	1994-present	Large/ small mammals, reptiles/amphibians, fish, birds	N/A	Mitigation-widening of U.S. Route 1 and FWC	Reduce wildlife/vehicle collision in support of INRMP goals
Native wildlife seed mixes	W-4, Mulligan Road landfill-FWC	2013	Grassland wildlife, pollinators	1	Stewardship-use of native wildlife seed mixes in lieu of fescue	Meet erosion and sediment (E&S) control requirements and in support of INRMP goals
Native wildflower seed mixes	W-3, Pohick Rd	2015	Pollinators	0.25	Stewardship-use of native wildflower mixes to benefit pollinators	Meet E&S control goals and in support of INRMP goals
Native wildlife seed mixes, tree planting	Fort Belvoir Community Hospital, Dental Clinic, North Atlantic Regional Medical Clinic	2012	Pollinators and meadow generalists	24	Mitigation-BRAC 2005	Obtain LEED Silver certification with U.S. Green Building Council and in support of INRMP goals
Understory creation	W-1, McCarty Trail-ABWR	2010	PIF-SOC and understory generalists	8	Mitigation-BRAC 2005	In support of INRMP goals

<b>Table 7-4: Wildlife and Habitat Management Actions to Date</b>						
<b>Project</b>	<b>Location</b>	<b>Year</b>	<b>Species Benefitted</b>	<b>Acres Affected</b>	<b>Mitigation Stewardship/ Action</b>	<b>Mission Benefit</b>
Native Warm Season Grass and small shrubs/trees planting	T-6B, W-1, and W-6-ABWR	2010	PIF-SOC and early successional wildlife, pollinators	3	Mitigation-BRAC 2005	In support of INRMP goals
Pine Thinning	W-5 & W-1 ABWR	1999	T&E Species- Bald Eagle	20	Stewardship	Support to T&E species- Bald Eagle
Early successional habitat, old-field grassland	W-6 ABWR	2003, 2010	PIF-SOC and early successional wildlife	1	Stewardship (2003)- Boy Scout conservation project, Mitigation (2010) BRAC 2005	In support of INRMP goals
Early successional habitat, old-field grassland	T-6B & T-8 ABWR and landfills	2014	PIF-SOC and early successional wildlife, pollinators	3.5	Mitigation-BRAC 2005	In support of INRMP goals
Wildflower meadows	JMAWR	2013	Pollinators	0.1	Stewardship-Eagle Scout project	In support of INRMP goals
Wetland planting/creation	Tompkins Basin	2012	Pollinators, reptiles/amphibians	0.1	Stewardship-Earth Day volunteers	In support of INRMP goals
Tree planting in bio-retention ponds	DFMWR-RV Travel Camp	2014-2016	Pollinators and water quality	1	Stewardship-Earth Day volunteers,	In support of INRMP goals

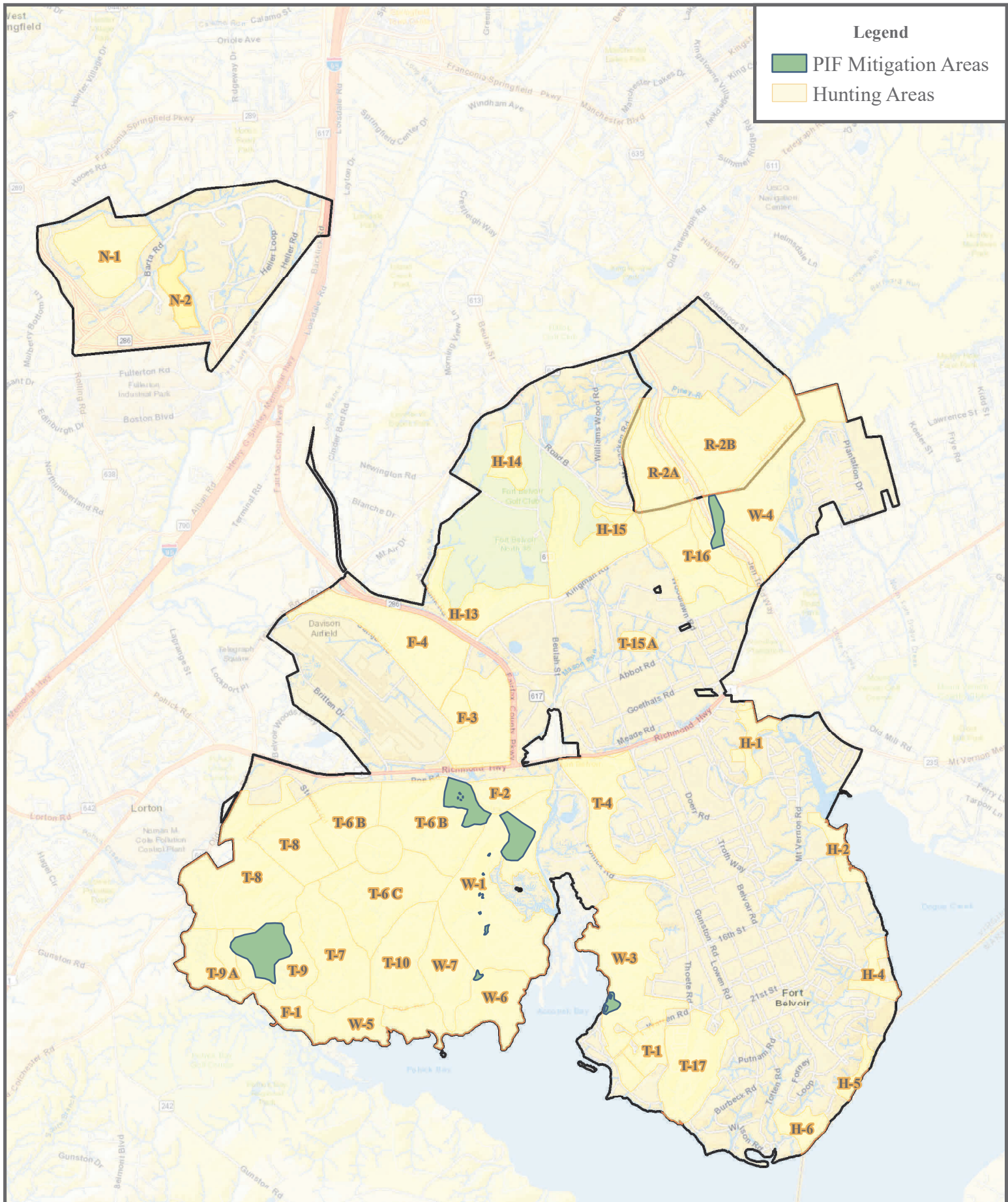
<b>Table 7-4: Wildlife and Habitat Management Actions to Date</b>						
<b>Project</b>	<b>Location</b>	<b>Year</b>	<b>Species Benefitted</b>	<b>Acres Affected</b>	<b>Mitigation Stewardship/ Action</b>	<b>Mission Benefit</b>
					Cub Scout group	
Early successional habitat, old-field grassland	W-3 Basin Trail, ABWR	2010	PIF-SOC, early successional generalists, pollinators	2.5	Mitigation-BRAC 2005	In support of INRMP goals
Early successional conservation areas	Fort Belvoir Golf Course complex	2002	PIF-SOC, early successional generalists, pollinators	5	Stewardship-Audubon Certified Gold Course	In support of INRMP goals
Early successional habitat	H-13, FWC	1996, 2014, 2015	PIF-SOC, early successional generalists	3	Mitigation-BRAC 1988, BRAC 2005	In support of INRMP goals and FWC Management Plan
Invasives Removal	T-17	2012	Native species	0.1	Stewardship-Legacy National Public Lands Day	In support of INRMP goals
Early successional habitat, Native Warm Season Grass seed mixes	FBNA	2010-2013	PIF-SOC, early successional generalists, pollinators	40	Mitigation-BRAC 2005	In support of INRMP goals
Invasives Removal, replanted native	Dogue Creek	2004	Native species	1	Stewardship-Legacy National Public Lands Day	In support of INRMP goals

<b>Table 7-4: Wildlife and Habitat Management Actions to Date</b>							
<b>Project</b>	<b>Location</b>	<b>Year</b>	<b>Species Benefitted</b>	<b>Acres Affected</b>	<b>Mitigation Stewardship/ Action</b>	<b>Mission Benefit</b>	
wetland plants							
Tree planting	Beulah Rd	2001	General wildlife and pollinators	0.5	Stewardship	In support of INRMP goals and FWC Management Plan	
Utility Right-of-ways - Native Warm Season Grass plantings	Installation wide	2011-present	Pollinators and open field grassland species	32+	Stewardship	In support of INRMP goals	
Removal of feral animals	Installation wide	On-going	Native species	N/A	Stewardship	In support of INRMP goals	
Wildlife disease monitoring and treatment	Installation wide	On-going	All fish and wildlife	N/A	Stewardship	In support of INRMP goals	
Problem and dangerous wildlife control	Installation wide	On-going	N/A	N/A	Trapping, removal, euthanasia	In support of INRMP goals and reduce risk to mission, health, life, and safety	
Wildlife population control	Installation wide	On-going	White-tailed deer, Canada geese	N/A	Hunting	In support of INRMP goals	
Partnering on regional fish and wildlife actions	Installation wide	On-going	White-tailed deer, anadromous fish, mast surveys	N/A		In support of INRMP goals	
Invasive Plant Removal	Installation wide	On-going	General wildlife	N/A	Stewardship	In support of INRMP goals, training, aesthetics	

Table 7-4: Wildlife and Habitat Management Actions to Date						
Project	Location	Year	Species Benefitted	Acres Affected	Mitigation Stewardship/ Action	Mission Benefit
Nest boxes and osprey platforms	Installation wide	On-going	Birds	N/A	Stewardship	In support of INRMP goals, volunteer utilization
Building design – windows, lighting	Installation wide	On-going	General wildlife, birds	N/A	Stewardship	In support of INRMP goals



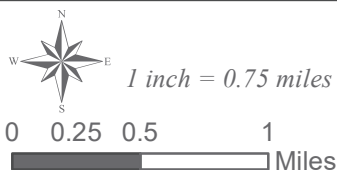
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# **PIF MITIGATION AREAS ON FORT BELVOIR**

**Figure 7.3**

Source: Fort Belvoir GIS,  
Google road maps,



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### **7.3.3 Mammal Management**

As documented through the baseline surveys, Fort Belvoir supports a fairly diverse mammal community. The baseline survey results indicate that the installation's mammal species are typical of the Northern Virginia area, and that these species appear to be present at the levels of abundance that one would expect for undisturbed habitat in this area. The baseline surveys do not indicate a need for any species or habitat-specific management recommendations for mammals.

The principal management need identified through the baseline surveys is the need to (1) preserve native wildlife habitat on Fort Belvoir, and (2) preserve wildlife movement/migratory corridors within and through the installation. Ernst et al. (1988) documented an area running from the northeast to the southwest through the installation that supported movement of mammals. This report also documented shorter, more localized wildlife movement routes along stream corridors within the installation. The results of this work led to the establishment of the Fort Belvoir FWC (Section 9.0). In addition to the establishment of the FWC, wildlife crossing structures were constructed throughout the installation to enable wildlife passage under roadways that traverse through and alongside the FWC (Figure 9-1).

#### **7.3.3.1 Deer Management**

Fort Belvoir recognizes that deer hunting is the only effective, practical and adaptive method available for deer population management. Consequently, Fort Belvoir is using deer hunting, through a bow hunting-only program, as the installation's primary deer management tool. Fort Belvoir uses regulated hunting to manage the effects of deer on other plant and animal communities, and to reduce urban (e.g., vehicle collision, landscape damage), ecosystem, forestry and other types of deer damage. Fort Belvoir's herd reduction goal, which is consistent with Virginia's Deer Management Plan (Deer Management Planning Committee, VDGIF, 1999) as well as the 2015-2024 Deer Management Plan (<https://www.dgif.virginia.gov/wildlife/deer/management-plan/>), is intended to manage deer at a level most compatible with local social, economic, political, and biological needs, and to preserve native wildlife habitat.

Fort Belvoir has participated in Virginia's Deer Management Assistance Program (DMAP) since 1987. This site-specific program allows more-liberal harvest of antlerless deer than what could be obtained under the existing system of regulations. Deer harvest levels at Fort Belvoir reached a peak in 1999 at 250, and have declined since then, and for the past 5 years have averaged 71. Exclusive use of archery tackle for hunting has proven effective in reducing the installation's deer population level. It is our intention to continue archery only hunting, increasing hunter success through the DMAP, and to continue to

reduce the population. This approach will meet safety constraints and maximize the recreational value of urban hunting.

Fort Belvoir supports periodic deer herd health checks by VDGIF. VDGIF undertakes herd health checks on a periodic basis or as needed. The most recent herd health check was undertaken in March 1999. The results indicated overall poor condition, which is typical in overpopulated areas (Lovelace, 1999). DPW-Environmental Division requested a herd health check in 2015, however, it was determined by VDGIF that a herd health check was not necessary because of the reduction in the deer herd combined with relatively healthy age/sex/weight ratios. In 1999, Fort Belvoir coordinated with VDGIF in responding to a statewide increase in epizootic hemorrhagic disease (EHD), and continues to monitor for such outbreaks as well as chronic wasting disease (CWD).

Deer can present a safety hazard to aircraft operations at Davison Army Airfield (DAAF). Since 1996, Fort Belvoir has operated under wildlife population control permits from VDGIF to remove deer or other wildlife from Davison Army Airfield as needed in response to airfield safety issues. This is covered in the Wildlife Hazard Management Plan (WHMP) for DAAF (Appendix G).

### **7.3.3.2 Mammal Species of Management Concern**

Raccoons are a species of management concern because of their association with rabies. In 1999, Fort Belvoir began participating in a program with Fairfax County to test the effectiveness of oral rabies vaccination on raccoons. Extensive data on raccoon population, movement, and health conditions were collected. Rabies vaccination baits were distributed on Fort Belvoir in the spring and fall of 2000, and in the spring of 2002. A post-treatment survey using trapping techniques indicated that 37% of the installation's raccoon population were successfully vaccinated after the spring 2000 distribution. A post-treatment survey for the fall 2000 distribution was conducted in winter 2000. A post-treatment survey in spring 2002 indicated 55% of trapped raccoons had detectable antibodies. It is expected that other species, such as striped skunk, red fox and gray fox (*Urocyon cinereoargenteus*) also received treatment; however, because these species were not target species in the study, they were not being evaluated in the post-treatment surveys.

Woodchucks are a species of management concern because of their potential for damage to structures, utilities and landscape materials. Fort Belvoir's management actions to date for woodchuck have been to trap and relocate within the installation boundary or euthanize individuals determined to be causing problems or posing safety risks.

Beavers are another species of management concern because of their ability to alter habitats and impact man-made structures. To date, Fort Belvoir's management approach for beaver has been to control the animal's activity rather



than control its population. Management actions are site-specific, such as installation of beaver guards on trees and on wildlife nest box structures to prevent gnawing, and installation of beaver guards on culverts to prevent damming, as well as removal of dam structures when appropriate. Various ecological surveys of Fort Belvoir caution that beaver have the potential to negatively impact habitat for several rare species and plant communities on post (Hobson, 1996; McCoy and Fleming, 2000). These surveys recommend monitoring beaver activity and undertaking control actions if necessary.

Other species of management concern because of their potential for disruption of installation activities or destruction of installation resources include the striped skunk, raccoon, house mouse, Norway rat and feral cats. Skunks, raccoons, and all other native mammals are handled on a case-by-case basis when they become a problem. Fort Belvoir also removes the house mouse and Norway rat as needed to control potential damage.

Feral cats pose a significant threat to native wildlife populations, and pose a safety hazard to installation personnel and their pets due to disease. Scientists estimate that hundreds of millions of birds and small wildlife are killed each year by free-roaming domestic cats (American Bird Conservancy, undated). DoD Instruction 4150.7-1 requires military facilities to use the Armed Forces Pest Management Board Technical Information Memorandum No. 37, *Guidelines For Reducing Feral/Stray Cat Populations On Military Installations in the United States*, as guidance for their feral cat programs. In accordance with this Memorandum, Fort Belvoir Regulation 40-905, *Animal Control* (U.S. Army, 2000c) prohibits the release of domestic animals on post and establishes guidelines for capturing and removing feral animals. This regulation applies to all persons residing on, employed by, serving on, or visiting Fort Belvoir, and it is enforceable by the Fort Belvoir Conservation Law Enforcement Officer and military police. Fort Belvoir's feral cat management to date has been to trap and remove feral cats from the wild. Individual feral cats that can be rehabilitated are put up for adoption; those that cannot are euthanized.

### **7.3.4 Bird Management**

DoD installations must ensure that INRMPs and their NEPA analyses adequately address migratory bird management and regulatory compliance issues.

Migratory birds are protected by a variety of laws and regulations, including the Migratory Bird Treaty Act (16 USC 703-712) and the Bald and Golden Eagle Protection Act. Any actions that result in the take (i.e., to "pursue, hunt, shoot, wound, kill, trap, capture, or collect" 50 C.F.R. § 10.12) of migratory birds or eagles is prohibited unless authorized by USFWS. In 2017 Fort Belvoir created a *Fort Belvoir Conservation of Migratory Birds Policy* Memorandum (Appendix C)



to conserve (avoid, minimize, and manage) migratory bird populations, specifically during construction and maintenance activities.

As of 1998, Fort Belvoir has conducted installation-wide bird monitoring. This effort has been extremely valuable in identifying and evaluating the bird species and their habitat associations at Fort Belvoir. The results of this survey effort document that Fort Belvoir supports a highly diverse bird community, including a significant number of bird species of management priority. The study results leave no doubt as to the high value of Fort Belvoir's natural habitat to migratory bird communities at the regional, national and international levels.

Until 1999, Fort Belvoir's bird-habitat enhancement actions were limited to installing and maintaining nest box structures (e.g., bluebirds, wood ducks, owls, kestrels, prothonotary warblers) and osprey nest platforms; converting manicured lawn areas to old field conditions; and using wildlife seed mixes when re-seeding disturbed areas such as utility rights-of-way and closed landfills.

In 1999, Fort Belvoir began coordination with the PIF program to develop specific management actions for PIF Species of Concern on post. The Avian Inventory, Monitoring, and Management report (Fischer et al., 1999, 2000) identified 10 high priority PIF bird species (now referred to as PIF Species of Concern) that breed on Fort Belvoir. These 10 species have varied habitat requirements. Some, like the wood thrush, require large tracts of undisturbed forest. Others, like the prairie warbler, require areas of early successional vegetation (i.e., a mix of grass with shrub/scrub woody vegetation). Management actions for forest dwelling species can be accomplished through the conservation of the large forest tracts presently occurring on Fort Belvoir and controlling fragmentation. However, management actions for the prairie warbler and other early successional dwelling species, require active management to maintain sufficiently sized areas of early successional vegetation. Since early successional vegetation is a transitional vegetation type, intervention is required to preclude this habitat type from being replaced by forest cover. While these management actions (i.e., conservation of interior forest habitat and maintenance of early successional habitat) have been selected to support PIF Species of Concern, Fort Belvoir recognizes that they will benefit other wildlife species on post. Consequently, Fort Belvoir uses three of the PIF Species of Concern as indicator species for the installation's wildlife management program.

The results of the bird surveys indicate that the cowbird, a nest parasite that poses a significant threat to nesting migrants including several of the PIF bird Species of Concern that breed on Fort Belvoir, occurs throughout the installation and extends into all forest tracts on post. Cowbirds benefit from fragmentation, which occurs throughout the installation. The installation bird surveys (Fisher et al., 1999) recommend eliminating excessive areas of fragmentation to control cowbird intrusion into the installation's forest tracts and to protect vulnerable migratory bird species from nest predation.

#### **7.3.4.1 Bald and Golden Eagles**

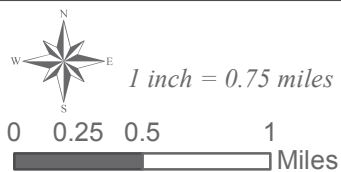
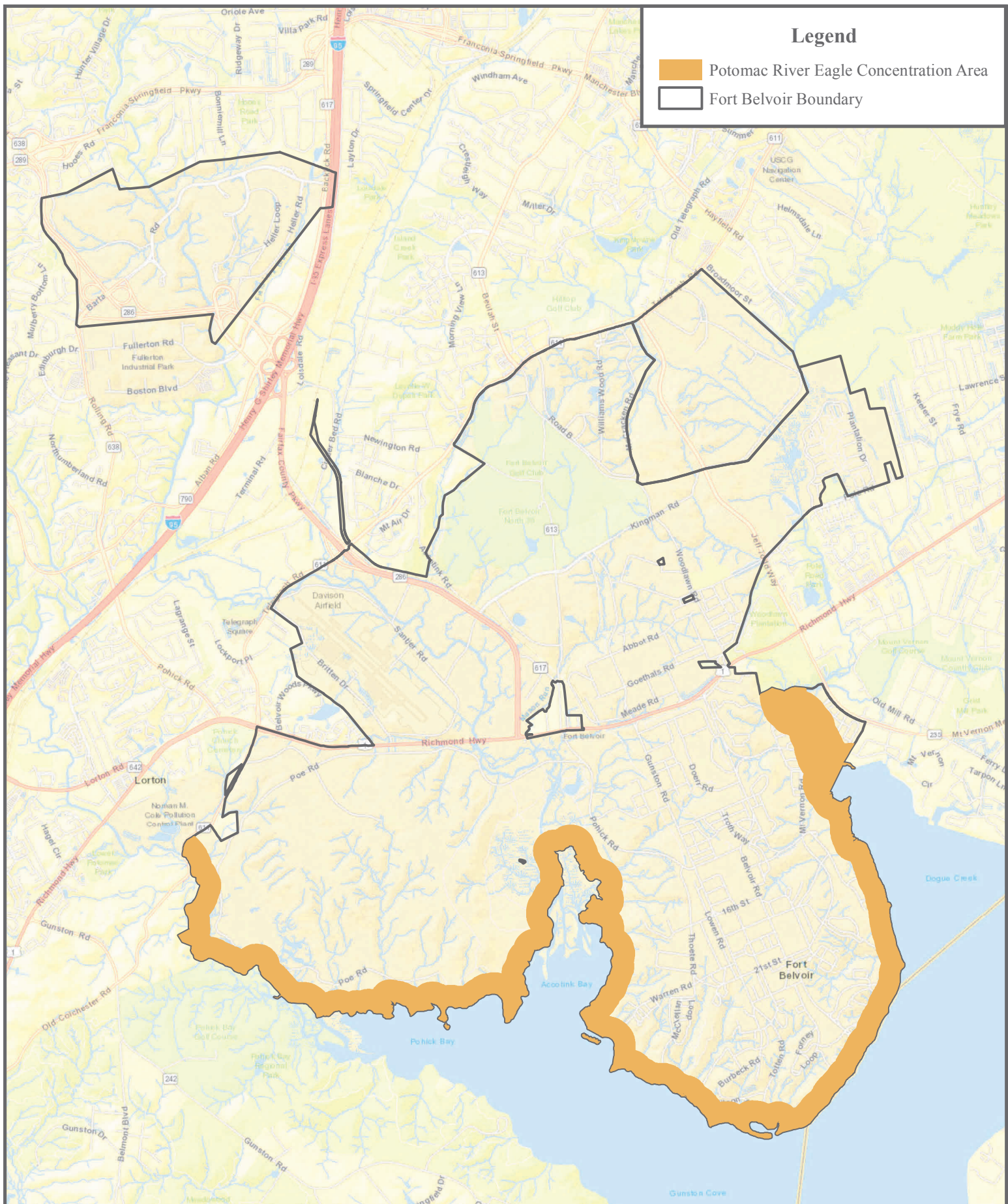
In the 20<sup>th</sup> century, the bald eagle was on the brink of extirpation in the contiguous U.S. By the latter part of the century, the population had recovered sufficiently for the bald eagle to be removed from the endangered list and placed on the threatened list (1995). Recovery continued, and the bald eagle was removed from the threatened list in 2007. Although no longer listed under The Endangered Species Act, the bald eagle remains (along with the golden eagle (*Aquila chrysaetos*)) protected under *The Bald and Golden Eagle Protection Act* (16 USC 668-668d).

Fort Belvoir's position along the Potomac River makes it an ideal location for nesting bald eagles (November to July) as well for foraging and roosting eagles, year-round. In 1990, after a multi-decade absence, a bald eagle nest was discovered on post. Fort Belvoir immediately developed and implemented the 1990 *Fort Belvoir Bald Eagle Management Plan* to protect those nesting bald eagles and their nest habitat. In 1997, in recognition of the high use of Fort Belvoir's shoreline by bald eagles year round, VDGIF added the installation shoreline to their designated Mason Neck Eagle Concentration Area (now known as the Potomac River Eagle Concentration Area). Fort Belvoir incorporated the shoreline habitat into a new *Fort Belvoir Bald Eagle Management Plan*, and included that plan as a component of the 2001 INRMP.

As of 2018, Fort Belvoir has 7 active bald eagle nests on post. The USFWS has included Fort Belvoir's shoreline in their designated Potomac River Eagle Concentration Area (the VDGIF eagle concentration area designations are no longer in existence), one of only 3 such designated eagle concentration areas in Virginia. Fort Belvoir has updated the Bald Eagle Management Plan in this INRMP (Table 7-5). Management actions are based upon the more than 2 decades of Fort Belvoir staff monitoring of bald eagles on post, and the Fort Belvoir-specific management guidance from Cline, 1996. Management also took into consideration guidance from the *Bald Eagle Management Plan*, *National Bald Eagle Management Guidelines* (USFWS, 2007) and *Communal Roosts in Virginia: A Guideline for Landowners* (VDGIF et al., 2012). Fort Belvoir's current Bald Eagle Management Plan retains the 750-foot shoreline buffer and nest buffer distances from the 2001 plan. The plan also retains nesting dates specific to documented bald eagle nests on post.

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# **BALD EAGLE MANAGEMENT AREAS ON FORT BELVOIR**

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**Figure 7.4**

Source: USFWS Bald Eagle Buffer,  
Google road maps

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<b>Table 7-5: Fort Belvoir Bald Eagle Management Actions</b>	
Shoreline habitat/eagle concentration areas	<ul style="list-style-type: none"> <li>• Perform seasonal foraging habitat surveys</li> <li>• Control invasive vegetation</li> <li>• Reduce electrocution hazards</li> <li>• Rotate waterfowl hunting zones</li> <li>• Eagle concentration areas – protect shoreline management zone by preserving a forested habitat (e.g., no clear cutting or construction) of up to 750 feet inland</li> <li>• Undertake a public information effort to protect eagles from disturbance by human activity</li> <li>• Develop and implement an eagle awareness-training program for installation personnel</li> <li>• Coordinate with USFWS and VDGIF regarding Potomac River eagle activity</li> </ul>
Nest Sites	<ul style="list-style-type: none"> <li>• Establish primary nest management zone at 750 feet radii, respectively, around active nests, and establish land use and activity restrictions (e.g., no clear cutting or construction within the primary zone; no human activity within the primary zone from November 15 through July 15).</li> <li>• Undertake a public information effort to protect eagle foraging habitat from disturbance by human activity.</li> <li>• Establish a rotary-wing flight zone of 500 feet above each nest site and prohibit flight within these zones during nesting season.</li> <li>• Protect active nest sites</li> <li>• Perform nest site and habitat surveys</li> <li>• Protect nest sites for up to 5 years of inactivity</li> <li>• Develop and implement an eagle awareness-training program for installation personnel</li> <li>• Coordinate with USFWS and VDGIF eagle nest location and activity</li> </ul>

The golden eagle has been observed at Fort Belvoir but with much less frequency. In the last 50 years it has been identified five times in the month of February. Those that were identified were normally present for at least a day but never more than three days. All sightings were in Accotink and Pohick Bays.

#### **7.3.4.2 Canada Geese**

Fort Belvoir has, as does all of northern Virginia, an overabundance of resident Canada geese. The ecological and societal problems resulting from an



overabundance of geese are well documented (Nelson and Oetting, 1998). At Fort Belvoir, geese can also present a serious threat to airfield safety at DAAF. In 1999, in coordination with DAAF, Fort Belvoir developed and implemented a goose hazard management program for the airfield. This program relied upon effective and successful harassment by trained border collies until 2009. Since 1999, the use of bird distress recordings, noise cannons, active harassment by DAAF staff, and habitat manipulation (e.g., maintaining tall grass along runway areas and eliminating open water areas within the airfield's wetland mitigation site) has served as an effective method to deter geese. In 2015 a Wildlife Hazard Management Plan (WHMP) for DAAF was developed to dictate roles/responsibilities of Fort Belvoir staff, identify hazards, and establish procedures found in Appendix G; Fort Belvoir Environmental Division is responsible for implementing wildlife management actions at the airfield. Control of geese elsewhere on the installation where they pose a problem (i.e., North Post golf course and Defense Logistics Agency Headquarters facility) is done through harassment by Fort Belvoir staff and contractors.

#### **7.3.4.3 Wild Turkey**

In 2000, at the request of the hunting community and with support from VDGIF, Fort Belvoir added wild turkey (*Meleagris gallopavo*) to the list of species that may be taken by bow hunting during deer season. VDGIF (Gary Norman, 2000) advised that the incidental harvest of wild turkey during the deer-hunting season with archery tackle was not considered to have an effect on turkey populations. VDGIF recommended that all hunters be required to record data from turkey sightings and from harvest, and submit it to the state. Although data from sightings are no longer required, Fort Belvoir does require hunters to submit harvest data. VDGIF also recommended re-evaluation of turkey hunting if the hunters were more successful than anticipated (Gary Norman, 2000). Since the creation of a fall and eventually a spring (2002) turkey hunting season, annual harvests have never exceeded 7 individuals. The taking of male turkeys have little to no effect on turkey populations. Turkey populations are dependent upon adequate nest cover, brood rearing cover, and successful hatch rates.

#### **7.3.4.4 Miscellaneous Bird Management**

Other than geese, bird problems during the past five years tend to be site-specific instances. While the DLA Headquarters building experienced a rock pigeon problem because the building's design included extensive ledge areas, most bird problem situations tend to occur when a bird enters an occupied structure, or constructs a nest on the ground in a high traffic area or on a structure where they interfere with installation operations. These instances are handled by protecting the area from disturbance until the hatchlings fledge or the nest is no longer active, or consulting with the USDA (who maintains depredation permits), to remove nests/birds as necessary and in accordance with federal regulations. There have been occasions when ospreys have constructed nests on facilities

and interfered with operations, or presented potential facilities maintenance risks. These situations are handled on a case-by-case basis, and have included removal of nest material during the non-nesting season, and the placement of nest excluders on structures to render the structures unsuitable for osprey nesting (e.g., erecting perch guards, placing nesting platforms adjacent to the electrocution hazard to avoid electrocution). In addition, in areas where high electrocution rates were occurring, electric lines were placed underground and osprey platforms were placed on the poles that had documented osprey electrocutions in these areas.

### **7.3.5 Reptile and Amphibian Management**

The results of the installation surveys indicate that Fort Belvoir possesses very diverse reptile and amphibian communities. The installation survey results emphasize the importance of Fort Belvoir's natural habitat to the conservation of these species. The surveys document how land areas like Fort Belvoir are becoming islands of habitat essential for their continued survival. Reptiles and amphibians, with their limited ranges and complex habitat requirements, are highly vulnerable to the effects of urbanization.

Nationwide, amphibians are recognized as a group of animals experiencing population declines. Additional studies are needed at Fort Belvoir to ascertain whether similar declines are occurring on post. Dr. Joseph Mitchell, University of Richmond, developed a survey protocol for monitoring amphibian populations, which might be appropriate to use at Fort Belvoir (Mitchell, 1998). In addition, a nationwide effort, Partners in Amphibian and Reptile Conservation (PARC), is underway to assess declines in all reptiles and amphibians, and uses the same approach as PIF in utilizing partnerships to more effectively approach conservation efforts.

At Fort Belvoir, the major threats to amphibians and reptiles are disease, habitat loss and fragmentation, and chemical exposures. Amphibians are particularly vulnerable to habitat fragmentation where it eliminates the connectivity among their varied habitat types. Amphibian survival depends upon continuity among wet habitats as well as between upland and wet habitats. Fort Belvoir recognizes the importance of preserving this interface of habitat types. Amphibians are also highly sensitive to environmental chemical contamination, given their physiology and close association with soils and water. Fort Belvoir controls the potential threats from pesticides by following an Integrated Pest Management program (U.S. Army, 2000b) (Appendix D). Another significant threat to amphibians is habitat disruption and degradation caused by stormwater management problems (e.g., sedimentation). Controlling this threat is a major factor in Fort Belvoir's stormwater management program (Section 5).

In 2015 Fort Belvoir began monitoring a reptile/amphibian crossing structure located along Pohick Road. The monitoring effort includes the placement of two motion detecting cameras on either side of the structure set to record migratory movements within the crossing. This project is currently underway with results anticipated to be reported in FY18. In 2017, Fort Belvoir began a reptile/amphibian monitoring project to include four reptile/amphibian call data loggers placed at various locations along transects to record auditory calls. Four transects were established, two that are 1000 meters and two that are 500 meters. Each transect contains survey points 50 meters apart and each point contains two different cover-boards (plywood and carpet), and every third point contains sheet metal as well. Cover-boards are currently being monitored for species abundance and material preference. This effort will be expanded in 2018 to include FBNA.

### **7.3.6 Fish Management**

Although Fort Belvoir does not manage fisheries towards any specific species or population level, the installation does routinely monitor aquatic resources through water quality analysis, institutional research (George Mason University), and through requirements associated with construction projects (wetlands delineation, stream assessments, etc.). The installation has undertaken several fish habitat improvement projects, most notably at Mulligan Pond.

Management is currently passive or as needed on the 3 ponds (Mulligan, North Post Golf Course, and INSCOM) and various streams located on Fort Belvoir. Baseline surveys have been conducted at Mulligan Pond and installation streams but all three ponds and all streams are in need of updating. Fish species and communities that have been found in the ponds and streams are typical of what to expect for the region, thus it has been determined that active management of specific species or communities is not warranted at this time. However, habitat management is of interest and actions such as erosion control, habitat structures, riparian tree plantings, and stream restoration projects are conducted regularly as needed and if funding and resources are available.

## **7.4 FISH & WILDLIFE MANAGEMENT GOALS, OBJECTIVES, AND STRATEGIES**

Fort Belvoir intends to continue the management emphasis and actions addressed in Section 7.3. Fish and wildlife management will continue to follow sound ecological principles to conserve natural resources. Continued support of military training and testing will take primacy. After that, management emphasis will be on conservation and enhancement of water resources in accordance with established DoD and DA natural resources management policies, as well as stewardship programs, such as PIF. Fort Belvoir will continue

to provide the public with opportunities to access installation fish and wildlife resources for recreation, and for conservation education and scientific research and study, consistent with resource conservation goals, and with military mission and operations and security requirements.

### **7.4.1 Projects**

Proposed activities that are considered Projects in this INRMP are activities that may potentially impact the environment and would need to be evaluated for the appropriate level of NEPA documentation. The following goals contain Projects within their objectives or strategies:

**Goal 1:** Continue to monitor and manage birds listed on the USFWS BCC, DoD PIF MSS, and PIF SOC.

- **Objective:** Reduce the decline of these species and their habitats because they have the highest potential to impact the military mission should they become federal or state threatened or endangered.
- **Strategy:** Monitor lists for species status changes and designations and adjust habitat projects and management plans accordingly.

**Goal 2:** Continue to maintain forested wetland habitat.

- **Objective:** To support a stable population of 5-8 pairs of prothonotary warblers and 75-100 pairs of Acadian flycatchers.
- **Strategy:** Identify and conserve existing forested wetland blocks to prevent loss and degradation.

**Goal 3:** Continue to maintain mixed bottomland and upland hardwood forest habitat.

- **Objective:** Support a population of 300 pairs of wood thrush.
- **Strategy:** Identify and maintain existing contiguous blocks of mixed bottomland and upland forest habitat.

**Goal 4:** Continue to maintain open grasslands.

- **Objective:** Support 10 pairs of grasshopper sparrows.
- **Strategy:** Identify, conserve, and/or create/maintain grasslands.

**Goal 5:** Continue to maintain early-successional/scrub-shrub habitat.

- **Objective:** Support 25 pairs of prairie warblers.
- **Strategy:** Identify, conserve, and/or create/maintain early-successional/scrub-shrub habitat.

**Goal 6:** Continue to reduce habitat fragmentation

- **Objective:** Manage small grassland areas (less than 20 acres in size), that are largely within the FWC or refuges, to re-establish later successional conditions to support shrub-dependent birds within the region.

- **Strategy:** Re-plant, or allow natural regeneration to occur, enabling the small, grassland patches to transition to early-successional/scrub-shrub habitat.

**Goal 7:** Continue to obtain scientific information on installation fish and wildlife resources

- **Objective:** Support our knowledge of biodiversity, to identify stressors and detect changes to biodiversity, and to evaluate effectiveness of management actions.
- **Strategy:**
  - 1) Update Planning Level Surveys (PLS) relevant to fish and wildlife management:
    - a) Update the herpetofauna PLS.
    - b) Update the fish PLS
    - c) Update the small mammal inventory
    - d) Perform fish and aquatic insect inventory of small installation streams
  - 2) Perform year-round surveillance (i.e., close observation in lieu of studies or monitoring projects of fish and wildlife conditions throughout the installation. This could include close observation, or monitoring, in lieu of detailed field survey.
  - 3) Perform insect and pollinator inventory and abundance survey.
  - 4) Develop and implement protocols for localized and/or issue-specific fish and wildlife surveys and studies as needed to support resource management, or for specific installation projects or mission activities.
  - 5) Coordinate with DCR-NHP and other entities regarding stewardship of fish and wildlife resources.
  - 6) Incorporate the location of habitat enhancement projects in the installation GIS.
  - 7) Perform an annual survey of a representative sample of habitat areas to assess changes, and to assess the success of management actions.
  - 8) Update and maintain baseline fish and wildlife information in installation documents, records, databases, GIS, etc.
  - 9) Identify opportunities for fish and wildlife habitat, and other, enhancement projects.
  - 10) Perform annual bird surveys.
  - 11) Perform annual bald eagle nest surveys and monitoring.

**Goal 8:** Continue to protect bald eagles habitat and protect bald eagles from disturbance.

- **Objective:** Avoid disrupting bald eagle use of installation areas.
- **Strategy:**
  - 1) Maintain designated shoreline buffer.

- 2) Reduce hazards/disruptions to eagle activity (e.g., remove electrocution hazards, control invasive vegetation).
- 3) Review and manage (e.g., schedule) installation activities (e.g., operations and maintenance, military training, recreation) to avoid potential impacts to bald eagles.
- 4) Maintain designated nest site buffers.
- 5) Educate and inform on-post personnel regarding eagle protection requirements.
- 6) Coordinate with USFWS, VDGIF, and DCR-NHP as required.
- 7) Monitor bald eagle presence and activity on post.

**Goal 9:** Continue to preserve wildlife movement/migratory corridors within and through the installation.

- **Objective:** Offset the ecological impacts of habitat fragmentation caused by major construction, by providing forest habitat connectivity through the installation.
- **Strategy:**
  - 1) Maintain continuous areas of natural forest habitat through Fort Belvoir, connecting with forested habitat off-post to the north and south, and facilitating wildlife movement through the installation.
  - 2) Re-plant disturbed areas within the FWC.
  - 3) Install and maintain wildlife crossing structures at roads through the FWC.

**Goal 10:** Continue to protect against loss of native diversity and ecosystem function of Fort Belvoir's fish and wildlife resources.

- **Objective:** Conserve and enhance areas of ecologically significant fish and wildlife resources as stipulated by regulatory requirement, mitigation commitment, or that have been prioritized for conservation, such as bald eagle.
- **Strategy:** Identify areas of ecologically significant fish and wildlife resources consistent with DoDI 4715.03 policy for designating specific areas of the installation that warrant species conservation as "Special Natural Areas" (Section 9) if consistent with military mission. Maintain designation of these areas as environmentally constrained to development in the RPMP, and as warranting conservation commitments in other installation plans and documents. Designate new Special Natural Areas where legally obligated to do so.

**Goal 11:** Continue to emphasize fish and wildlife species that have been prioritized for conservation by federal and state statute or regulation, DoD or DA policy, DoD partnered programs, State Natural Heritage Program, or through recognized importance to regional ecosystem function when making fish and wildlife management decisions.



- **Objective:** Use these species as habitat indicator species for the development and implementation of habitat enhancement projects, consistent with the principles of ecosystem management.
- **Strategy:** Maintain current lists of fish and wildlife species as prioritized by regulations and recommendations.

**Goal 12:** Continue to conserve and enhance native fish and wildlife habitat conditions.

- **Objective:** Ensure habitat areas are sufficiently sized and positioned, and possess the appropriate conditions to support healthy, self-sustaining native fish and wildlife populations.
- **Strategy:** Maintain and perform habitat and vegetation assessments every 5 years. Identify and execute habitat improvement projects for species of management priority (e.g., chimney cap removals to support chimney swift, timber stand improvements to establish early successional habitat, etc.).

**Goal 13:** Continue to maintain appropriate fish and wildlife populations in an urban setting.

- **Objective:** Protect the military mission and public from hazard or disturbance by fish and wildlife, by reducing the number of human-wildlife conflicts.
- **Strategy:** Perform fish and wildlife population and hazard assessments, determine and engage appropriate management measures based upon species and associated hazards. Review and respond to requests by military and public regarding fish and wildlife hazards.

**Goal 14:** Continue to provide opportunities for public access to fish and wildlife by all persons.

- **Objective:** Promote consumptive and non-consumptive recreation, environmental education and study consistent with resource conservation.
- **Strategy:** Identify areas of the installation that are appropriate for consumptive and non-consumptive recreation, environmental education and study consistent with resource conservation. Review and respond to requests by the military and public for access to/use of wildlife resources for expansion of consumptive and non-consumptive recreational opportunities (e.g. hunting, fishing, bird watching, wildlife art, etc.)

**Goal 15:** Continue to control threats to native fish, wildlife, and associated habitats.

- **Objective:** Protect, conserve, and maintain native fish, wildlife, and associated habitats and prevent displacement of native plants, and consequent impacts on native fish, wildlife, and associated habitats.

- **Strategy:**

- 1) Implement actions to monitor and control invasive species, conserve wetlands and riparian forest buffers, implement watershed conservation and restoration actions, incorporate fish and wildlife considerations into grounds maintenance and forest management, monitor and control wildlife that cause significant habitat destruction/degradation.
- 2) Manage pesticide use in accordance with the Fort Belvoir Integrated Pest Management Plan.
- 3) Implement efforts to avoid native fish and wildlife habitat loss or fragmentation when planning and constructing new facilities on post.
- 4) Use the installation project/activity review processes to incorporate wildlife conservation requirements as appropriate into all phases of facilities planning, construction, renovation, operation, maintenance and demolition activities; in reviewing and supporting military training and testing activities; and, in reviewing and responding to outdoor recreation, environmental education, scientific research and study, and all other types of access and use requests.
- 5) Review and revise, as needed, the Fort Belvoir *Policy Memorandum #28, Environmental Policy* (Appendix C), applicable to construction projects to ensure that they include fish and wildlife protection provisions. Develop recommendations to revise the Fort Belvoir Installation Design Guide to include fish and wildlife sensitive facilities siting, design and construction considerations.
- 6) Classify open/undeveloped installation areas by their suitability for development and recreation based upon sensitivity and value to fish, wildlife, and associated habitat. This system would identify areas that would least harm Fort Belvoir's fish and wildlife resources if they were to be developed and/or used for recreation. Incorporate fish, wildlife, and associated habitats protection strategies into utilities privatization, and all other privatization and outsourcing actions, as appropriate.
- 7) Review and revise as needed the Fort Belvoir environmental protection specifications applicable to construction contracts to ensure that they include appropriate fish and wildlife protection provisions.

**Goal 16:** Continue to identify and incorporate fish and wildlife habitat enhancement procedures in installation operations.

- **Objective:** Enhance broad fish and wildlife habitat conditions.
- **Strategy:** Use native wildlife seed mixes for re-seeding disturbed areas as appropriate, and reduce the location and frequency of mowing and grounds maintenance activities. Remove abandoned impervious surfaces and replant with native, wildlife-friendly species. Use native plants to enhance vegetation within disturbed riparian areas. Replant disturbed areas within the FWC to enhance forest cover conditions.

**Goal 17:** Continue to maintain all installation wildlife crossing structures and identify locations in need of crossing structures.

- **Objective:** Maintain these structures free of impediments to fish and wildlife movement and install new crossings where needed.
- **Strategy:** Create Internal Job Orders (IJOs) and/or Service Orders for the maintenance and upkeep of wildlife crossing structures and coordinate the installation of new structures in current and future construction projects when practical.

**Goal 18:** Continue to evaluate the effectiveness of Fort Belvoir's existing nest box program.

- **Objective:** Determine whether the program should be continued, modified, or terminated.
- **Strategy:** Develop recommendations for volunteer projects to assume responsibility for nest box maintenance and data gathering.

**Goal 19:** Continue to evaluate and correct hazards to fish and wildlife.

- **Objective:** Reduce and/or eliminate hazards to fish and wildlife.
- **Strategy:** Remove/reduce fish and wildlife hazards where appropriate to include but not limited to electrocution hazards, fence hazards, window hazards, lighting, etc. Coordinate with Master Planning and Engineering Divisions of DPW, utility companies, and consult the Fort Belvoir Installation Design Guide.

**Goal 20:** Continue the Fort Belvoir hunting and fishing program.

- **Objective:** Reduce and stabilize white-tailed deer population and maintain herd health.
- **Objective:** Continue to provide access to consumptive recreation such as fishing, turkey hunting, and waterfowl hunting.
- **Strategy:** Participate in the VDGIF DMAP program, perform biological/harvest data collection in support of the program, perform annual population census via spotlight survey, support VDGIF on herd health checks when appropriate, support Veterinarian Services in disease data collection, collect road kill data when practical, coordinate with VDGIF regarding other types of data collection as appropriate, set hunting season dates and harvest limits in coordination with VDGIF established season dates and harvest limits.
- **Strategy:** Maintain management of the hunting and fishing programs using the iSportsman access software.

**Goal 21:** Continue feral cat control in accordance with DoD, DA, and Fort Belvoir policy.

- **Objective:** Reduce and eliminate the release of feral cats into the wild.

- **Strategy:** Removal of feral cats from the wild by the installation Pest Manager or Pest Management Contractor, prohibit the establishment and maintenance of feral cat colonies by any organization or individual.

**Goal 22:** Continue to support regional efforts to monitor and control wildlife diseases, as practical.

- **Objective:** Control, reduce and/or minimize the outbreak and spread of wildlife diseases at the local, regional, and national level.
- **Strategy:** Maintain the most current information and monitoring of diseases to include but not limited to West Nile Virus, Chronic Wasting Disease (CWD), Epizootic Hemorrhagic Disease (EHD), rabies, etc.

**Goal 23** Continue to manage Mulligan Pond as fish habitat.

- **Objective:** Maintain Mulligan pond as a healthy, sustainable native warm-water fishery and provide consumptive and non-consumptive recreational opportunities.
- **Strategy:** Remove undesirable species, perform fish habitat improvements, control bank erosion, plant riparian vegetation, install habitat structures, and protect plantings from damage/loss to beavers. Consider programs for stocking.

**Goal 24:** Continue to reduce mowing, seasonally restrict mowing, and plant Native Warm Season Grass (NWSG) and wildflowers.

- **Objective:** Promote pollinators and improve habitat for wildlife.
- **Strategy:** Encourage the real property maintenance contractor and utility managers to reduce mowing and plant NWSG when applicable. Place restrictions on grassland and early-successional/scrub-shrub management activities during April-July to protect birds during the nesting season.

## 7.4.2 Actions

Actions are those activities that do not require ground breaking or environmentally altering activities. The following goals include Actions in their objectives and strategies:

**Goal 25:** Continue to coordinate with federal, state, and local agencies, and other entities, as appropriate, regarding fish and wildlife management.

- **Objective:** Foster consistency in goals and management actions for fish and wildlife.
- **Strategy:** Identify and coordinate with appropriate agencies and entities.

**Goal 26:** Continue to designate installation areas as open or closed to hunting, fishing and/or recreation in support of the military mission.

- **Objective:** Specify area restrictions as needed for safety or resource protection considerations.

- **Strategy:** Use current and former fish and wildlife surveys and data to specify area restrictions when applicable.

**Goal 27:** Continue to coordinate with USFWS under the Sikes Act and the Fish and Wildlife Coordination Act. Continue to coordinate with VDGIF under the Sikes Act, and state wildlife regulations.

- **Objective:** Maintain compliance with state and federal laws and regulations.
- **Strategy:** Maintain up-to-date policies and procedures regarding the management of fish and wildlife. Obtain and maintain all necessary fish and wildlife permits from state and federal agencies when applicable and perform all reporting requirements of these permits.

**Goal 28:** Continue to participate in regional and national level fish and wildlife conservation programs, such as PARC, PIF, and Chesapeake Bay Program.

- **Objective:** Remain current on all policies, research, and development as they pertain to each program's area of expertise.
- **Strategy:** Develop, maintain, and engage in communication with the programs as well as participate when applicable.

**Goal 29:** Continue to respond to requests for technical information from on-post and off-post entities, as appropriate.

- **Objective:** Provide public access to natural resources information, as appropriate.
- **Strategy:** Respond to requests for information, as appropriate.

**Goal 30:** Continue to manage natural resources information so it is accessible to, and usable by, installation natural resources managers

- **Objective:** Develop and implement a fish and wildlife database
- **Strategy:**
  - 1) Develop a system for storing data so that it is accessible for use.
  - 2) Enter electronic data.
  - 3) Scan and upload paper records.

**Goal 31:** Continue to issue installation-specific policies and guidance documents regarding conservation policies.

- **Objective:** Provide direction and guidance for projects and mission activities that may impact fish and wildlife resources.
- **Strategy:** Review and revise, as necessary, the *Fort Belvoir Conservation of Migratory Birds Policy* memorandum; the *Watercraft Recreation, Hunting and Fishing Policy* memorandum; the *Fort Belvoir Animal Control Regulation*; and the *Pet Control on Post Policy* memorandum, and any other documents, as needed.

**Goal 32:** Continue to enforce federal and state laws and regulations applicable to Fort Belvoir, as well as DoD, DA and Fort Belvoir natural resources policies.

- **Objective:** Ensure Fort Belvoir remains in compliance with all applicable fish and wildlife laws and policies.
- **Strategy:** Perform fish and wildlife compliance inspections. Perform inspections in support of enforcement actions.

**Goal 33:** Continue to provide technical assistance in emergency situations, such as injured wildlife.

- **Objective:** Ensure emergencies are responded to while meeting regulatory requirements.
- **Strategy:** Inspect, provide guidance, and provide assistance.

**Goal 34:** Continue an educational outreach program to highlight fish and wildlife management and conservation.

- **Objective:** Increase the level of education and awareness for the on-post public.
- **Strategy:**
  - 1) Develop field educational materials and/or field trips similar to a living classroom that can be used by schools and other large groups as appropriate, and to educate the general public.
  - 2) Write and publish articles on fish and wildlife
  - 3) Identify and provide opportunities for specialized training in conservation for garrison, partner, tenant and contractor personnel, as appropriate.
  - 4) Participate in educational and service events pertaining to fish and wildlife.

**Goal 35:** Continue as a responsible party in the DAAF Wildlife Working Group (WWG).

- **Objective:** Maintain working relationship with DAAF WWG and meet all roles and responsibilities as defined by the DAAF WHMP.
- **Strategy:** Attend semi-annual WWG meetings and retain open lines of communication with WWG.



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## 8.0 ENDANGERED, THREATENED AND RARE SPECIES

Within the U.S., federal land holdings such as DoD installations play a key role in the protection and restoration of declining species. The DoD has demonstrated that it is possible to manage its lands to support the military mission while promoting species protection/restoration. DoD's shift in focus in the 1990s toward ecosystem management provides greater protection for declining species. Leslie (1996), *Conserving Biodiversity on Military Lands: A Handbook for Natural Resources Managers*, provides guidance and tools for natural resource managers on DoD installations to conserve ecosystems and rare species while maintaining military readiness.

Under the Endangered Species Act of 1973 (ESA), plant and animal species in danger of extinction throughout all or a significant part of their range are listed as endangered. Species that are likely to become endangered within the foreseeable future throughout all or a significant part of their range are listed as threatened. Endangered and threatened listings impart protective status to the listed species and their habitats. Additional designations under the ESA include proposed endangered and proposed threatened statuses, for species awaiting additional data to determine the need for listing. The ESA also includes candidate species, where the data support a species listing, but the listing procedure has been delayed. Additionally, the USFWS has a category for species under consideration for listing and species on the National Listing Workplan (NLW), and the Army maintains a listing of species considered at risk for listing ("Army Species at Risk" (ASAR)). While NLW and ASAR listings do not impart any legal protective status, they do require additional management considerations and resources to avoid emergency protection under the ESA.

In addition to federal protections, many states have endangered species legislation that provide protection status for threatened and endangered species vulnerable to extinction at the state level. Species that are protected under the federal ESA are also provided Endangered Species Act protection on the state level. States also have Natural Heritage Programs that maintain listings and rarity (i.e., conservation) rankings of rare plant and animal species, and ecological communities. Unlike endangered and threatened listings, rare species listings and their rankings are not legal designations, and do not provide any protective status. They are used to prioritize resources for conservation. Department of Conservation and Recreation Natural Heritage Program (DCR-NHP) rates individual species and communities with resource conservation rankings from S1 (extremely rare) to S5 (very common). Table 8-1 summarizes species that are potentially found on Fort Belvoir and their federal, state, NLW, and ASAR status.

**Table 8-1: Species documented or potentially occurring on Fort Belvoir with federal, state protection or on the USFWS National Listing Workplan or identified by Army as Species at Risk for Listing**

Species	Scientific Name	Federal	State	NLW	ASAR
Small whorled pogonia	<i>Isotria medeoloides</i>	Threatened	Endangered		
Northern long-eared bat	<i>Myotis septentrionalis</i>	Threatened	Threatened		
Tricolored bat	<i>Perimyotis subflavis</i>		Endangered	X	
Little brown bat	<i>Myotis lucifugus</i>		Endangered	X	
Peregrine falcon	<i>Falco peregrinus</i>		Threatened		
Wood turtle	<i>Glyptemys insculpta</i>		Threatened	X	
Spotted turtle	<i>Clemmys guttata</i>			X	
Northern Virginia well amphipod	<i>Stygobromus phreaticus</i>			X	X
Tidewater amphipod	<i>Stygobromus indentatus</i>			X	
Monarch butterfly	<i>Danaus plexippus</i>			X	
Rusty patched bumble bee	<i>Bombus affinis</i>	Endangered			
Atlantic Sturgeon	<i>Acipenser oxyrinchus</i>	Endangered	Endangered		

Source: U.S. Fish and Wildlife Service, 2018. Virginia Department of Game and Inland Fisheries, 2018

## **8.1 ENDANGERED, THREATENED, AND RARE SPECIES POLICIES**

### **8.1.1 Federal Endangered, Threatened, and Rare Species Policies**

- ***Endangered Species Act (16 USC §§ 1531-1543)***

The Endangered Species Act of 1973 was enacted to protect plant and animal species considered to be in danger of extinction. The Act affords legal protection to species listed as endangered and threatened, including protection of their habitats. The USFWS makes the listings (as well as down-listings and de-listings) of endangered and threatened species on the basis of the species population, its biological vulnerability and threats to its survival. The USFWS also develops and implements recovery plans for listed endangered species. The Endangered Species Act establishes the federal government's responsibility for protection and recovery of species considered to be in danger of extinction. The act requires federal agencies to collaborate and undertake proactive actions to protect and restore populations of listed threatened and endangered species, and to prevent proposed and candidate species from being listed.

- ***The Fish and Wildlife Coordination Act (16 USC 661 et seq.)***

This Act includes provisions for the protection of bald and golden eagles (Chapter 5A, subchapter II) and endangered species of fish and wildlife (Chapter 5A, subchapter III).

- ***The Sikes Act (16 USC Section 670a, et seq.) as amended in the Sikes Act Improvement Act of 1997***

This act directly requires conservation and management of fish and wildlife on DoD installations. The Sikes Act authorizes the Secretary of Defense to (1) carry out a program for the conservation and rehabilitation of natural resources on military installations, and (2) prepare an INRMP in cooperation with the USFWS and state fish and wildlife agencies. The Sikes Act requires the INRMP to reflect the mutual agreement of the parties [USFWS and state fish and wildlife agencies] concerning conservation, protection, and management of fish and wildlife resources.

### **8.1.2 State Endangered, Threatened, and Rare Species Policies**

The Commonwealth of Virginia has two state endangered species acts that were enacted to protect plant and animal species from extinction at the state level. These acts are used for guidance when addressing mitigation and stewardship so as not to further imperil those species listed at the state level. Species listed at the state level have the potential to become federally listed thus affecting mission.

- ***Code of Virginia, § 29.1***

This Act, administered by the Virginia Department of Game and Inland Fisheries (VDGIF), addresses fish and wildlife, excluding insects.

- ***Code of Virginia, §§ 3.1***

This Act, administered by the Virginia Department of Agriculture and Consumer Services (VDACS) addresses plants and insects.

### **8.1.3 Department of Defense Endangered, Threatened, and Rare Species Policy**

- ***Natural Resources Conservation Program (DoDI 4715.03)***

DoD's natural resources management policy and instruction requires installations to follow an ecosystem-based approach to natural resources management using adaptive management of natural resources, to inventory and protect important biological resources, and to promote biodiversity, while being able to provide continued access to installation air, water and land for realistic military training and testing. The instruction also allows for multiple uses of an installation's natural resources, and for public access to these resources for recreation, education, and scientific research and study, compatible with the installation's ecosystem management goals and military mission. The instruction also instructs installations, to the best of their ability, implement conservation and management efforts to further the conservation of federal endangered and threatened species, as well as State endangered and threatened species when such action is practicable and does not conflict with military mission or capabilities.

### **8.1.4 Department of the Army Endangered, Threatened, and Rare Species Policy**

- ***Environmental Protection and Enhancement (AR 200-1)***

This regulation covers environmental protection and enhancement and provides the framework for the Army Environmental Management System.

AR 200-1 implements Federal, State, and local environmental laws and DoD policies for preserving, protecting, conserving, and restoring the quality of the environment. AR 200-1 also establishes the Army's commitment to carry out mission and program requirements that are consistent with the requirements of the Endangered Species Act, be sensitive to those species listed as endangered or threatened under state law, and prepare endangered species management plans for listed and proposed species. Excerpts from AR 200-1, follow.

**Excerpts from AR 200-1 as Applicable to Endangered, Threatened, and Rare Species**

- Planning level surveys must include a survey that maps and shows occurrence, habitat distribution, and habitat management areas of federally endangered, threatened, proposed, candidate, and species at risk occurring on the installation.
- Prepare and implement an Endangered Species Management Component (ESMC) to the INRMP consistent with current policy and guidance.
- Carry out mission requirements in compliance with 16 USC 35.
- Integrate endangered species management and installation planning functions to ensure compliance with 16 USC 35.
- In accordance with ACSIM guidance, take appropriate actions to preclude critical habitat designation.
- Assess all activities (to include Military Construction (MILCON)) at the earliest opportunity to determine whether they may affect listed species or critical habitat.
- Coordinate threatened and endangered species actions or issues with ACOM, ASCC, and DRU commanders and other tenants that may be affected by them.
- Conduct biological assessments for activities that may have an effect on listed species or critical habitat where they are present or may be present in the action area.
- Informally or formally consult with the USFWS or NOAA-Fisheries and document results in writing, and conduct a biological assessment or evaluation to assess whether an action may affect a listed species or critical habitat.
- Confer with the USFWS and NOAA-Fisheries on any action that is likely to jeopardize the continued existence of any proposed species or result in the destruction or adverse modification of proposed critical habitat.
- Participate in listing/delisting process, recovery plan, and critical habitat designation where the species in question may impact installation military missions.



- In accordance with ACSIM guidance, manage species at risk and habitats to prevent listing that could affect military readiness.
- Implement management plans for species at risk to include, but not limited to, surveying, monitoring, habitat enhancement, and protection.

### **8.1.5 Fort Belvoir Endangered, Threatened, and Rare Species Policy**

Fort Belvoir does not have an over-arching endangered, threatened and rare species policy other than the policy specified in this INRMP. Fort Belvoir has a *Memorandum of Instruction – Northern Long-eared Bat Protection on Fort Belvoir*. (Appendix \_L)

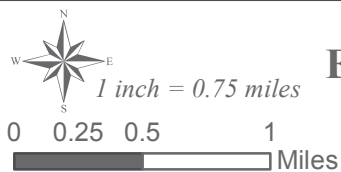
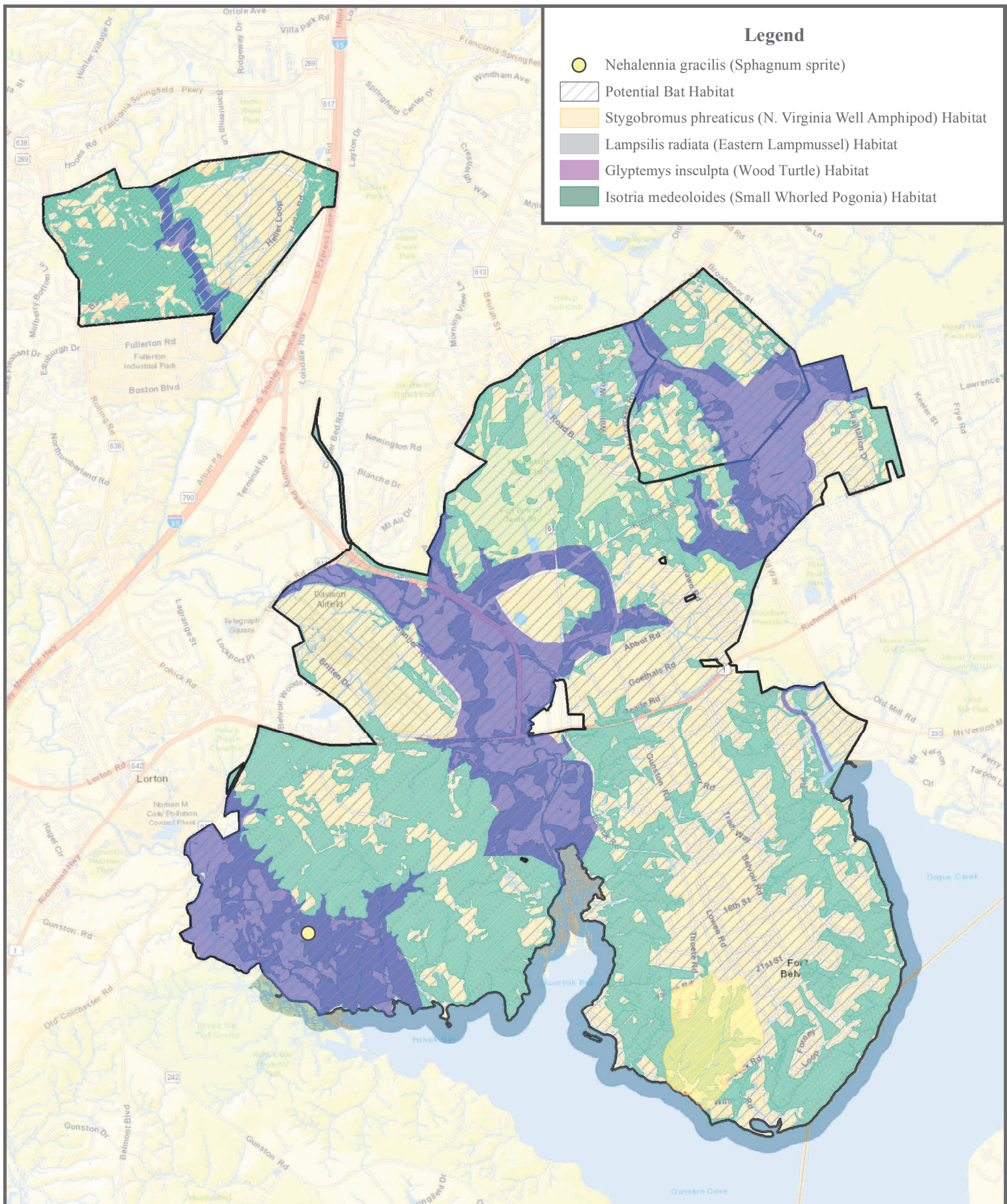
## **8.2 ENDANGERED, THREATENED, AND RARE SPECIES MANAGEMENT**

The foundation of Fort Belvoir’s endangered, threatened and rare species management is habitat conservation, consistent with the conservation recommendations of DCR-NHP (McCoy and Fleming, 2000; Hobson, 1996; 1997, 2013). Much of the installation’s habitat for federal threatened species and state threatened or endangered species, as well as the rare wetland community types, and their associated rare plant and animal species, are contained within the designated “Special Natural Areas” (Section 9). The Fort Belvoir RPMP designates these areas (the three installation refuges and the two installation corridors) as well as wetlands and steep-sloped areas outside the boundaries of the Special Natural Areas, as environmentally constrained areas. Such conservation land-use designations protect the habitat in these areas from loss to development or land disturbing training activities.

Fort Belvoir also addresses conservation and enhancement of native biodiversity within ecological communities by identifying and controlling threats from invasive/exotic species and from stormwater-related problems (Sections 6 and 5, respectively).

Information on endangered, threatened, and rare plant and animal species, and rare ecological communities of Fort Belvoir has been obtained through various surveys. The results of these surveys have been incorporated into the installation GIS (Figure 8.1).

In 1996-1997, and in 2011-2013 DCR-NHP completed multi-year natural heritage inventory surveys (Hobson, 1996; 1997, 2013) (Appendix K). The purpose of these inventories was to systematically identify the installation’s natural heritage resources: those sites supporting unique or exemplary natural



## ENDANGERED, THREATENED, AND RARE SPECIES HABITAT ON FORT BELVOIR

Unclassified // FOUO

**Figure 8.1**

Source: Fort Belvoir GIS,  
Google road maps

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communities, rare plants and rare animals, and other significant natural areas. The natural heritage inventories identified three installation areas with significant biodiversity, all of which included wetlands: (1) the Pohick Creek-Pohick Bay-lower Accotink Creek-Accotink Bay wetland complex; (2) the upper Dogue Creek wetland complex; and (3) the T-17 ravine seeps (Appendix K).

Conservation of rare plant and animal species and their habitats were important considerations in the establishment/expansion of three of the Special Natural Area designations: ABWR, Jackson Miles Abbott Wildlife Refuge (JMAWR), and the T-17 Refuge (Section 9). Special Natural Area designation of these areas has effectively protected a large amount of the installation's habitat for federal threatened and state threatened and endangered species, and rare wetland communities and associated rare plant and animal species, from loss to development or land disturbing training activities.

In 2000, DCR-NHP completed an ecological communities assessment of Fort Belvoir Main Post (McCoy and Fleming, 2000). This assessment was undertaken as an expansion and follow-on to the 1996-1997 DCR-NHP natural heritage inventory. The purpose of the ecological communities assessment was to develop an ecological-based definition and description of the ecological communities on post, consistent with The Nature Conservancy's National Vegetation Classification system. The ecological communities assessment defined and described the communities in greater detail than was done in the previous natural heritage inventory, and addressed plant relationships with site environmental conditions (e.g., hydrology, soil chemistry). The ecological communities assessment confirmed the high biodiversity of the Fort Belvoir wetland communities, as previously reported by the natural heritage inventory, and assigned these communities a high priority for conservation.

### **8.2.1 Small Whorled Pogonia**

The small whorled pogonia is a federal threatened and state endangered forest dwelling orchid that has been identified previously at FBNA. The status of the small whorled pogonia on Fort Belvoir is currently unknown because of its unusual life-cycle of up to five year dormancy periods. Surveys have been conducted within selected areas, but have not yielded any additional colonies elsewhere on Fort Belvoir. These surveys, done in support of land planning, have identified areas of high-quality and medium-quality small whorled pogonia habitat. This information has been included in the installation GIS. Potential threats to the small whorled pogonia include destruction of habitat, herbicide use, and consumption by herbivores.

#### **8.2.1.1 Small Whorled Pogonia Management and Conservation Strategies**

- Implement land use restrictions around known colonies to avoid earth moving activities and habitat/ecosystem impacts that might impact colonies.
- Continue to use the NEPA process to evaluate, provide alternatives and if possible eliminate risks.
- Consult with the USFWS if potential impacts occur, may occur or are unavoidable.
- Avoid use of herbicide around known colonies. If herbicide may have to be used for control of invasive exotic species that are a threat to the colony, then consultation with the USFWS is required to address the issues.
- Placement of protective structures to protect the plant from predation.
- Perform a small whorled pogonia survey if Fort Belvoir staff or the USFWS identify small whorled pogonia during the NEPA or project review process.
- Small whorled pogonia surveys may be required as a project cost if a project may impact “high quality habitat” elsewhere on Fort Belvoir or as a requirement for other permits.

### **8.2.2 Northern Long-Eared Bat**

The northern long-eared bat is a federal threatened and state threatened forest dwelling bat that historically used to be a common species in Virginia and that has been identified on Fort Belvoir. The devastating effects of White-Nose Syndrome caused by the fungus (*Pseudogymnoascus destructans*) created the need for federal and state protection. Fort Belvoir has been conducting mist net surveys and using acoustics devices since 1998 to monitor bat populations on Fort Belvoir property.

Potential threats to the northern long-eared bat are disease, habitat destruction (roost, foraging, reproduction, and hibernacula impacts), bioaccumulation of pesticides, and predation.

#### **8.2.2.1 Northern Long-eared Bat Management and Conservation Strategies**

- Continue to manage Fort Belvoir’s mission activities, construction, development, and natural resources in accordance with the Informal Conference & Management Guidelines on the Northern Long-eared Bat for Ongoing Operations on Installation Management Command Installations (Appendix L) and the USFWS intra-Service Programmatic Biological Opinion on the final 4(d) rule until an updated programmatic consultation can be approved that provides coverage for Fort Belvoir.

- Follow *Memorandum of Instruction – Northern Long-eared Bat Protection on Fort Belvoir*, addressing the time of year restriction for tree removal of April 15 – September 15 (Appendix L).
- Manage pesticide use and application as addressed in the informal conference.
- Consult with USFWS if activities cannot be conducted under the guidelines established in the informal conference.
- Continue with installation wide acoustic, mist netting surveys and use of radio telemetry for determination of year round use (roosts, maternity, migration, swarming, and hibernation).
- Perform a bat survey if a project is not able to adhere to the management guidelines set in the informal conference.
- Perform bat surveys if it is a condition of other federal or state permits or if the protective status of the species changes such as threatened to endangered.
- Continue to use the NEPA process to evaluate, provide alternatives and if possible eliminate risks.

### **8.2.3 Tricolored Bat**

The tricolored bat is state endangered and has also been added to the National Listing Workplan. The tricolored bat is still frequently documented foraging and roosting on Fort Belvoir. The devastating effects of White-Nose Syndrome created the need for state protection and petition for federal protection. Fort Belvoir has been conducting mist net surveys and using acoustics devices since 1998 to monitor bat populations on Fort Belvoir property.

Potential threats to the tricolored bat are disease, habitat destruction (roost, foraging, reproduction, and hibernacula impacts), bioaccumulation of pesticides, and predation.

#### **8.2.3.1 Tricolored Bat Management and Conservation Strategies**

The management and conservation strategies established under the northern long-eared bat informal conference and Fort Belvoir's *Memorandum of Instruction – Northern Long-eared Bat Protection on Fort Belvoir*, will also provide applicable guidelines to protect and conserve the tricolored bat.

### **8.2.4 Little Brown Bat**

The little brown bat is state endangered and has also been added to the National Listing Workplan. The little brown bat used to be a common species documented at Fort Belvoir prior to the devastating effects of White-Nose Syndrome. Fort Belvoir has been conducting mist net surveys and using acoustics devices since 1998 to monitor bat populations on Fort Belvoir property.



Potential threats to the little brown bat are disease, habitat destruction (roost, foraging, reproduction, and hibernacula impacts), bioaccumulation of pesticides, and predation.

#### **8.2.4.1 Little Brown Bat Management and Conservation Strategies**

The management and conservation strategies established under the northern long-eared bat informal conference and Fort Belvoir's *Memorandum of Instruction – Northern Long-eared Bat on Fort Belvoir*, will also provide applicable guidelines to protect and conserve the little brown bat.

#### **8.2.5 Peregrine Falcon**

The peregrine falcon is a state threatened species. The peregrine falcon occurs occasionally along Fort Belvoir's shoreline.

Potential threats to the peregrine falcon foraging habitat include disturbances near the shoreline, shoreline development, and recreational activities on waters surrounding Fort Belvoir.

##### **8.2.5.1 Peregrine Falcon Management and Conservation Strategies**

No management strategies are in place specifically for the Peregrine falcon. Bald eagle management strategies will provide protection of the foraging areas along the Fort Belvoir shoreline (Figure 7.4).

#### **8.2.6 Wood Turtle**

The wood turtle is a state threatened species and has also been added to the National Listing Workplan. The wood turtle has been documented on Fort Belvoir in several locations. The wood turtle is found primarily in mesic deciduous woodlands in and near clear creeks in Fairfax County (Ernst et al., 1997a). The wood turtle is very mobile and is a highly terrestrial species that typically uses creeks for hibernacula and mating and uses the riparian zones around the creeks during its more terrestrial stages.

Wood turtle habitat surveys, done throughout the installation, have identified areas of high-quality, medium-quality and low-quality wood turtle habitat. This information has been incorporated into the installation GIS. Ongoing turtle projects that utilize radio telemetry to track turtle usage of the landscape on Fort Belvoir will incorporate Wood turtles into the project if any are located.

Potential threats to the wood turtle include development of the riparian buffers, increased storm water flow, and poaching of turtles for the pet trade.

#### **8.2.6.1 Wood Turtle Management and Conservation Strategies**

- Continue to use the NEPA process to evaluate, provide alternatives, and, if possible, eliminate risks.
- Continue to manage and protect riparian zones.
- Continue protections in place for water quality within the industrial storm water permit program and MS4 permit program.
- Perform a wood turtle survey for projects that are located in identified aquatic or terrestrial habitats.
- Perform a wood turtle survey if one is a condition of federal permits.
- Provide turtle education information or educational training to project sites that are within or in close proximity to wood turtle habitat.
- Continue winter/spring aquatic surveys.
- Continue late spring/summer terrestrial surveys.

#### **8.2.7 Spotted Turtle**

The spotted turtle (*Clemmys guttata*) is a turtle common to Fort Belvoir that has been recently added to the National Listing Workplan to evaluate the species' needs for federal protection. The turtle is found primarily in the flooded forested wetlands but will travel across the Fort Belvoir landscape from wetland to wetland. An ongoing spotted turtle project has recaptured marked spotted turtles that were originally marked in 1989 and also turtles marked in 2002. Radio telemetry units have been placed on some spotted turtles to identify the species' usage of the Fort Belvoir landscape.

Potential threats to the spotted turtle include development within the riparian buffers around the wetlands, alterations to wetland hydrology, and poaching of turtles for the pet trade.

##### **8.2.7.1 Spotted Turtle Management and Conservation Strategies**

- Continue to use the NEPA process to evaluate, provide alternatives, and, if possible, eliminate risks.
- Perform a spotted turtle survey if one is a condition of federal permits for actions within or adjacent to wetlands.
- Continue to manage and protect wetlands and riparian zones.
- Continue protections in place for water quality within the industrial storm water permit program and MS4 permit program.
- Provide turtle education information or educational training to project sites that are within or in close proximity to spotted turtle habitat.
- Continue multi-year spotted turtle population and landscape usage-based surveys.

## **8.2.8 Northern Virginia Well Amphipod**

The northern Virginia well amphipod (*Stygobromus phreaticus*), a groundwater dwelling species, was first discovered in a seep within a T-17 ravine during surveys at Fort Belvoir conducted by DCR-NHP in 1996. This was the first known sighting of the amphipod since its collection from wells in Vienna, Virginia, in 1941, and Alexandria, Virginia, in 1948 (Hobson, 1997). Little is known about the amphipod; it is not state or federally listed but does have an ASAR designation and has been added to the National Listing Workplan for evaluation to determine the species' needs for federal protection. Surveys for *Stygobromus* species have been conducted since the discovery of *Stygobromus phreaticus* in 1996 to identify other populations or locations that the species can be surveyed. Presently the species is only known from one location on Fort Belvoir. A "Special Natural Area" designation (as the T-17 refuge) was made in accordance with DoDI 4715.03 to afford the seep area special conservation status on post. This designation was done as a NEPA mitigation commitment for BRAC 2005 (Section 9).

Potential threats to the northern Virginia well amphipod include a sensitivity to groundwater contamination, pollution, impacts to the recharge zones of the water table as well as groundwater withdrawal, and disruption of slope stability.

### **8.2.8.1 Northern Virginia Well Amphipod Management and Conservation Strategies**

- Continue to use the NEPA process to evaluate, provide alternatives, and, if possible, eliminate risks.
- Continue to maintain Special Natural Area designation of the T-17 Refuge to provide a buffer around the seep and restrict activities in the landscape surrounding the seep.
- Protect the recharge zones for the aquifer by limiting an increase in impervious surface within 0.5 mile of the seep if mission allows.
- Continue to address the 21<sup>st</sup> street solid waste transfer facility under the industrial storm water permit program (VPDES –Industrial Stormwater Major Permit VA0092771 Part 1 A.7) and continue testing storm water samples leaving the facility and entering the drainage in accordance with the permit requirements. Analytic results from water testing under the installation stormwater permits, and responses to any exceedances, will be coordinated with the USFWS annually.
- Continue to manage the 21<sup>st</sup> street solid waste transfer facility under the MS4 permit program (VAR040093) to regulate the quantity and condition of the storm water in accordance with the permit requirements as well as sediment and erosion control measures. Analytic results from water testing under the installation stormwater

permits, and responses to any exceedances, will be coordinated with the USFWS annually.

- Monitor other seeps around Fort Belvoir as new seeps are identified or there are potential risks to currently known seeps that are not known to have *S. phreaticus* to be able to identify if any additional locations or populations can be located. The known seep will be visited and visually inspected on a periodic basis (quarterly and after heavy rain events) to ensure that the habitat has not been impacted by installation operations. If impact is observed, response will be coordinated with USFWS.
- Continue to monitor the condition of the wells that are surrounding the T-17 seep and used to monitor water quality of the aquifers.

## **8.2.9 Tidewater Amphipod**

The Tidewater amphipod (*Stygobromus indentatus*) is a species that has been documented on Fort Belvoir. The species is similar to the northern Virginia well amphipod in that it lives in the underground aquifers and can typically only be encountered in a few seeps around Fort Belvoir. The species has been added to the National Listing Workplan. Currently ongoing surveys for *Stygobromus phreaticus* have allowed us to identify populations and locations of the *Stygobromus indentatus*.

Potential threats to the Tidewater amphipod include a sensitivity to groundwater contamination, pollution, impacts to the recharge zones of the water table as well as groundwater withdrawal.

### **8.2.9.1 Tidewater Amphipod Management and Conservation Strategies**

- Continue to monitor and survey the seeps on Fort Belvoir for additional locations where the species can be identified.
- Continue to use the NEPA process to evaluate, provide alternatives and if possible eliminate risks.
- Attempt to minimize the addition of impervious surfaces within the recharge zones of the underground water table, through the NEPA project review process.

## **8.2.10 Monarch Butterfly**

The monarch butterfly (*Danaus plexippus*) is one of several native pollinators that occur on Fort Belvoir and have seen a decrease in populations across the region. The monarch is currently on the National Listing Workplan and all management strategies are voluntary. The monarch butterfly relies heavily upon milkweed plants for early life stages. When stands of milkweed are identified, attempts are

made to protect those stands from herbicide and/or mowing if applicable and do not affect the military mission.

Potential threats to the monarch butterfly are loss of habitat and host plant species, insecticide usage, herbicide usage, disease, and predation.

#### **8.2.10.1 Monarch Butterfly Management and Conservation Strategies.**

- Continue to use the NEPA process to evaluate, provide alternatives, and, if possible, eliminate risks.
- Continue to survey for and monitor native pollinators.
- Incorporate and maintain natural landscaping designs into appropriate areas.
- Adhere to the guidelines for insecticide use as described in the Integrated Pest Management Plan (Appendix D).
- Adhere to the guidelines for herbicide use as described in the Integrated Pest Management Plan (Appendix D).
- Avoid mowing of natural landscapes during the growing season unless it is part of non-native species management and then avoid mowing milkweed, if possible.
- Continue to monitor and track milkweed populations.

#### **8.2.11 Rusty Patched Bumble Bee**

The rusty patched bumble bee (*Bombus affinis*) is a federally endangered species that has not been located on Fort Belvoir but could be located on Fort Belvoir or in close proximity. No official surveys specifically for the rusty patched bumble bee have been conducted, however other pollinators surveys have been conducted. The species is being included in this section to incorporate some strategies that will benefit the species. In addition it will benefit from management and conservation strategies for the monarch butterfly.

Potential threats to the species include loss of habitat, insecticide use, herbicide use, and disease.

##### **8.2.11.1 Rusty Patched Bumble Bee Management and Conservation Strategies**

- Continue to use the NEPA process to evaluate, provide alternatives, and, if possible, eliminate risks.
- Continue to survey for rusty patched bumble bee and monitor native pollinators.
- Incorporate and maintain natural landscaping designs into appropriate areas.

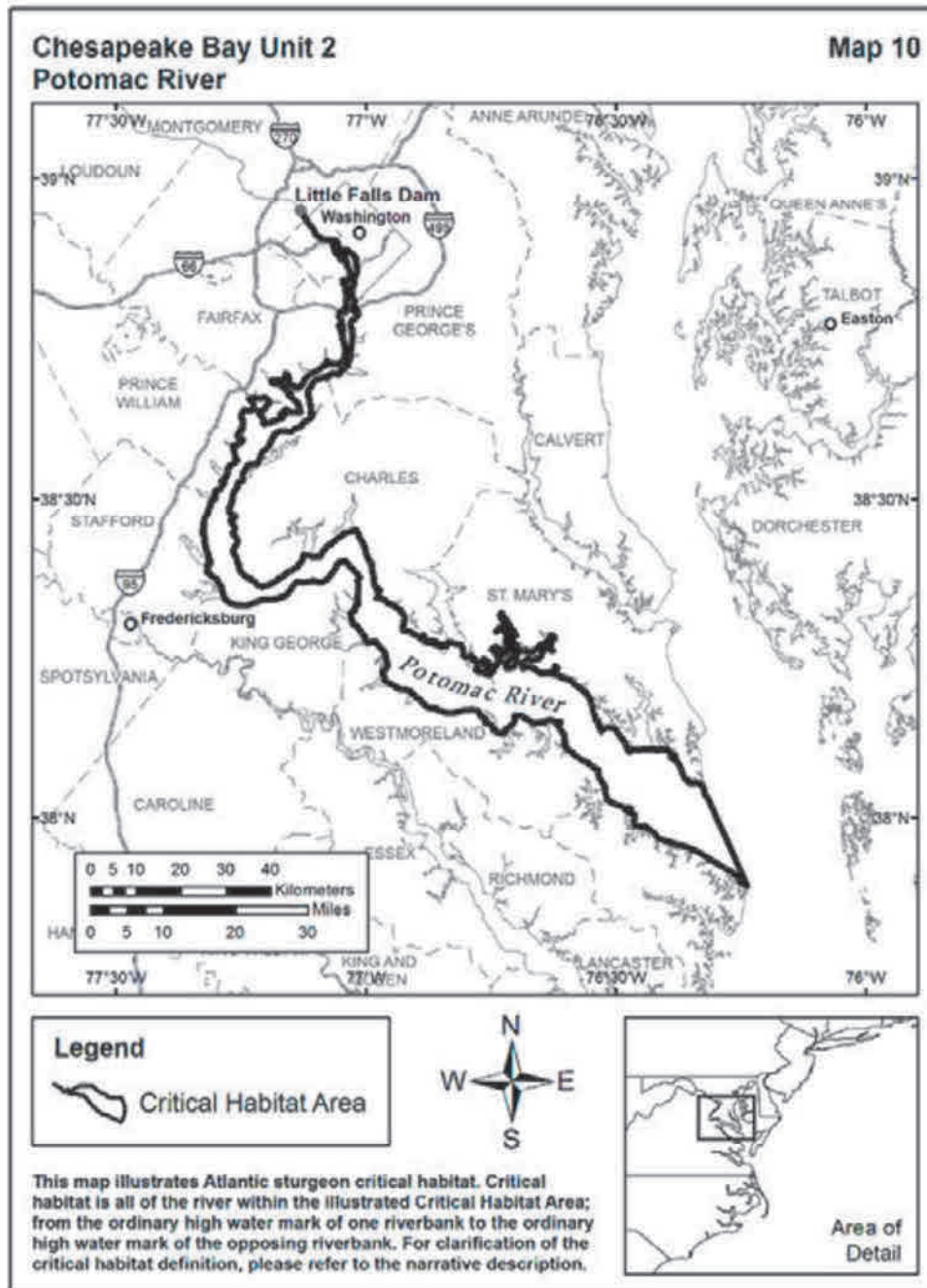
- Adhere to the guidelines for insecticide use as described in the Integrated Pest Management Plan (Appendix D).
- Adhere to the guidelines for herbicide use as described in the Integrated Pest Management Plan (Appendix D).

### **8.2.12 Atlantic Sturgeon**

The Atlantic sturgeon (*Acipenser oxyrinchus*) is a federal endangered and state endangered anadromous fish species that has been documented in the Potomac River near Fort Belvoir. In 2017 critical habitat was designated for the Chesapeake Bay Distinct Population Segments to include the Potomac River and some of its bays and tributaries (Figure 8.2).



**Figure 8.2: Designated Habitat for the Atlantic Sturgeon**



Potential threats to the Atlantic sturgeon include bycatch of sturgeon in fisheries targeting other species, pollution, excessive loud noise (in water bridge or pier construction), increases in sedimentation, degradation of habitat from human activities, loss of habitat, and loss of access to spawning grounds. Given Fort Belvoir's location in the Chesapeake Bay drainage area, activities that may impact the sturgeon are heavily regulated and permitted. Additional information on these factors are covered in greater detail in Section 5 Water Resources.

#### **8.2.12.1 Atlantic Sturgeon Management and Conservation Strategies**

- Continue to use the NEPA process to evaluate, provide alternatives, and, if possible, eliminate risks.
- Continue protections in place for water quality within the industrial storm water permit program and the MS4 permit program.
- Protect and minimize impacts within the 750 foot Bald Eagle foraging buffer zone along Fort Belvoir's shoreline.
- Continue to manage and protect riparian zones.
- Continue to be compliant with wetland permit protections.
- Continue implementing BMP's for sediment and erosion control measures.
- Continue to protect a 100 foot RPA buffer along perennial streams.
- Continue to protect a 35 foot buffer along intermittent streams.
- Continue restoration and stabilization of shorelines and stream channels.
- Continue to adhere to a time of year restriction on bodies of water that could impact anadromous fish as designated in our wetland permits.
- Provide educational materials to the fishing community.
- Continue to follow guidance as set in the Nutrient Management Plan.
- Continue to follow the guidance as set in the Integrated Pest Management Plan (IPMP) for herbicide and pesticides (Appendix D).
- Consult with NMFS under section 7 of the ESA for any activities that may impact sturgeon or designated critical habitat for the Atlantic sturgeon.
- Participate in regional sturgeon monitoring efforts.

#### **8.2.13 Rare Species**

The result of the various surveys indicate that Fort Belvoir possesses a large number of rare plant and animal species, and rare ecological communities. Unlike threatened and endangered listings, rare species rankings by themselves do not provide any legal protective status. Rare species remain a focal point for conservation so that species populations can remain stable and avoid the need for any additional federal or state protection. The results of the 2011-2013 DCR-NHP survey identified previously unknown populations of the Osmunda borer

moth (*Papaipema speiosissima*) that allowed the state to adjust the rankings from rare to uncommon. Fort Belvoir uses information from the DCR-NHP to inform natural resources stewardship actions on post.

Eighty-six plant and animal species with state rarity/conservation rankings of either S3 (rare to uncommon), S2 (very rare), or S1 (extremely rare) have been identified as occurring on Fort Belvoir (Table 8-2). The list of rare animal species provided in the Natural Heritage Inventory reports (Hobson, 1996; 1997, 2013) does not contain the complete list of rare animals that occur on Fort Belvoir. This is mainly because the inventory surveyed areas that were determined to have high potential for rare species or exemplary vegetation communities rather than surveying throughout the post. In addition, the Virginia rare animal species list is a living list that is updated annually. This necessitates regular cross-referencing with species documented on the installation. Table 8.2 presents a comprehensive listing of all birds, mammals, reptiles, and amphibians that have been documented as occurring on post and that have been designated as a Virginia state-rare species with a state rarity rank of either S1, S2, or S3 or a watch list species. Information on rare species has been incorporated into the installation GIS.

Table 8-2: Commonwealth of Virginia and Natural Heritage Ranked Species That Have Been Identified on Fort Belvoir				
Scientific Name	Common Name	Taxon	Virginia Status*	DCR-NHP Status
<i>Lasionycteris noctivagans</i>	Silver-haired bat	Mammal		SUB/S4N
<i>Lasiurus cinereus</i>	Hoary bat	Mammal		SUB/S4N
<i>Myotis leibii</i>	Eastern small-footed bat	Mammal		S2
<i>Myotis lucifugus</i>	Little brown bat	Mammal	LE	S1S3
<i>Myotis septentrionalis</i>	Northern long-eared bat	Mammal	LT	S1S3
<i>Perimyotis subflavus</i>	Tricolored bat	Mammal	LE	S1S3
<i>Accipiter cooperi</i>	Cooper's hawk	Bird		S3B/S2
<i>Actitis macularia</i>	Spotted sandpiper	Bird		S1B
<i>Aegolius acadicus</i>	Northern saw-whet owl	Bird		S1B/S2N
<i>Anas discors</i>	Blue-winged teal	Bird		S1B/S2N
<i>Anas strepera</i>	Gadwall	Bird		S2B/S4N
<i>Aquila chrysaetos</i>	Golden eagle	Bird		SHB/S1N
<i>Ardea alba</i>	Great egret	Bird		S2S3B/S3N
<i>Ardea herodias</i>	Great blue heron	Bird		S3B/S5N
<i>Asio flammeus</i>	Short-eared owl	Bird		S1B/S2N
<i>Asio otus</i>	Long-eared owl	Bird		S1
<i>Bartramia longicauda</i>	Upland sandpiper	Bird	LT	SHB
<i>Botaurus lentiginosus</i>	American bittern	Bird		S1B/S2N
<i>Haemorhous purpureus</i>	Purple finch	Bird		S1B/S5N
<i>Catharus guttatus</i>	Hermit thrush	Bird		S1B/S5N
<i>Catharus ustulata</i>	Swainson's thrush	Bird		S1B
<i>Certhia familiaris</i>	Brown creeper	Bird		S3B/S5N
<i>Circus cyaneus</i>	Northern Harrier	Bird		S1S2B/S3N
<i>Cistothorus platensis</i>	Sedge wren	Bird		S1B/S1S2N
<i>Contopus borealis</i>	Olive-sided flycatcher	Bird		SHB
<i>Setophaga magnolia</i>	Magnolia warbler	Bird		S2B
<i>Dolichonyx oryzivorus</i>	Bobolink	Bird		S1B
<i>Egretta caerulea</i>	Little blue heron	Bird		S2B/S3N
<i>Egretta thula</i>	Snowy egret	Bird		S2B/S3N
<i>Empidonax alnorum</i>	Alder flycatcher	Bird		S1S2B

Table 8-2: Commonwealth of Virginia and Natural Heritage Ranked Species That Have Been Identified on Fort Belvoir				
Scientific Name	Common Name	Taxon	Virginia Status*	DCR-NHP Status
<i>Empidonax flaviventris</i>	Yellow-bellied flycatcher	Bird		S1B
<i>Falco peregrinus</i>	Peregrine falcon	Bird	LE	S1B/S2N
<i>Fulica americana</i>	American coot	Bird		S1B/S5N
<i>Haliaeetus leucocephalus</i>	Bald eagle	Bird	LE	S3S4B/S3S4N
<i>Ixobrychus exilis</i>	Least bittern	Bird		S3B/S3N
<i>Lanius ludovicianus</i>	Loggerhead shrike	Bird	LT	S1B/S2N
<i>Loxia curvirostra</i>	Red crossbill	Bird		S1
<i>Melospiza georgiana</i>	Swamp sparrow	Bird		S1B/S4S5N
<i>Mergus merganser</i>	Common merganser	Bird		S1B/S4N
<i>Nycticorax nycticorax</i>	Black-crowned night heron	Bird		S3B/S4N
<i>Nycticorax violacea</i>	Yellow crowned night heron	Bird		S2S3B/S3N
<i>Oporonis philadelphia</i>	Mourning warbler	Bird		S1B
<i>Petrochelidon pyrrhonota</i>	Cliff swallow	Bird		S3S4B
<i>Plegadis falcinellus</i>	Glossy ibis	Bird		S2B/S1N
<i>Podilymbus podiceps</i>	Pied-billed grebe	Bird		S1S2B/S4N
<i>Porzana carolina</i>	Sora	Bird		S1B/S2N
<i>Rallus elegans</i>	King rail	Bird		S2B/S3N
<i>Rallus limicola</i>	Virginia rail	Bird		S2B/S3N
<i>Regulus calendula</i>	Golden-crowned kinglet	Bird		S2B/S5N
<i>Riparia riparia</i>	Bank swallow	Bird		S3B
<i>Parkesia noveboracensis</i>	Northern waterthrush	Bird		S1B
<i>Sitta canadensis</i>	Red-breasted nuthatch	Bird		S2B/S4N
<i>Sphyrapicus varius</i>	Yellow-bellied sapsucker	Bird		S1B/S4N
<i>Sterna antillarum</i>	Least tern	Bird		S2B
<i>Sterna caspia</i>	Caspian tern	Bird		S1B/S2N
<i>Sterna forsteri</i>	Forster's tern	Bird		S3B/S3N
<i>Sterna hirundo</i>	Common tern	Bird		S3B
<i>Troglodytes troglodytes</i>	Winter wren	Bird		S2B/S4N
<i>Vermivora chrysoptera</i>	Golden-winged warbler	Bird		S3B
<i>Vermivora ruficapilla</i>	Nashville warbler	Bird		S1B

**Table 8-2: Commonwealth of Virginia and Natural Heritage Ranked Species That Have Been Identified on Fort Belvoir**

<b>Scientific Name</b>	<b>Common Name</b>	<b>Taxon</b>	<b>Virginia Status*</b>	<b>DCR-NHP Status</b>
<i>Glyptemys insculpta</i>	Wood turtle	Reptile	LT	S2
<i>Stygobromus tenuis</i>	Potomac amphipod	Crustacean		S3
<i>Stygobromus phreaticus</i>	Northern Virginia well amphipod	Crustacean		S1
<i>Lampetra aepyptera</i>	Least brook lamprey	Fish		S3
<i>Ischnura prognata</i>	Furtive forktail	Insect		S3
<i>Nehalennia gracilis</i>	Sphagnum sprite	Insect		S2
<i>Lampsilis radiata</i>	Eastern lampmussel	Mollusk		S2S3
<i>Leptodea ochracea</i>	Tidewater mucket	Mollusk		S3
<i>Moehringia lateriflora</i>	Grove Sandwort	Plant		S1
<i>Sceptridium oneidense</i>	Blunt-lobed grape fern	Plant		S1
<i>Calamovilfa brevipilis</i>	Pine barrens reedgrass	Plant		S1
<i>Carex vestita</i>	Velvety sedge	Plant		S2
<i>Eleocharis equisetoides</i>	Horsetail spike-rush	Plant		S1
<i>Iris versicolor</i>	Larger blue flag	Plant		S3
<i>Lathyrus palustris</i>	Marsh pea	Plant		S1
<i>Ranunculus ambigens</i>	Water plantain crowfoot	Plant		S1
<i>Bolboschoenus fluviatilis</i>	River bulrush	Plant		S2
<i>Sparganium eurycarpum</i>	Giant bur-reed	Plant		S3
<i>Cordulegaster erronea</i>	Tiger spiketail	Insect		Watchlist
<i>Danaus plexippus plexippus</i>	Monarch	Insect		Watchlist
<i>Lasionycteris noctivagans</i>	Silver-haired bat	Mammal		Watchlist
<i>Lasiurus cinereus</i>	Hoary bat	Mammal		Watchlist
<i>Ligumia nasuta</i>	Eastern pondmussel	Mollusk		Watchlist
<i>Strophitus undulatus</i>	Creeper	Mollusk		Watchlist
<i>Stygobromus indentatus</i>	Tidewater amphipod	Crustacean		Watchlist
<i>Eleocharis smallii</i>	Creeping spikerush	Plant		Watchlist

**Sources:** Bird identification information from Fleming, 2000; Mammal identification information from Fort Belvoir files; Reptile identification information from Fort Belvoir files; Crustacean information from Hobson, 1996 and 1997, 2013; Insect information from Hobson, 1996 and 1997, 2013; Mollusk information from Hobson, 1996 and 1997, 2013; Plant information from Wells, 1999 and Hobson, 1996 and 1997. All species status information was updated according to Roble, 1999 and Killeffer, 2000.

**\*Virginia Status Listings:**



*LE: Listed Endangered*  
*LT: Listed Threatened*

**Natural Heritage Rankings:**

*S1: Extremely rare; usually 5 or fewer occurrences in the state; or may have a few remaining individuals; often especially vulnerable to extirpation.*  
*S2: Very rare; usually between 5 and 20 occurrences; or few occurrences with many individuals; often susceptible to becoming endangered.*  
*S3: Rare to uncommon; usually between 20 and 100 occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.*  
*SH: Historically known from the state, but not verified for an extended period, usually more than 15 years; this rank is used primarily when inventory has been attempted recently.*  
*SU: Status uncertain, often because of low search effort or cryptic nature of the element.*  
*S\_B, S\_N: Breeding and nonbreeding status of an animal in Virginia, when they differ.*  
*?: Indicates an uncertain ranking.*

### 8.2.13.1 Rare Species Management and Conservation Strategies

- Continue to use the NEPA process to evaluate, provide alternatives, and, if possible, eliminate risks to rare species.
- Continue protections in place for water quality within the industrial storm water program and the MS4 permit program.
- Continue to conduct installation-wide surveys for threatened, endangered, and rare species.
- Many of the threatened and endangered species protection strategies will provide coverage to most of the rare species given the shared habitats.

### 8.2.13.2 Rare Ecological Communities

The ecological communities assessment (McCoy and Fleming, 2000) identified 17 community types on Fort Belvoir Main Post, four of which are ranked very rare or extremely rare, and three of which are ranked as rare to uncommon (Note, S1 = extremely rare; S2 = very rare and S3 = rare to uncommon; G = global; ? = Indicates an uncertain ranking). These communities are presented in Figure 9.2. DCR-NHP has delineated the boundaries of three areas on Fort Belvoir to encompass all of the rare plant species and rare ecological communities, and most of the rare animal species. DCR-NHP ranked one of these areas as B1 (outstanding significance), one as B3 (high significance) and one as B5 (general biodiversity significance) (Hobson, 1996; 1997; McCoy and Fleming, 2000) Figure 6.6, Figure 9.2, Appendix K).

- Coastal Plain/Piedmont Acidic Seepage Swamp - G2, G3, S2
- Tidal Hardwood Swamp - G3, S3?
- Tidal Shrub Swamp - G?, S2?
- Tidal Freshwater Marsh: Mixed Type - G-?, S1
- Tidal Freshwater Marsh: Mud Flat Type - G?, S3?
- Tidal Freshwater Marsh: Wild Rice - Smartweed Type - G?, S3?
- Tidal Freshwater Marsh: Spikerush - Golden-club Type - G1G3, S1.

The ecological communities assessment identified existing and potential threats to the biodiversity of these wetland communities (McCoy and Fleming, 2000). The most significant threat is posed by invasive/exotic species. Aggressive invasive/exotic vegetation, such as common reed (*Phragmites australis*), marsh dewflower (*Murdannia keisak*), hydrilla (*Hydrilla verticillata*), and Japanese stiltgrass (*Microstegium vimineum*) were encountered in installation wetlands. The Chinese mystery snail (*Cipangopaludina chinensis*), which can negatively alter aquatic vegetation habitat, was encountered throughout the installation. DCR-NHP also noted that these wetlands are vulnerable to storm water-related problems (e.g., sedimentation), degraded water quality, and boat wakes, as well as beaver activity (Hobson, 1996).

### **8.2.13.3 Rare Ecological Communities Management and Conservation Strategies**

- Continue to use the NEPA process to evaluate, provide alternatives, and, if possible, eliminate risks to rare ecological communities.
- Continue protections in place for water quality within the industrial storm water permit program and the MS4 permit program.
- Continue to use existing land use restrictions around known rare communities to avoid earth moving activities and habitat/ecosystem impacts that might adversely impact communities.
- Avoid use of herbicide around known colonies and minimize herbicide use if needed for control of invasive exotic species that are a threat to the communities. Refer to the Integrated Pest Management Plan (Appendix D) for appropriate use of herbicides.
- Continue surveys to monitor changes to the rare ecological communities.

## **8.3 ENDANGERED, THREATENED, AND RARE SPECIES MANAGEMENT GOALS, OBJECTIVES, AND STRATEGIES**

Fort Belvoir intends to continue the management emphasis on conservation of endangered, threatened and rare species (and their habitats), and rare ecological communities, as addressed in Section 8.2. In addition to the species specific strategies, Fort Belvoir will continue to use conservation land-use designations to protect rare species and important habitat areas for these resources, as addressed in Section 9. Management actions, such as invasive/exotic species management, storm water management and problematic wildlife management will continue to be implemented in order to control threats to these resources. Fort Belvoir will consider the potential for impacts to these resources when making land-use and operational decisions. Where practicable and consistent with installation mission, Fort Belvoir will undertake actions to enhance habitat conditions for endangered, threatened, and rare species.

### **8.3.1 Projects**

Proposed activities that are considered Projects in this INRMP are activities that may potentially impact the environment and would need to be evaluated for the appropriate level of NEPA documentation. The following goals contain Projects within their objectives or strategies:

**Goal 1:** Continue to conserve habitats, and manage installation activities, to protect federal endangered and threatened species and state endangered and threatened species, and to reduce the risk of listing additional species

- **Objective:** Avoid adverse impacts to any listed endangered, threatened, or species under consideration for federal listing.
- **Strategy:**
  - 1) Continue to use the NEPA process and the other installation project and activity review processes to evaluate, provide alternatives, and, if possible, eliminate risks; incorporate endangered, threatened, and rare species/communities conservation requirements into all phases of facilities siting, construction, renovation, operation, maintenance, and demolition activities; and, in reviewing and supporting military training and testing activities.
  - 2) Review and update INRMP annually to account for changes in listing status.
  - 3) Continue to coordinate with USFWS, NMFS, VDGIF, DCR-NHP, and other appropriate agencies regarding protection requirements for federal and state protected species.
  - 4) Continue ongoing surveys to obtain scientific information on endangered, threatened, and rare species, and their habitats.
  - 5) Develop and participate in regional partnerships for threatened, endangered, and rare species, and rare ecological communities protection.
  - 6) Investigate and enforce violations of federal and state endangered species statutes and regulations. Continue to investigate and enforce violations of federal and state laws and regulations, as well as DoD, DA, and Fort Belvoir policies.
  - 7) Identify and conserve habitat areas for endangered, threatened, and rare species, and rare ecological communities, consistent with DoDI 4715.03 policy for designating specific areas of the installation that warrant special conservation as “Special Natural Areas” (Section 9) if consistent with the military mission. Currently, Fort Belvoir has five such areas: three refuges (ABWR, JMAWR, and T-17 Refuge) and two corridors (the FWC and Accotink Creek Conservation Corridor). Maintain designation of these areas, as environmentally constrained to development in the RPMP, and as warranting conservation consideration in other installation plans and documents. Designate new Special Natural Areas where legally obligated to do so.

**Goal 2:** Continue to conserve habitats/populations of rare animal and plant species, and ecological communities that have been prioritized for conservation by the Virginia NHP.

- **Objective:** Avoid adverse impact to rare species or their habitats.

- **Strategy:**
  - 1) Maintain land use restrictions and classifications of Special Natural Areas designation, and of environmentally constrained areas in the RPMP. (Section 9)
  - 2) Develop and implement a program to monitor rare plant and animal species, and rare ecological communities, including their habitats, as recommended by DCR-NHP (Hobson, 1996; 1997, 2013; McCoy and Fleming, 2000).

**Goal 3:** Continue to obtain scientific information on installation endangered, threatened, and rare species resources

- **Objective:** Support our knowledge of biodiversity, identify stressors and detect changes to biodiversity, to evaluate effectiveness of management actions.
- **Strategy:**
  - 1) Update Planning Level Surveys (PLS) relevant to endangered, threatened, and rare species management.
  - 2) Perform year-round surveillance of endangered, threatened, and rare species conditions throughout the installation. This could include close observation, or monitoring, in lieu of detailed field survey.
  - 3) Develop and implement protocols for localized and/or issue-specific fish and wildlife surveys and studies as needed to support resource management, or for specific installation projects or mission activities.
  - 4) Identify opportunities for endangered, threatened, and rare species habitat, and other enhancement projects.
  - 5) Coordinate with DCR-NHP and other entities regarding stewardship of endangered, threatened, and rare species resources.
  - 6) Incorporate the location of habitat enhancement projects in the installation GIS.
  - 7) Perform an annual survey of a representative sample of habitat areas to assess changes, and to assess the success of management actions.
  - 8) Update and maintain baseline endangered, threatened, and rare species information in installation documents, records, databases, GIS, etc.

### 8.3.2 Actions

Actions are those activities that do not require ground breaking or environmentally altering activities. The following goals contain Actions within their objectives or strategies:

**Goal 4:** Continue to manage natural resources information so it is accessible to, and can be used by, installation natural resource managers.

- **Objective:** Develop and implement an endangered, threatened, and rare species database, with the appropriate level of security for such information.
- **Strategy:**
  - 1) Develop a system for storing and managing data. Keep installation GIS up to date.
  - 2) Enter electronic data.
  - 3) Scan and upload paper records.

**Goal 5:** Continue to enforce federal and state laws and regulations applicable to Fort Belvoir, as well as DoD, DA, and Fort Belvoir natural resources policies.

- **Objective:** Ensure Fort Belvoir remains in compliance with all applicable endangered and threatened species protection laws and policies.
- **Strategy:**
  - 1) Perform compliance inspections.
  - 2) Perform inspections in support of enforcement actions and provide assistance.

**Goal 6:** Continue an educational outreach program to highlight protection of endangered and threatened species, and conservation of rare species.

- **Objective:** Increase the education and awareness level for the on-post public, as appropriate, and with consideration for the protection of sensitive species information.
- **Strategy:**
  - 1) Provide opportunities for specialized awareness education/training (e.g., wood turtle identification and response projects, as required by wetland permits).
  - 2) Write and publish articles, as appropriate.

**Goal 7:** Continue to provide technical assistance in emergency situations that could affect endangered or threatened species.

- **Objective:** Ensure emergencies are responded to in a timely manner while meeting all regulatory requirements.
- **Strategy:** Inspect and provide guidance.

**Goal 8:** Continue to issue installation-specific policies and guidance documents.

- **Objective:** Provide direction and guidance for projects and activities in areas where there may be endangered, threatened, or rare species.
- **Strategy:** Maintain the *Memorandum of Instruction – Northern Long-eared Bat Protection on Fort Belvoir*. Assess the need for, and prepare other guidance documents, as appropriate.



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## 9.0 SPECIAL NATURAL AREAS

DoD installations nationwide contain some of America's most precious natural resources. As steward of these resources, DoD is responsible not only for assuring for their conservation, but also for providing the public opportunities for appropriate educational and recreational use, consistent with military mission.

DoDI 4715.03, *Natural Resources Conservation* allows DoD Installations to provide "Special Natural Area" designation to specific areas of the installation that contain natural resources that warrant special conservation efforts if consistent with military mission. Such designation can be made to areas with special attributes, including areas with botanical, ecological reserve, geological, natural resources, riparian, scenic, zoological, and watchable wildlife qualities.

Fort Belvoir possesses a variety of ecologically significant natural resource areas. These include extensive wetlands and riparian forests. They also include habitats for: federally endangered or threatened species and Species at Risk for federal listing; state-listed endangered or threatened species; State Natural Heritage Inventory rare plant communities and rare plant and animal species; bald eagle; anadromous and other migratory fish species; and, PIF bird Species of Concern. (See Section 8 for regarding species presence.) Fort Belvoir also has regionally significant watersheds, and locally important wildlife migratory corridors. These on-post resource areas factor into biodiversity conservation efforts at the local, regional and national levels. The importance of conserving these on-post resources is underscored by the increasing urbanization locally, and throughout the Chesapeake Bay watershed.

Fort Belvoir began designating installation areas for special conservation efforts in 1979. Each area designation was made after careful evaluation for consistency with installation mission. Since the 1990's, these designations were made as mitigation commitments through the National Environmental Protection Act (NEPA) process. Fort Belvoir has five designated Special Natural Areas –ABWR, JMAWR, T-17 Refuge, Fort Belvoir FWC, and Accotink Creek Conservation Corridor. All of these areas possess significant biological and ecological attributes, and all afford high quality opportunities for outdoor recreation and for scientific study and education, consistent with military mission.

At Fort Belvoir, "Special Natural Area" designation protects significant natural resources by encouraging new facilities to be sited away from locations of significant natural resources; by evaluating mission activities for potential impact to significant natural resources and incorporating mitigations to offset unavoidable impacts (e.g., incorporating wildlife crossing structures on roads

through the FWC); and prioritizing natural resources monitoring and management efforts on the significant natural resources on post.

## **9.1 SPECIAL NATURAL AREAS POLICIES**

### **9.1.1 Federal Special Natural Areas Policy**

- ***The Sikes Act: (16 USC Section 670a, et seq.) as amended in the Sikes Act Improvement Act of 1997***

The Sikes Act Improvement Act *Chapter 5C-Conservation Programs on Government Lands* (16 USC 670a. Section (a)(3)) requires military installations to carry out a program, “consistent with the use of military installations ... to provide for (i) the conservation and rehabilitation of natural resources on such installations; (ii) the sustainable multipurpose use of the resources, which shall include hunting, fishing, trapping, and non-consumptive uses; and (iii) subject to safety requirements and military security, public access to military installations to facilitate the use.”

- ***Natural Resources Management Program (32 CFR 190)***

This program provides in §190.4(a) that “the Department of Defense shall act responsibly in the public interest in managing its lands and natural resources. There shall be a conscious and active concern for the inherent value of natural resources in all DoD plans, actions, and programs”. Also, “DoD lands shall be available to the public and DoD employees for enjoyment and use of natural resources, except when a specific determination has been made that a military mission prevents such access for safety or security reasons or that the natural resources will not support such usage” §190.4 (g).

### **9.1.2 State Special Natural Area Policy**

None applicable.

### **9.1.3 Department of Defense Special Natural Area Policy**

- ***Natural Resources Conservation Program (DoDI 4715.03)***

This requires installations to follow an ecosystem-based approach to land management using adaptive management of natural resources, to inventory and protect important biological resources, and to promote biodiversity, while being able to provide continued access to installation air, water and land for realistic military training and testing. This instruction addresses various aspects of land management, and authorizes installations to designate as “Special Natural Areas” specific

areas of the installation having natural resources that warrant special conservation efforts consistent with military mission. This instruction also allows for multiple uses of an installation's natural resources, and for public access to these resources for recreation, education and scientific research and study compatible with the installation's ecosystem management goals and military mission.

**Excerpts from DoDI 4715.03**  
**Select Provisions Applicable to Special Natural Areas**

- The principal purpose of DoD lands, water, airspace, and coastal resources is to support mission-related activities. All DoD natural resources conservation program activities shall work to guarantee DoD continued access to its land, air, and water resources for realistic military training and testing, and to sustain the long-term ecological integrity of the resource base and the ecosystem services they provide. (Policy)
- DoD shall demonstrate stewardship of natural resources in its trust by protecting and enhancing those resources for mission support, biodiversity conservation, and maintenance of ecosystem services. (Policy)
- Areas on DoD installations that contain natural resources (ecological, scenic, recreational, or educational) that warrant special conservation efforts may be designated as special natural areas, as defined in the Glossary, where such conservation is consistent with the military mission. Such areas should be reassessed if mission requirements change, or if the property becomes excess and requires disposal. The INRMP will address special management provisions necessary for the conservation of each area. DoD components shall coordinate with appropriate agencies to support conservation law enforcement to enforce Federal and applicable State laws and regulations pertaining to the management and use of the natural resources under their jurisdiction. (Enclosure 3, Item 9)
- [Definition] Significant Natural Resources. Resources identified as having special importance to an installation and/or its ecosystem. Natural Resources may be significant on a local, regional, national, or international scale. All threatened, endangered and at-risk species are significant natural resources that normally will require an INRMP. Installations that actively manage fish and wildlife, forestry, vegetation and erosion control, agricultural outleasing or grazing, or wetlands protection should be evaluated for significance, but normally will require an INRMP. An evaluation for significance should also consider the degree of active management, special natural features, aesthetics, outdoor recreational opportunities, and the ecological context of the installation. (Glossary)

<p align="center"><b>Excerpts from DoDI 4715.03</b>  <b>Select Provisions Applicable to Special Natural Areas</b></p>
<ul style="list-style-type: none"> <li>• [Definition] <u>Special Natural Areas</u>. All areas officially recognized as having special attributes, including areas with botanical, ecological reserve, geological, natural resources, riparian, scenic, zoological, and watchable wildlife qualities. (Glossary)</li> <li>• DoD lands, waters, and coastal resources shall be made available to the public for the educational or recreational use of natural resources when such access is compatible with military mission activities, ecosystem sustainability, and with other considerations such as security, safety, and fiscal soundness. (Enclosure 3, Item 7a)</li> <li>• INRMPs shall describe areas and conditions appropriate for public access. (Enclosure 3, Item 7b)</li> <li>• The Department of Defense shall engage in public awareness and outreach programs to educate the public regarding the resources on military lands and DoD efforts to conserve those resources. (Enclosure 3, Item 8)</li> </ul>

#### 9.1.4 Department of the Army Special Natural Area Policy

- ***Environmental Protection and Enhancement (AR 200-1)***  
This regulation addresses the Army policy for natural resources conservation on DoD installations.

<p align="center"><b>Excerpts from AR 200-1</b>  <b>Select Provisions Applicable to Special Natural Areas</b></p>
<ul style="list-style-type: none"> <li>• Provide for the conservation and rehabilitation of natural resources on Army lands. (4-3(a)(2))</li> <li>• Integrate natural resources stewardship and compliance responsibilities with operational requirements to help achieve sustainable ranges, training areas, and other land assets. (4-3)(c)(1)</li> <li>• Promote biodiversity and ecosystem sustainability on Army lands and waters consistent with the mission and INRMP objectives. (4-3)(d) (4)(a)</li> <li>• Manage flora and fauna consistent with accepted scientific principles and in accordance with applicable laws and regulation and, where lands and waters are suitable, for conservation of indigenous flora and fauna. (4-3)(d)(4)(b)</li> <li>• Manage habitat to conserve and enhance existing flora and fauna consistent with the Army goal to conserve, protect, and sustain biological diversity while supporting the accomplishment of the military mission. (4-3)(d)(4)(c)</li> </ul>

### **9.1.5 Fort Belvoir Special Natural Areas Policy**

Fort Belvoir does not have an over-arching Special Natural Areas policy other than the policy specified in this INRMP.

## **9.2 BASELINE SPECIAL NATURAL AREAS CONDITIONS**

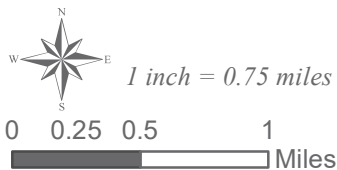
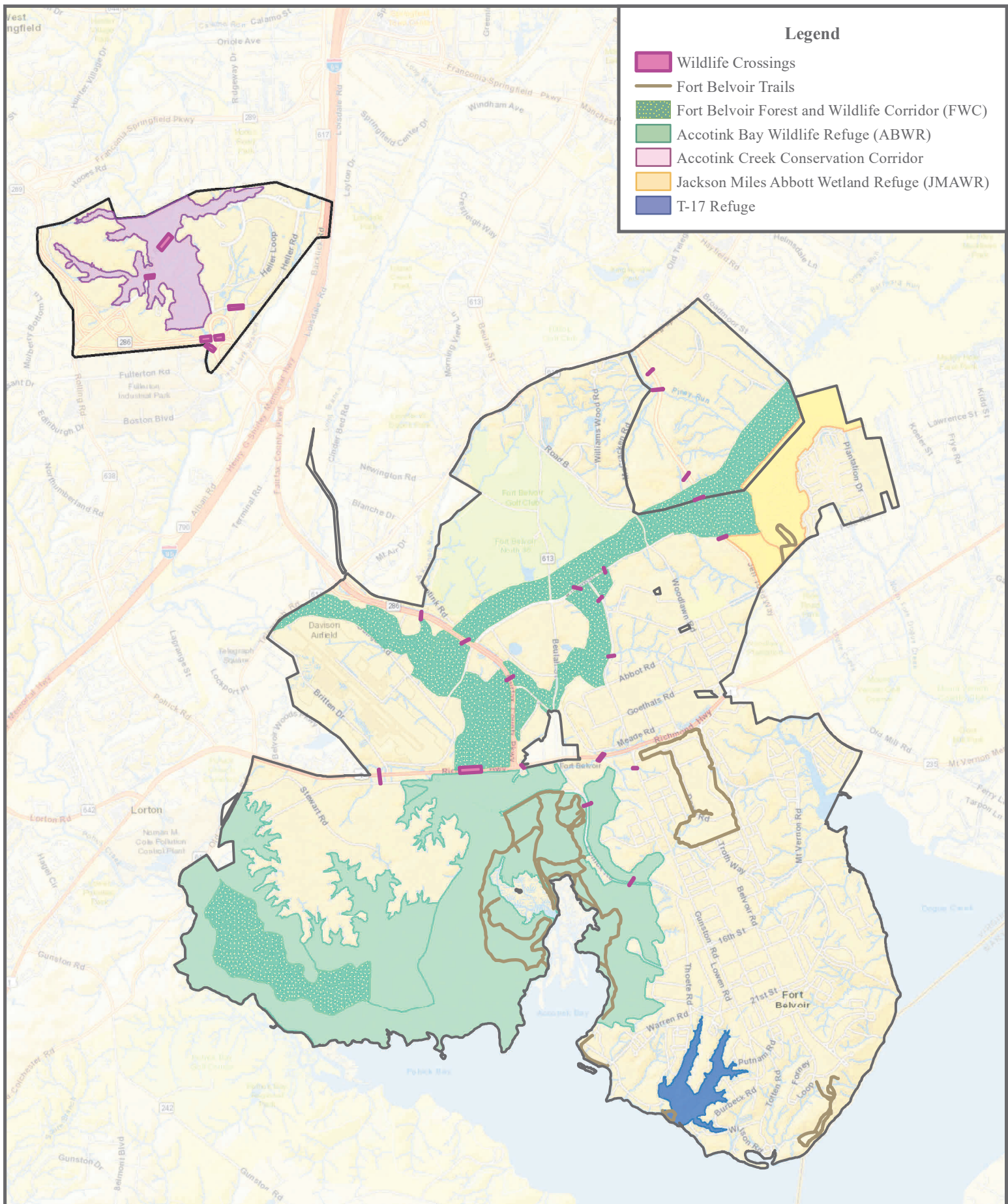
In accordance with DODI 4715.03, Fort Belvoir has designated five locations on post as “Special Natural Areas” (Figure 9.1). These areas have natural resources that have been assigned a high conservation priority through federal or state statute or regulation (e.g., Endangered Species Act, Bald and Golden Eagle Protection Act), DoD or DA policy (e.g., DoDI 4715.03), DoD-partnered programs (e.g., Chesapeake Bay Program, PIF Program), NEPA mitigation commitment (e.g., BRAC 1988 NEPA, BRAC 2005 NEPA, RPMP NEPA), the state Natural Heritage Program, or have been recognized as being important to local or regional ecosystem function (e.g., wildlife migratory routes). The five Special Natural Areas are:

- Accotink Bay Wildlife Refuge (ABWR)
- Jackson Miles Abbott Wetland Refue (JMAWR)
- T-17 Refuge
- Fort Belvoir Forest and Wildlife Corridor (FWC)
- Accotink Creek Conservation Corridor

Fort Belvoir maintains these Special Natural Area designations within all installation planning documents and within the installation GIS. The 2015 Fort Belvoir Real Property Master Plan (RPMP) identifies these Special Natural Areas as part of the “Environmental Constraints Complex”, an area classified as being “least suitable for development”.



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## DESIGNATED SPECIAL NATURAL AREAS ON FORT BELVOIR

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**Figure 9.1**

Source: Fort Belvoir GIS,  
Google road maps,

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### **9.2.1.1 Accotink Bay Wildlife Refuge**

#### ***History***

The ABWR (Figure 9.1) was established in 1979 to protect areas of recognized ecological significance, most notably the freshwater tidal marsh and climax hardwood forest adjacent to Accotink Bay, and to provide the public with opportunities for environmental education and low-intensity outdoor recreation. The refuge initially encompassed a 460-acre area along Accotink Bay in the south-central part of the installation. Through a series of subsequent expansions, the ABWR was enlarged to encompass the entire shoreline/slope area around Accotink and Pohick Bays, the entire riparian area along Accotink Creek south of U.S. Route 1, part of the Pohick Creek riparian area, portions of the upland plateau of the South Post training area, and a slope area on South Post along the east side of Pohick Road to a total refuge size of 1,945 acres. The expansions were undertaken, as military mission changes allowed, to incorporate more of the recognized sensitive natural resources into the refuge. Since the 1990's, these expansions were undertaken as NEPA mitigation actions to offset impacts from development. The most recent expansions came about through the 2005 BRAC Environmental Impact Statement (EIS) Record of Decision (ROD) (U.S. Army, 2007) which extended the refuge boundary in the Southwest Training Area up to the 125-foot contour, and the 2016 RPMP EIS ROD (U.S. Army, 2016a), which added two areas to the refuge - a small parcel in the central portion of the Southwest Training Area and a parcel east of Pohick Road on South Post. These expansions were done to add bald eagle habitat, steep slopes, wetlands, sensitive watershed area, and rare species habitat.

The ABWR includes all of the tidal marsh wetlands associated with Accotink and Pohick Bays. Several rare plant and animal species, and rare plant communities occur in these wetlands. The refuge includes the lower part of Subwatershed 48 (Figure 5.2), a rare example of an undisturbed Mid-Atlantic upper Coastal Plain stream, and the riparian protection areas associated with lower Accotink Creek, Accotink Bay, lower Pohick Creek and Pohick Bay. Accotink and Pohick Creeks are used by anadromous and other migratory fish. The refuge includes several active bald eagle nest sites, and is within the federal- and state-designated Potomac River Eagle Concentration Area. The refuge includes habitat for a federal threatened bat, several state threatened and endangered bats, habitat for federal threatened (state endangered) small whorled pogonia, habitat for state-threatened wood turtle, as well as habitat for multiple PIF bird Species of Concern.

The ABWR falls within the National Audubon Society's Lower Potomac River Important Bird Area and is part of the Virginia Coastal Birding Trail published by the VGDIF.

## ***Existing Conditions and Use***

There are no buildings in the ABWR and existing infrastructure is limited to the gate-controlled network of paved and unpaved training roads, a network of recreational hiking trails, and several utility corridors that pass through the area. The refuge boundary overlaps with a portion of several closed installation landfills. Pohick Road, which has refuge on both sides, had three wildlife crossing structures (one specifically for reptiles and amphibians) installed as part of the BRAC 2005 Infrastructure project (Figure 9.1). Two wildlife crossing structures have been installed on U.S. Route 1 by the Federal Highway Administration (FHWA) as part of the U.S. Route 1 road widening project.

The ABWR includes several operational (active) and closed training ranges. These range areas continue to be managed and used in accordance with their training designation. Operational training areas are controlled by the Fort Belvoir Directorate Plans, Training, Mobilization and Security (DPTMS). Routine types of military training activity on Fort Belvoir generally have low disturbance to natural resources. DPTMS coordinates environmental assessment requests for non-routine training with Directorate of Public Works (DPW)-Environmental Division. Closed training areas are being assessed through the Military Munitions Response and Installation Restoration programs.

Recreation facilities within the ABWR are limited to the approximately 14-mile hiking trail network and associated public access and educational features (Figure 9.1). Virtually all of the ABWR trail network has a natural surface (except for a 0.3-mile section of pervious stone within a flood-prone area and the paved 0.5-mile Pohick Loop Trail, a trail accessible to persons with disabilities). There are several wildlife observation structures along the trail network and parking facilities at three trailheads (entrance at the SSG John D. Linde Visitor Center along Pohick Road, Pohick Loop Trail and Basin Trail). Information kiosks and interpretive signs are located at the major trail heads and along trails. There are no restroom facilities.

The ABWR hiking trail system is accessible to any person authorized to be on Fort Belvoir. Trail use is by pedestrian traffic only, and users must remain on the trails. Except for hunting and fishing, and other activities specifically approved by DPW-Environmental Division, refuge users must remain on the trails. Dogs are allowed on the trails and must be leashed at all times. Activities with the potential to disrupt or disturb land and natural resources, such as bike/ORV or ATV, horseback riding, boat launches and landings, are prohibited. Hunting and fishing are allowed in accordance with the installation's hunting and fishing programs (Section 10), however camping is not permitted. Organized group events and any use other than hiking, hunting or fishing, must be submitted to DPW-Environmental Division for review and approval because of the potential for impact to sensitive resources and risk of access to Unexploded Ordinance (UXO) areas.



The ABWR has been, and continues to be, accessible, for recreation and for scientific study and environmental education (consistent with military mission and operations and security requirements). The refuge has been used for outdoor classroom and study by several universities, include George Mason University, and for research by several institutions, including the Smithsonian Institution. Requests for such use must be submitted to DPW- Environmental Division for review and approval. Persons coming into the refuge for such activities must have authorized access to Fort Belvoir, and be briefed on and agree to abide by, all installation force protection, safety and environmental protection requirements (e.g., UXO briefing). Persons performing scientific study/research must possess, and adhere to, the conditions of all applicable permits (e.g., VDGIF's Scientific Collection Permit).

Routine maintenance of the ABWR trail system is done under the installation's Real Property Maintenance contract. Purchase, installation and maintenance of signs and educational displays may be accomplished under that contract, or be contracted separately. Major improvements, such as the replacement of the suspension bridge over Accotink Creek (completed in 2015) are generally done under separate contracts. Small projects may be accomplished as volunteer projects (e.g., Eagle Scout projects).

The ABWR Environmental Education Center (ABWR EEC), located along Accotink Bay (outside the ABWR boundary) prior to the entrance to Basin Trail, provides a focal point for persons visiting the refuge. The Center is open by appointment only, and provides natural resource information, exhibits, and programs. The Center serves as the base location for Fort Belvoir's Conservation Education Program.

#### **9.2.1.2 Jackson Miles Abbott Wetland Refuge**

##### ***History***

The JMAWR (Figure 9.1) was established in 1988 to protect an area of sensitive wetlands along Dogue Creek, and to provide public access to an important bird watching area on post. The refuge, originally 146 acres, was expanded to 191 acres in 2007 as a mitigation action under the BRAC 2005 EIS ROD (U.S. Army, 2007). The BRAC 2005 expansion was done to include additional watershed area and rare species habitat.

The JMAWR includes a beaver-impounded section of Dogue Creek that supports several state-rare animal species and the 1.5-acre man-made Mulligan Pond. JMAWR is part of a larger forested wetland system that continues beyond Fort Belvoir's installation boundary into Humphreys Engineering Center (HEC), and into Fairfax County's Huntley Meadows Park. The JMAWR includes all of the resource protection areas along Dogue Creek main stem (in the North Post). The refuge includes habitat for a federal threatened bat and several state threatened



and endangered bats, habitat for federal threatened (state endangered) small whorled pogonia, habitat for state threatened wood turtle, and habitat for multiple PIF bird Species of Concern (Section 7.2.2). Migratory fish passage through JMAWR is questionable due to an off-post blockage in the Dogue Creek channel downstream from JMAWR (near the stream crossing on U.S. Route 1), outside Fort Belvoir's boundary.

The JMAWR falls within the National Audubon Society's Lower Potomac River Important Bird Area and is part of the Virginia Coastal Birding Trail published by the VDGIF.

### ***Existing Conditions and Use***

Existing facilities are limited to the 0.6-mile hiking trail, a portion of which is paved and accessible to persons with disabilities, as well as a wildlife viewing structure (rebuilt in 2016 to replace the original structure destroyed by vandal's fire) that overlooks the wetland to the north. Mulligan Pond contains three fishing piers accessible to persons with disabilities. The pond underwent extensive renovations in the late 1990's to install a new water control structure, stabilize the inlet and outlet areas, dredge for sediment removal, replant vegetation, and stock the pond. The entrance along Pole Road contains a parking facility and an information kiosk. There are no buildings, restrooms, or active ranges in the area and the only road is a gated, paved service road from the parking area to the pond. Several utility corridors pass through the area. Maintenance of the infrastructure in JMAWR is the same as for ABWR.

Hunting and fishing are allowed in JMAWR, in accordance with the installation's Hunting and Fishing Programs (Section 10). Other activities as well as policies and restrictions are the same as for ABWR.

#### **9.2.1.3 T-17 Refuge**

##### ***History***

Operational Range T-17 Refuge (Figure 9.1) is located on the southern extent of Fort Belvoir Main Post along the Gunston Cove shoreline. This training area is under the operational control of DPTMS.

The T-17 area has long been recognized as an area of ecological significance. A groundwater seepage along one of its two streams is the only known location in the world for the groundwater dwelling Northern Virginia Well Amphipod (*Stygobromus phreaticus*) (Section 8). This area is included in the federal and state-designated Potomac River Eagle Concentration Area and contains habitat for several PIF bird Species of Concern (Section 7.2.2). The area is forested, includes riparian and wetland areas, habitat for a federal threatened bat and for several state threatened and endangered bats, habitat for federal threatened

(state endangered) small whorled pogonia, rare plant communities, and habitat for rare species. The T-17 Refuge falls within the National Audubon Society's Lower Potomac River Important Bird Area.

The T-17 Refuge was designated as a Special Natural Area under the 2005 BRAC EIS ROD (U.S. Army, 2007a) to protect *Stygobromus phreaticus*. The boundaries of this Special Natural Area were delineated to include the groundwater seepage area where *Stygobromus phreaticus* and other rare *Stygobromus* species are encountered, along with an estimated area of influence for groundwater recharge to that seepage area. The boundary delineation took into account installation mission and included the steep-sloped riparian areas and down-slope wetlands, areas that are not suitable for development, and excluded the upper, previously disturbed plateau (now in use as ball fields). For ease of management, the boundary of this Special Natural Area was set at the 100-foot contour and below. The area encompasses approximately 70 acres.

### ***Existing Conditions and Use***

There are no buildings or public roads in the T-17 Refuge; however, an unimproved utility access road runs north-south from the ball fields, along the ridge (outside of the boundary) to the utility corridors located mid-way through the refuge.

In 2008, a fishing/watchable wildlife pier (accessible to persons with disabilities) was constructed at the base of T-17 on Gunston Cove, just outside the limit of the T-17 Refuge, to replace the previous pier that was destroyed by Hurricane Isabel in 2003. The new pier was engineered and constructed for pedestrian traffic only and does not support boat docking. The pier area includes a parking facility, and kiosk with educational displays. In 2011, a trail was constructed to support the Wounded Warriors Program and is located in the lower, near-shore area of T-17, connecting to the parking facilities at the pier.

Facilities maintenance, as well as area access and use policies, for the T-17 Refuge are the same as for ABWR. Hunting and fishing are allowed in accordance with the installation's hunting and fishing programs.

#### **9.2.1.4 Fort Belvoir Forest and Wildlife Corridor**

##### ***History***

The Fort Belvoir FWC (Figure 9.1) was established in 1993 as the result of several NEPA mitigation commitments to offset the ecological impacts of habitat fragmentation caused by major construction projects on post. The 1988 BRAC EIS ROD (U.S. Army, 1991) acknowledged the presence of a functioning wildlife corridor through Fort Belvoir. That ROD committed to developing and implementing a Corridor Management Plan. The Fort Belvoir FWC Management

Plan was completed in 1993 and incorporated into the 1993 Fort Belvoir RPMP and its Environmental Assessment (EA) Finding of No Significant Impact (FNSI) (U.S. Army 1993 a,b,c).

The Fort Belvoir FWC was established to protect significant wildlife habitat, and to maintain a continuous area of natural forest habitat connecting larger natural areas to the north and south of Fort Belvoir, facilitating wildlife movement through the installation. The FWC was defined as having a minimum width of 250 to 300 meters (820 to 984 feet), based upon the results of a George Mason University study of minimum corridor widths for wildlife migration (Ernst et al., 1998). As shown in Figure 9.1, the FWC extends from (and overlaps with) the JMAWR in the northeastern part of the installation to the ABWR in the southwestern part. The FWC and the two refuges together provide, by definition, a continuous forested band through Fort Belvoir.

The FWC includes the majority of the installation's habitat for the state threatened wood turtle, habitat for a federal threatened bat and several state endangered and threatened bats, habitat for federal threatened (state endangered) small whorled pogonia, and habitat for several PIF bird Species of Concern. The FWC also includes all of the riparian forest buffer and wetlands along Accotink Creek, and along two major drainages to Accotink Creek. It also falls within the National Audubon Society's Lower Potomac River Important Bird Area.

The Fort Belvoir FWC encompasses 980 acres, exclusive of where it overlaps the refuge areas. The FWC underwent a minor modification of its boundaries in 1999, as it was incorporated into the installation GIS, and was expanded in 2016 as a mitigation action in the EA FNSI for INSCOM construction (U.S. Army, 2012, 2016b). The 2016 expansion added a small area (a parcel at the southeast corner of the intersection of Gunston and Kingman Roads) to the FWC to offset a small area of unavoidable construction within the FWC. The FWC was expanded again in 2017 as a NEPA mitigation action under the 2015 Fort Belvoir RPMP EIS ROD (U.S. Army, 2016a). This expansion added the remainder of the Accotink Creek riparian area on Main Post to the FWC.

### ***Existing Conditions and Use***

There are no buildings within the FWC, however roads, trails, utilities and other infrastructure traverse the FWC and are unavoidable. Fort Belvoir has incorporated wildlife crossing structures into the roads to facilitate wildlife movement with a total of nine wildlife crossing structures on roads within, and near, the FWC (Figure 9.1). These crossing structures generally are modifications to bridges and culverts that foster wildlife use. Such design modifications may include over-sizing culverts, using natural surface bottoms, or day-lighting the tops (by using grids), and also include land modification and

structures (e.g., fencing) to guide wildlife to the crossings. These are the only facilities specifically constructed to serve FWC function.

Fort Belvoir has undertaken a number of projects to improve, or that resulted in improvement of, FWC function. Such projects included removing unneeded fencing, reforesting disturbed areas, and replacing overhead utility transmission lines with underground lines. The latter is allowing the existing cleared rights-of-way to re-vegetate, diminishing previously existing habitat fragmentation. New street lighting along roads in the FWC strives to use light fixtures with reduced light scatter.

Except for the portions of the FWC that overlap with the installation Golf Course or the refuges, there are no recreational facilities, hiking trails, or active ranges. The FWC is accessible for hunting, in accordance with the installation's hunting program, however there are no fishing opportunities in the section of the Corridor between the refuges. That section of the Corridor is not open to public use, except for installation-authorized events.

### **9.2.1.5 Accotink Creek Conservation Corridor**

#### ***History***

The Accotink Creek Conservation Corridor was established in 2005 to protect the Accotink Creek riparian area through FBNA (Figure 9.1). This predominantly forested 191-acre area serves as a wildlife migratory corridor, and supports habitat for a federal endangered bat and several state threatened and endangered bats, and habitat for federal threatened (state endangered) small whorled pogonia, state-listed threatened wood turtle and for several other species of management concern. Designation of this Special Natural Area was a mitigation action of the 2005 BRAC EIS ROD (U.S. Army, 2007a).

#### ***Existing Conditions and Use***

There are no buildings, trails, recreational facilities, or ranges in this area, only unimproved roads and utilities. Except for hunting under the Fort Belvoir hunting program, this area has no recreational use. Requests for access for other recreation, or scientific study/education must be made to DPW-Environmental Division for review and approval.

There is an operational bridge and an abandoned bridge over Accotink Creek. The abandoned bridge has been identified as needing to be removed. One of the tributaries to Accotink Creek is crossed by a BEBO Arch, a precast concrete structure, which functions as a wildlife crossing structure (Figure 9.1). There are a total of six wildlife crossings within FBNA in the vicinity of the Accotink Creek Conservation Corridor.

## 9.3 SPECIAL NATURAL AREAS MANAGEMENT

The results of the planning level natural resources surveys of Fort Belvoir (Sections 5 through 8) document a variety of ecologically significant natural resources within the boundaries of the designated Special Natural Areas on post (Figure 9.2). The survey results warn that these resources are vulnerable to a number of threats, including displacement by exotic species; de-stabilization, erosion or sedimentation resulting from stormwater problems; damage/mortality caused by insects or disease; disturbance/destruction caused by wildlife (e.g., deer overbrowsing, beaver activity); or, by overuse by humans.

The resources within the designated Special Natural Areas, while generally protected from direct loss to development through their “environmental constraints” designation in the 2015 Fort Belvoir RPMP, could be affected by unavoidable land disturbances for installation operations (e.g., infrastructure construction and maintenance, training area use, Military Munitions Response and Installation Restoration Program work, etc.). Natural resources in those areas are also vulnerable to “spill-over” impact by any adjacent development (e.g., lighting, noise, activity, accidental chemical spills, stormwater runoff, problem wildlife, etc.).

### 9.3.1 DCR-NHP Conservation Area Recommendations

Virginia DCR-NHP, through two natural heritage inventories (Hobson, 1996; Hobson, 1997), recommended managing specific installation areas for conservation of significant natural resources. *A Natural Heritage Inventory of the U.S. Army Fort Belvoir, Virginia* (Hobson, 1996) recommended the establishment of conservation areas, covering ABWR and JMAWR to protect the significant resources within and adjacent to these areas from development and other land disturbing activities, and to buffer the adverse impacts of nearby developed land uses on sensitive resources (Section 8). DCR-NHP’s *A Natural Heritage Zoological Inventory of U.S. Army, Fort Belvoir* recommended establishing a third conservation area for T-17 to protect *Stygobromus phreaticus* (Hobson, 1997) (Appendix K). Fort Belvoir uses these recommendations to inform designation and management of the installation’s Special Natural Areas.

#### 9.3.1.1 Refuge Management Recommendations

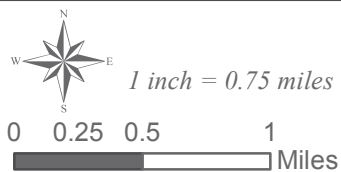
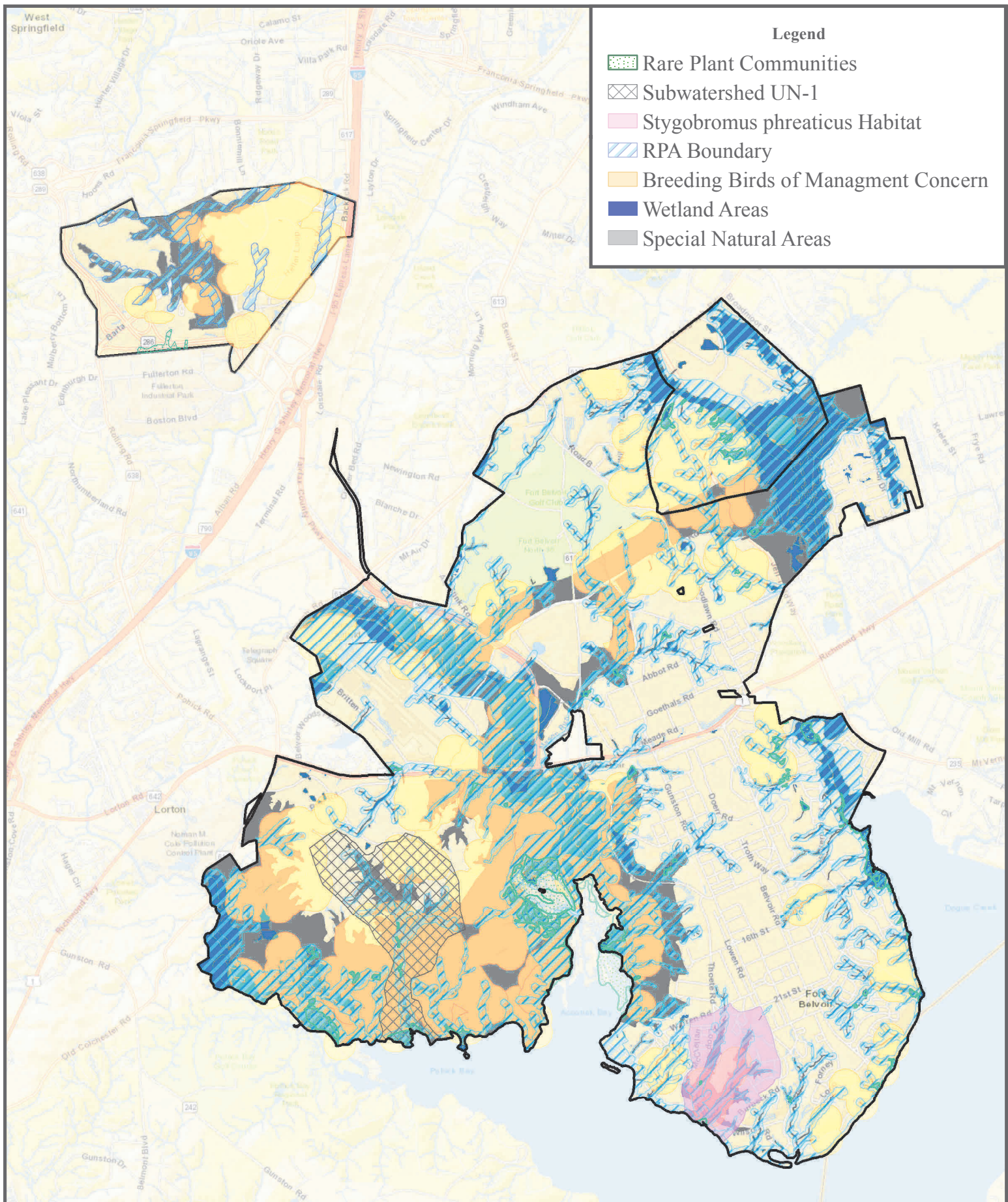
The *Comprehensive Management Plan for the Fort Belvoir Refuge Complex* (Paciulli, Simmons and Associates, Ltd., 1998b) took into account DCR-NHP’s conservation recommendations, and recommended that management priority be given to the protection of natural resources within the refuges from manmade or natural disasters by addressing:

- Use Management

- Boundaries and Buffers
- Natural Resources Conservation
- Educational Opportunities
- Facilities Maintenance



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## ECOLOGICALLY SIGNIFICANT AREAS ON FORT BELVOIR

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**Figure 9.2**

Source: Fort Belvoir GIS,  
Google road maps

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Table 9-1 presents a summary of the plan’s key management recommendations, and their implementation status, organized according to these five topics.

<b>Table 9-1: Key Management Recommendations from the Comprehensive Management Plan for the Fort Belvoir Refuge Complex</b>	
<b>Topic</b>	<b>Management Recommendations</b>
Use Management	<ul style="list-style-type: none"> <li>• Limit public access to the presently accessible areas, unless future studies specifically indicate that additional public areas can be created without damage to the ecosystem.</li> <li>• Prohibit horses, bicycles, ORVs, boat landings and launchings, etc.</li> <li>• Allow classes and scientific research and inventory in the non-public areas.</li> <li>• Allow archery hunting in the public and non-public areas as a means to control the deer population.</li> <li>• Allow fishing in Mulligan Pond, Dogue Creek, Accotink Creek, Pohick Creek, and Accotink and Pohick Bays.</li> <li>• Limit recreation to hunting, fishing, and passive recreational activities such as wildlife/nature photography.</li> <li>• Prohibit/control large organized recreational events such as volksmarches and orienteering competitions.</li> <li>• Encourage non-disruptive military use if other training areas do not provide proper space or training scenarios. <i>(Military training occurs within the refuges, mostly within ABWR. Public access to the refuges has been managed to be compatible with natural resources conservation. This multi-use initiative is on-going.)</i></li> </ul>
Boundaries and Buffers	<ul style="list-style-type: none"> <li>• Add training area T-10 to the ABWR, to protect the active bald eagle nest. <i>(This was accomplished as a result of the BRAC 2005 NEPA and the RPMP 2016 NEPA mitigations that included ABWR expansion.)</i></li> <li>• Add the landfills to the refuge(s) since other (land-disturbing) uses are not feasible at the landfills. Landfills occur in areas T-6, T-16, W-1, W-3, and W-4. <i>(This was accomplished as a result of the BRAC 2005 NEPA mitigations that included ABWR expansion.)</i></li> <li>• Modify the refuge boundaries to follow the top of slopes and specific contours. Add small areas, as necessary, to bring the refuge boundaries out to known fences, roads, or other geographic feature. Delete small, isolated segments that are not functionally part of the refuge.</li> </ul>



<b>Table 9-1: Key Management Recommendations from the Comprehensive Management Plan for the Fort Belvoir Refuge Complex</b>	
<b>Topic</b>	<b>Management Recommendations</b>
	<p><i>(This was accomplished as a result of the BRAC 2005 and the RPMP 2016 NEPA mitigations that included ABWR expansion.)</i></p> <ul style="list-style-type: none"> <li>• Expand JMAWR (1) to the south/southwest to include the remainder of the wetlands and floodplains southwest of Mulligan Pond and along the south side of Kingman Road, and (2) to the north to include the wetlands and bottomlands from Kingman Road north to Telegraph Road. <i>(Expansion of JMAWR northward to Kingman Road, and westward to Jeff Todd Way was accomplished as a result of the BRAC 2005 NEPA mitigations that included JMAWR expansion. Additional expansion is not practicable.)</i></li> <li>• Provide a buffer to both refuges to protect against development adjacent to the refuges, in the event training departs, and the training land is developed or excessed. <i>(Given the expansions that resulted from the BRAC 2005 NEPA mitigations, this recommendation is no longer being considered.)</i></li> </ul>
Natural Resources Conservation	<ul style="list-style-type: none"> <li>• Protect and enhance conditions for endangered, threatened, and rare species and their habitats (Section 8).</li> <li>• Protect and enhance wetlands.</li> <li>• Protect and enhance habitat conditions for anadromous fish species.</li> <li>• Protect and enhance habitat conditions for non-game bird populations.</li> <li>• Conserve riparian forest buffer habitat. <i>(Projects have been identified and undertaken to enhance habitats, and to restore riparian areas within the refuges and corridors. This initiative is on-going.)</i></li> </ul>
Educational Opportunities	<ul style="list-style-type: none"> <li>• Ensure that the refuges are a showcase for Fort Belvoir and other partners in environmental education and resource management.</li> <li>• In collaboration with various partners, provide a wide range of innovative environmental education programs and activities.</li> <li>• Ensure that the primary objectives of environmental education are to conserve and enhance biological</li> </ul>

<b>Table 9-1: Key Management Recommendations from the Comprehensive Management Plan for the Fort Belvoir Refuge Complex</b>	
<b>Topic</b>	<b>Management Recommendations</b>
	resources, and to motivate citizens to learn the role of management in the maintenance of healthy ecosystems. <i>(The installation's environmental education and outreach programs highlight the refuge and corridor areas, and the natural resources within them. This initiative is on-going.)</i>
Facilities Maintenance	<ul style="list-style-type: none"> <li>• Rehabilitate Mulligan Pond, and repair and upgrade the public access facilities at JMAWR.</li> <li>• Repair and upgrade public access facilities at the ABWR.</li> <li>• Construct a refuge headquarters and environmental education center at the ABWR.</li> </ul> <i>(The pond and public access facilities underwent major rehabilitation and upgrade in the early 2000's. The ABWR Environmental Education Center was established in the early 2000's. These initiatives are on-going.)</i>

Source: Paciulli, Simmons and Associates, Ltd., 1998b

### **9.3.1.2 Forest and Wildlife Corridor Recommendations**

*The Fort Belvoir Forest and Wildlife Corridor Management Plan* (Paciulli, Simmons and Associates, Ltd., 1993) recommended two broad conservation management initiatives to conserve the habitat value of the FWC and to protect and enhance wildlife movement: (1) restrict disruptive activities within the corridor, and (2) enhance natural habitat within the corridor. The plan stressed establishing and maintaining woodland habitat diversity, restricting land clearing, limiting public access, reducing edge habitat and providing wildlife habitat enhancement. Key management recommendations from the plan are summarized below:

- Reduce fencing within the corridor.
- Add wildlife crossing structures at existing roads (e.g., U.S. Route 1) and in new road designs.
- Use plantings, integrated pest management practices and stormwater management practices to minimize impacts of the North Post Golf Course.
- Use forest management practices (e.g., forest fire protection, insect and disease control, timber stand improvements) to preserve biodiversity and maintain forest health.
- Reforest disturbed areas.
- Avoid large-scale human intrusions that may fragment the corridor.
- Provide awareness training in corridor conservation and management.



In 1999, Fort Belvoir prepared an updated corridor management plan (Paciulli, Simmons and Associates, Ltd., 1999c). The 1999 plan update management recommendations are summarized below:

- Refine the corridor boundary.
- Maintain and enhance existing wildlife crossing structures.
- Identify locations for future wildlife crossing structures, and reforest disturbed and open areas.
- Safeguard the corridor and its function from future encroachment by development.

### **9.3.2 Previous and Current Special Natural Area Management Actions**

#### **9.3.2.1 Accotink Bay Wildlife Refuge**

Key management actions that have been undertaken in the ABWR include:

- Executed a series of boundary expansions, the latest of which added the remainder of the bald eagle habitat, the remainder of the key areas of wetlands and riparian corridor, habitat for several species of federal and state threatened and endangered bats, habitat for federal threatened (state endangered) small whorled pogonia, and additional habitat areas for rare species and PIF bird Species of Concern.
- Designated the ABWR as part of the “Environmental Constraints Complex” in the 2015 RPMP. (This Complex is classified in the Master Plan as “least suitable for development”.)
- Except for the mission-directed construction of the Access Control Point (the SSG John D. Linde Visitor Center) on Pohick Road, emphasized siting of new facilities outside the refuge boundaries, through the 1993 RPMP and the 2015 RPMP.
- Completed several major habitat enhancement projects, including vegetation planting/enhancements in T6-B, W-1, W-3 and W-6, and tree thinning in W-1 and T-9 to improve habitat for PIF Species of Concern bird species, and for other species of management priority.
- Coordinated timber stand improvement actions with wildlife habitat enhancement actions within several planted pine stands.
- Initiated several multi-year wildlife monitoring projects (in the broad installation area stretching from ABWR through the FWC and into JMAWR). These projects include long-term acoustic monitoring for northern long-eared bat and other bats, reptile and amphibian monitoring through series of cover boards and frog-loggers (call loggers), radio-telemetry of bats, and radio-telemetry of turtles, and seasonal bird surveys.

- Used wildlife seed mixes to stabilize disturbed areas (e.g., several Fairfax County sewer line projects, installation utility and infrastructure projects, area burned by wild fire, etc.).
- As part of the installation watershed management program (initiated under the 2001 INRMP), began performing stream restoration projects to correct stormwater management problems, and restore riparian habitats. To date, three stream restorations have been completed in subwatersheds to Accotink Creek. Additional restoration projects are in various stages of planning/design. Stream restoration is a mitigation commitment of the EIS ROD for the 2015 RPMP.
- Initiated several invasive/exotic vegetation control projects, including *Phragmites australis* control actions.
- Installed and maintained various wildlife habitat improvement structures (including wood duck nest boxes) throughout the refuge.
- Renovated and upgraded the refuge trail system, including trail realignment, footbridge repair/replacement, replacement of the large suspension bridge over Accotink Creek, and construction and maintenance of wildlife viewing structures. Maintained the Pohick Loop Trail as accessible to persons with disabilities.
- Developed and implemented a refuge facilities maintenance program, as part of the installation's Real Property Maintenance Contract.
- Corrected culvert and other water-related issues during the training roads renovation project.
- Installed three wildlife crossing structures (one specifically for reptiles and amphibians) on Pohick Road as part of the BRAC 2005 Infrastructure project.
- Developed and installed new interpretive displays in association with the trail system.

### **9.3.2.2 Jackson Miles Abbott Wetland Refuge**

Key management actions that have been undertaken in the JMAWR include:

- Expanded the boundary to include additional wetlands and watershed area, habitat for several species of federal and state threatened and endangered bats, habitat for federal threatened (state endangered) small whorled pogonia, and habitat for PIF bird Species of Concern.
- Designated the JMAWR as part of the "Environmental Constraints Complex" in the 2015 RPMP. (This Complex is classified in the Master Plan as "least suitable for development").
- Emphasized the siting of new facilities outside the refuge boundaries, through the 1993 RPMP and the 2015 RPMP
- Renovated Mulligan Pond, including installation of new water control structure, stabilization of inlet and outlet areas, bank planting, dredging for sediment removal, and fish stocking

- Renovated and upgraded the refuge trail system, including trail realignment, construction of a wildlife viewing structure, a trail section that is accessible to persons with disabilities, and construction of three fishing piers accessible to persons with disabilities
- Renovated the refuge main entrance, including parking facilities
- Developed and implemented a refuge facilities maintenance program, as part of the installation's Real Property Maintenance Contract
- Developed and installed new interpretive displays.
- Replaced the wildlife viewing structure and the refuge marker that were destroyed by vandals

### **9.3.2.3 Operational Range T-17 Refuge**

Key management actions that have been undertaken in the T-17 Refuge include:

- Established this refuge to protect significant natural resources, including *Stygobromus phreaticus*, and wetlands.
- Designated the T-17 Refuge as part of the "Environmental Constraints Complex" in the 2015 RPMP. (This Complex is classified in the Master Plan as "least suitable for development".)
- Emphasized the siting of new facilities outside the refuge boundaries, through the 2015 RPMP.
- Constructed a nature trail in the lower section, and connected the trail to the recently constructed fishing pier on Gunston Cove in T-17.
- Continued to monitor the T-17 seep for *Stygobromus phreaticus* and to sample groundwater wells in the area for water quality.

### **9.3.2.4 Fort Belvoir Forest and Wildlife Corridor**

FWC management actions to date have focused on conserving the FWC as a continuous forested band through Fort Belvoir, and maintaining and enhancing wildlife movement through the Corridor. Management actions that have been accomplished since 1993 include the following:

- Executed a series of boundary expansions (see section 9.2.1.4), the latest of which added the remainder of the Accotink Creek riparian area on Main Post, wetlands, habitat for several federal and state threatened and endangered bats, habitat for federal threatened (state endangered) small whorled pogonia, habitat for state threatened wood turtle habitat, and habitat areas for rare species and PIF bird Species of Concern.
- Designated the FWC as part of the "Environmental Constraints Complex" in the 2015 RPMP. (This Complex is classified in the Master Plan as "least suitable for development".)
- Emphasized siting of new facilities outside the FWC, through the 1993 RPMP and the 2015 RPMP.

- Developed and installed nine wildlife crossing structures on post for the Fairfax County Parkway, Gunston Road, Kingman Road and Jeff Todd Way where these roads cross the FWC.
- Monitored the existing crossing structures for wildlife use. Executed a project to correct conditions at five existing crossings to improve wildlife use. Two locations required site work to clean out sedimentation; three required physical repair/modification to the structure.
- Coordinated with FHWA for them to construct two wildlife crossing structures on U.S. Route 1 as part of the U.S. Route 1 road widening project, (where it passes through the FWC).
- Coordinated with FHWA for them to remove pavement from, and re-forest, the closed section of Woodlawn Road through the FWC. This is a mitigation for the construction of the Richmond Highway-Telegraph Road Connector (now known as Jeff Todd Way) through the FWC (U.S. DOT 2007).
- Minimized land-disturbing activities and tree removal within the FWC
- Relocated the southern portion of the Intelligence and Security Command security fence outside of the FWC.
- Reforested disturbed areas of the FWC (e.g., area between the North Post Golf Course and Kingman Road, open area along Fairfax County Parkway through the FWC, area between Beulah Road and Backlick Road, area east of Beulah Road, southern perimeter of the Golf Course, etc.).
- Prioritized the FWC to receive plantings to off-set tree removals elsewhere on the installation.
- Executed a natural stream channel restoration project to improve conditions at one of the Fairfax County Parkway wildlife crossing structures. Have several more stream restoration projects in various stages of planning/design.
- Followed the installation's Integrated Pest Management Plan and a Nutrient Management Plan at the Golf Course.
- Allowed for regeneration of previously cleared utility rights-of-way after overhead lines were undergrounded.

### **9.3.2.5 Accotink Creek Conservation Corridor**

Key management actions that have been undertaken in the Accotink Creek Conservation Corridor include:

- Emphasized siting of new facilities outside boundaries of this area, through the 2015 RPMP.
- Designated the Accotink Creek Conservation Corridor as part of the "Environmental Constraints Complex" in the 2015 RPMP. (This Complex is classified in the Master Plan as "least suitable for development".)

- As part of the BRAC 2005 construction on FBNA, installed a BEBO Arch to function as a wildlife crossing structure on an Accotink Creek tributary in this area.
- Removed old paved roads that were no longer needed after the BRAC 2005 construction.

### **9.3.2.6 Conservation Education and Outreach**

The installation's Special Natural Areas (primarily the refuges) and the ABWR Environmental Education Center have served many diverse educational and outreach functions for the installation.

#### ***Education***

Educational activities have included the following:

- Hosting Earth Day events, including events with DA- and DoD-level involvement.
- Hosting a variety of interpretive programs (e.g., bird walks, fishing clinics, wildflower walks, wildlife presentations, etc.).
- Hosting a variety of hands-on conservation learning events, including fishing clinics.
- Providing presentations to Fort Belvoir (and off-post) school groups (e.g., Earth Day Programs, Environmental Career Day Programs, curricula in support of Standards of Learning (SOLs)).
- Operating ABWR Environmental Education Center for drop-in and formal program events (now only by appointment only, as staffing and resources allow; previously was open on a seasonal basis).
- Providing programs to DFMWR events, include various summer camping and overnight camping events at the Tompkins Basin Recreational Area.
- Supporting Fort Belvoir in the Partners in Education program with several local off-post schools.
- Supporting native plant demonstration projects with groups such as the Fort Belvoir Girl Scouts and the Fort Belvoir Garden Club.
- Supporting several university class groups for field study and research projects (e.g., spring fish migration surveys, ground water seep surveys, botanical surveys) by several regional universities.
- Designing and fabricating educational displays for indoor and outdoor use
- Preparation of Fort Belvoir-specific conservation education materials, such as Fort Belvoir Bird List, Fort Belvoir "Plant and Animal Safety Concerns" briefing (Appendix M).
- Writing and publishing (e.g., in the Fort Belvoir Eagle) articles on natural resources and conservation topics for Fort Belvoir.
- Providing installation natural resources personnel as speakers to installation groups and events.

## **Outreach**

Outreach events and activities have included the following:

- Hosting professional meetings, conferences and trainings, including the 2000 PIF Mid-Atlantic Coastal Plain Bird Conservation Plan Conference, bendway weir training, stream restoration training, low-impact development training, bat survey/acoustic monitoring training for regional DoD biologists etc.
- Including the ABWR and JMAWR trail systems on the published Virginia Coastal Birding Trail.
- Supporting various environmental events by outside entities (e.g., Fairfax County Earth Day, and other environmental celebrations, public release of a rehabilitated bald eagle, etc.).
- Supporting scouting organization events (e.g., troop service projects, Eagle Scout projects for trail infrastructure service, invasive species control (mechanical removal, only)).
- Hosting various publically accessible environmental service days, such as the annual National Public Lands Day events, annual Virginia Shoreline Clean-up Day, and annual Christmas Bird Count.
- Providing biological information and photographs for professional-level publications addressing natural resources in the Fort Belvoir area (e.g., several technical reports by DCR-NHP, articles for the Virginia Wildlife Magazine).

## **9.4 CONTINUING AND FUTURE SPECIAL NATURAL AREAS MANAGEMENT**

Fort Belvoir intends to continue the management emphasis and actions addressed in Section 9.3. Fort Belvoir will continue to follow sound ecosystem management principles to conserve natural resources while maintaining no net loss of military training and testing capabilities. Fort Belvoir will continue to use “Special Natural Area” designation, in accordance with DODI 4715.03, to manage areas of the installation where resources warrant special conservation as consistent with military mission. Fort Belvoir will continue to consider such resources to include resources that have been assigned high conservation priority by statute or regulation (e.g., federal threatened species), resources previously identified as mitigation commitments under NEPA (e.g., the FWC), and resources with acknowledged regional ecological significance (e.g., extensive wetlands). Management will strive for no net loss of military training and testing capabilities. Fort Belvoir will continue to provide the public opportunities to access natural resources within the Special Natural Areas consistent with resource management goals, and with mission and operations and security requirements.



## 9.5 SPECIAL NATURAL AREAS MANAGEMENT GOALS, OBJECTIVES, AND STRATEGIES

### 9.5.1 Projects

Proposed activities that are considered Projects in this INRMP are activities that may potentially impact the environment and would need to be evaluated for the appropriate level of NEPA documentation. The following goals contain Projects within their objectives or strategies:

**Goal 1:** Continue to provide for conservation of significant natural resources, in balance with military mission and public access requirements.

- **Objective:** Conserve areas of ecologically significant resources, consistent with DoD policy (DoDI 4715.03) for designating specific areas of the installation that warrant special conservation as “Special Natural Areas”, consistent with military mission: ABWR, JMAWR, T-17 Refuge, FWC, and Accotink Creek Conservation Corridor.
- **Strategy:**
  - 1) Maintain designation of these areas as environmentally constrained to development in the installation RPMP, and as warranting conservation consideration in other installation plans and documents.
  - 2) Designate new Special Natural Areas where legally obligated to do so.
  - 3) Maintain and communicate access/use policy for Special Natural Areas.
  - 4) Incorporate Special Natural Area boundaries, and supporting documentation, into the installation GIS, real property records, and installation natural resources databases.
  - 5) Install and maintain signage and markers identifying Special Natural Areas, and their boundaries, in the field.

**Goal 2:** Continue to obtain scientific information on natural resources through surveys and monitoring. Monitor natural resources within Special Natural Areas to evaluate the potential for enhancement, and to assess the presence and effect of stressors. Identify and execute actions for enhancement, or protection, as appropriate.

- **Objective:** Prioritize Special Natural Areas on installation-wide efforts (e.g., rare species surveys [Section 8], bald eagle monitoring [Section 7], aquatic monitoring [Section 5] invasive and exotic species survey [Section 6], etc.)
- **Strategy:** Obtain scientific information on items of management interest specific to natural resources/ecological functions of Special Natural Areas. Such work includes:
  - 1) Wildlife movement surveys within the FWC
  - 2) Wildlife use monitoring of existing wildlife crossing structures within the FWC

- 3) User surveys of the nature trail systems
- 4) Assessment of the natural resources and their specific conservation needs of the T-17 Refuge and the Accotink Creek Conservation Corridor, and prepare area-specific management plans, as needed. Data gaps exist for rare plant communities, wildlife movement, and migratory fish presence/passage in these area. There is a continuous need to monitor for invasive vegetation/pest species.

**Goal 3:** Continue to protect and enhance natural resources and habitats.

- **Objective:** Manage access to, and use of, Special Natural Areas with emphasis on compatibility with natural resources conservation. Aim to keep access and use at levels that do not risk damage to the natural resources of management concern.
- **Strategy:**
  - 1) Identify and execute projects in response to identified opportunities for natural resources enhancement, or in situations where stressors are adversely affecting resources of conservation priority.
  - 2) Projects could be executed under installation-wide programs (e.g., fish and wildlife management [Section 7]; endangered, threatened, or rare species management [Section 8]; vegetation management [Section 6]; water resources management [Section 5.3], wetlands management [Section 5.3] etc.). Prioritize Special Natural Areas work under these programs.
  - 3) Projects could also be executed as stand-alone actions, such as maintenance and repair of existing wildlife crossing structures, or projects to improve fish passage.

**Goal 4:** Continue to implement outreach for public access, and environmental awareness and education programs

- **Objective:** Emphasize environmental education, scientific research and study; and low-intensity outdoor recreation and military training. Continue to discourage land disturbing activities, and other activities and events that may conflict with resource conservation.
- **Strategy:**
  - 1) Maintain and communicate specific Special Natural Area access and use policies and restrictions. Execute through installation Policy Memos; area and trail pamphlets, and signage; and briefing documents.
  - 2) Require all requests for non-routine Special Natural Area access and use to be coordinated through DPW- Environmental Division for review and approval.
  - 3) Monitor Special Natural Area use, and evaluate effect on resource conservation. Consider altering use policies, if necessary, to protect resources.
  - 4) Develop and maintain hiking trail systems and associated access facilities in ABWR, JMAWR, and T-17 Refuge for low-intensity use.

- 5) Develop and maintain interpretive/conservation education displays in ABWR, JMAWR, and T-17 Refuge.
- 6) Maintain and staff the ABWR Environmental Education Center.
- 7) Develop and maintain environmental education materials, such as displays, handouts, and curricula.
- 8) Develop and maintain fishing structures and wildlife viewing structures.
- 9) Investigate a Partner in Education relationship with local schools.
- 10) Investigate partnering, or entering into Memoranda of Agreement/Cooperative Agreements with Universities or other educational institutions to support educational programs at the refuges.
- 11) Conduct educational events in/associated with the refuges, including events/programs at the ABWR Environmental Education Center.
- 12) Prepare natural resources articles for publication (e.g., in the Belvoir Eagle)
- 13) Investigate a Qualified Volunteer Program to provide such services as organized clean-up days, minor facilities maintenance, educational programs, etc.
- 14) Respond to requests for technical information, or presentations, from on-post and off-post entities
- 15) Investigate development and use of educational applications for cell phone and other mobile technologies.
- 16) Coordinate with natural resources staff associated with refuges, parks and other conservation properties in the region, as appropriate.

## 9.5.2 Actions

Actions are those activities that do not require ground breaking or environmentally altering activities. The following goals contain Actions within their objectives or strategies.

**Goal 5:** Continue to incorporate natural resources conservation goals into installation-wide actions.

- **Objective:** Review all installation actions for potential impact to natural resources within Special Natural Areas. Identify and execute mitigation.
- **Strategy:**
  - 1) Include Special Natural Areas considerations in all review processes (e.g., project planning, NEPA evaluation, engineering planset review, Excavation Permit Review, Annual Work Plan Development, etc.).
  - 2) Include Special Natural Areas considerations in all installation planning processes (e.g., real property master planning, small area planning, stationing, privatization planning, five-year utility maintenance and modernization planning, etc.).

- 3) Identify and execute actions to avoid, minimize, or off-set impacts of installation actions on ecologically significant natural resources.
- 4) Integrate Special Natural Areas management with other installation programs as Spill Response, Wildland Fire Management, and Cultural Resources Management, Military Munitions Response and Installation Restoration programs, MS4 and Industrial Stormwater Programs.
- 5) Integrate Special Natural Area management with installation operation and security requirements.
- 6) Upon request from DES, provide support to investigation and enforcement actions regarding violations of Federal and state natural resources laws and regulations.

**Goal 6:** Continue to maintain Special Natural Areas information so it is accessible to, and can be used by, installation natural resource managers.

- **Objective:** Develop and implement a Special Natural Areas database.
- **Strategy:**
  - 1) Develop a system for storing and managing Special Natural Areas information
  - 2) Enter electronic data
  - 3) Scan and upload paper records.

**Goal 7:** Continue to make information on the Special Natural Areas available.

- **Objective:** Keep installation decision makers, and users of installation lands, informed of the Special Natural Areas
- **Strategy:**
  - 1) Update the installation GIS to contain accurate Special Natural Areas boundaries, and supporting information.
  - 2) Maintain Special Natural Area boundaries and supporting information in installation plans, records and documents.

**Goal 8:** Continue to issue installation-specific policy and guidance documents.

- **Objective:** Provide direction and guidance for projects which may impact Special Natural Areas
- **Strategy:** Develop and maintain a policy memorandum regarding Special Natural Areas, and update refuge and trails brochures.

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## **10.0 RECREATIONAL OPPORTUNITIES**

Fort Belvoir provides numerous recreational opportunities whether consumptive or non-consumptive in accordance with the Sikes Act. Opportunities can be found in various publically accessible installation areas such as Tompkins Basin. Activities such as hunting take place in areas off limits to the public through authorized use only. Fort Belvoir's location also provides miles of shoreline accessible by foot or watercraft. Consumptive and non-consumptive recreation rules and procedures as well as permits (in accordance with the Sikes Act) are found in the Fort Belvoir Watercraft Recreation, Hunting, and Fishing Policy #75 (Appendix C). Recreation access is controlled and monitored through the use of iSportsman, a software program that allows for the control of recreational access on the installation.

### **10.1 CONSUMPTIVE OPPORTUNITIES**

#### **10.1.1 Hunting**

The current relationship between wildlife management and recreational hunting maximizes hunter opportunity to reduce overabundant deer and Canada goose populations. Liberal seasons and harvest limits that allow the use of archery equipment (deer) and firearms (Canada geese) are selected to reduce the populations of both. Hunting is an effective management tool to achieve population levels that are most beneficial to a given species (e.g., populations that minimize the potential for disease problems), and that do not adversely affect other species or their habitats. The Fort Belvoir hunting program is not intended to introduce or increase populations of game species. Fort Belvoir maintains a Fish and Wildlife Conservation Fund, in accordance with the Sikes Act, which allows installations to establish fees for hunting, fishing, or trapping. The fees must be used for fish and wildlife related expenses on the installation such as protection, conservation, and management of fish and wildlife, including habitat improvement and related activities. DoDI 4715.03, enclosure 3(6)(c)(3) requires and installation to use the same fee schedule for all participants, with the exception of senior citizens, children, and the disabled. Information (rules, regulations, maps, etc.) regarding the Fort Belvoir hunting program can be located on the Fort Belvoir iSportsman ([www.fbisportsman.net](http://www.fbisportsman.net)) and Fort Belvoir DFMWR-Outdoor Recreation ([www.belvoir.armymwr.com/categories/outdoor-recreation](http://www.belvoir.armymwr.com/categories/outdoor-recreation) websites).

#### **10.1.2 Bowhunting**

Fort Belvoir's bowhunting program has existed since the early 1980's. Bowhunters are required to have all necessary state hunting permits (which require a hunter's safety course to obtain), attend an International Bowhunting



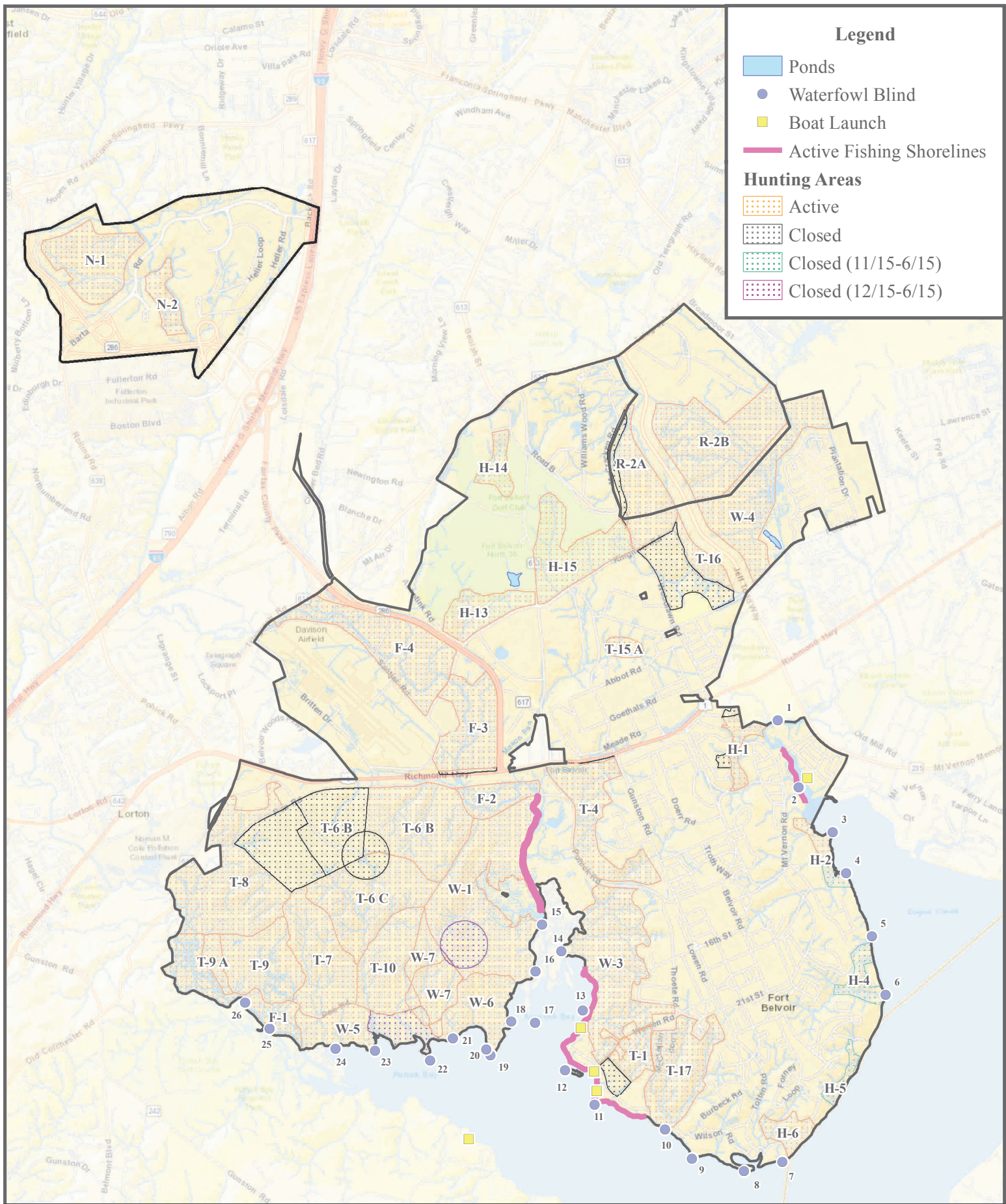
Education Program (IBEP), and pass a qualification test. The qualification test requires a bowhunter to place two out of three arrows (with broadheads) inside a nine inch circle at distances of 20 and 30 yards. Equipment is limited to recurve, longbow, compound bow, and crossbow (with doctor's approval). The use of crossbows is permitted in Virginia; however, use by all customers is currently under consideration by installation staff. Fort Belvoir allows the bowhunting of white-tailed deer, wild turkey, and other species that are in season and in accordance with VDGIF laws and regulations.

#### **10.1.2.1 White-tailed Deer**

Fort Belvoir's most popular game species is the white-tailed deer. The Fort Belvoir deer hunting program has existed for several decades with population, access, and harvest data dating back to the early 1980's. Hunters harvested a record 250 deer in 1998 when population levels were at an all-time high. Since the inception of a nationally recognized hunting program, liberal harvest limits (unlimited daily antlerless harvest), and seasons that occur from early September through the end of March, declines in population and harvest have occurred. The installation is divided into 34 hunting areas (Figure 10.1) as determined by training areas, roadways, and geographical features. These 34 areas accommodate 134 total hunting slots available to the public. Some areas, because of their proximity to major roadways and on-base housing, require hunters to use elevated tree stands only. Fort Belvoir participates in the VDGIF Deer Management Assistance Program (DMAP) program, which requires hunters to provide weight, sex, antler measurements, and health information, as well as removal of a jawbone for submission to DPW- Environmental Division for age determination. This data is then submitted by DPW- Environmental Division to VDGIF and a yearly report is provided by VDGIF to DPW- Environmental Division in order to assess overall herd health and make recommendations if necessary. Current data suggest a relatively healthy, stable, and balanced herd when compared regionally.

#### **10.1.2.2 Wild Turkey**

Fort Belvoir's second most popular game species is the eastern wild turkey. Fort Belvoir established a wild turkey season in 2000, for recreational purposes only. Current seasons and harvest limits (spring and fall) are based upon seasons/harvest limits set forth by VDGIF. Wild turkey can only be hunted by means of bowhunting; no firearms are permitted. The use of bowhunting equipment has limited the harvest of wild turkey, with no more than seven males (spring gobblers) harvested in the spring, and seldom more than one turkey (male or female) harvested in the fall. There are currently five zones (Figure 10.2) that make up the spring turkey season, accommodating 20 hunters and a maximum of 40 hunters if hunting in pairs. Hunters are required to provide the sex, weight, spur length, and beard length (if applicable) to DPW- Environmental Division.

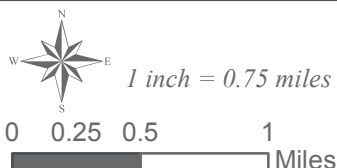


# CONSUMPTIVE OUTDOOR RECREATION ON FORT BELVOIR

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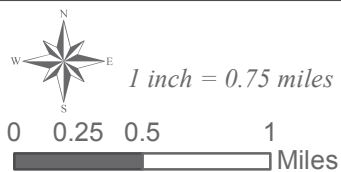
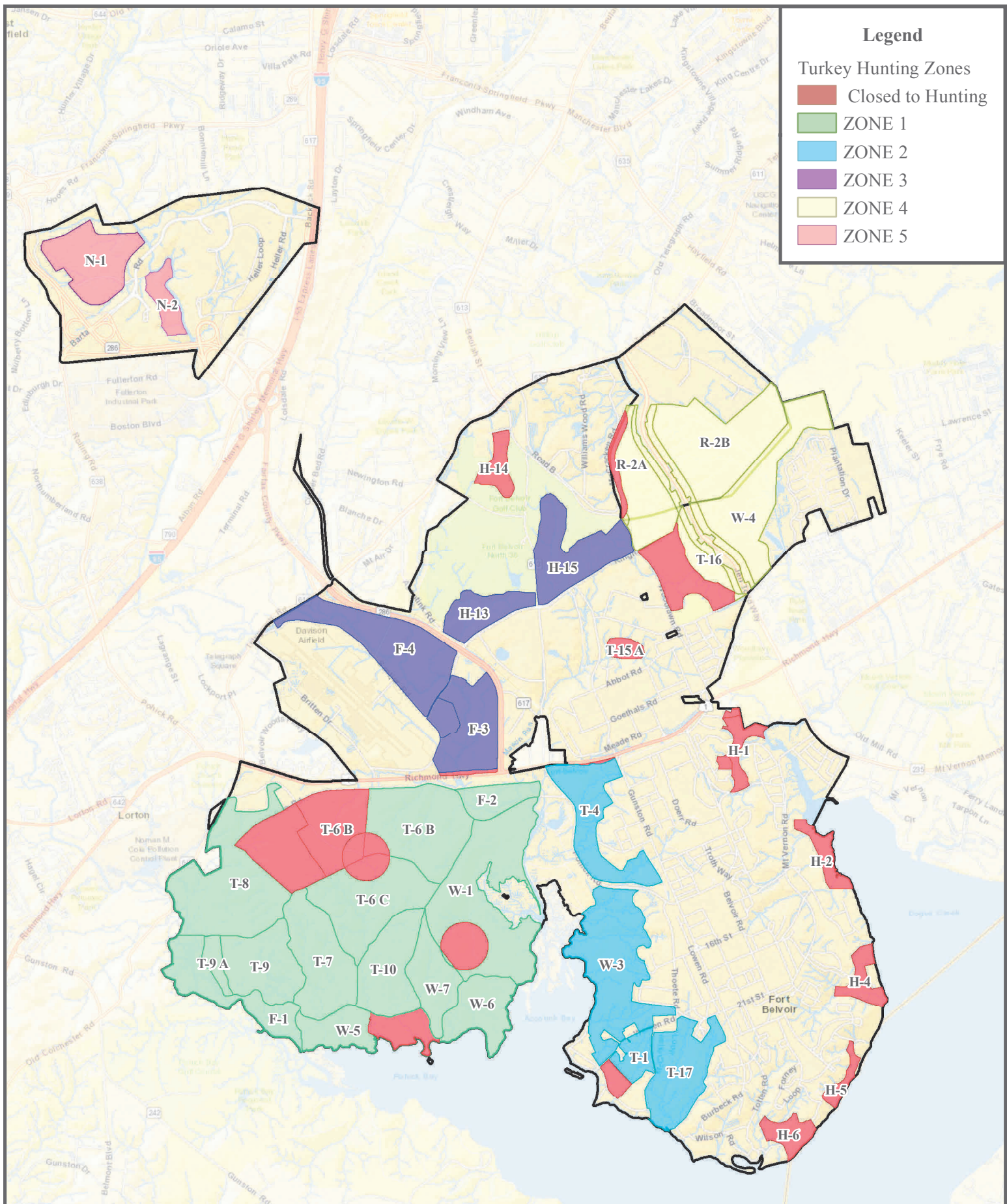
**Figure 10.1**

Source: Fort Belvoir GIS,  
Google road maps



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## TURKEY HUNTING ZONES ON FORT BELVOIR

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**Figure 10.2**  
Source: Fort Belvoir GIS,  
Google road maps

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### **10.1.2.3 Waterfowl**

Fort Belvoir established a waterfowl season in 2006 for recreational purposes only; however, its continuation as a management tool for Canada geese is imperative. Seasons are established by the USFWS and VDGIF annually, starting with early-resident Canada goose (September) followed by various seasons from the end of September (teal), October-January (all approved waterfowl), and February (late Canada goose). The waterfowl hunting program allows the use of firearms, and takes place along the shorelines of Fort Belvoir, where three zones are established (Dogue/Potomac, Accotink Bay/Gunston Cove, Pohick Bay). These zones were established through recommendations by the USFWS and VDGIF to accommodate bald eagles (resting, foraging, and nesting areas), and waterfowl (resting/foraging areas), and have proven to be essential. These zones are utilized for hunting on a rotational basis and schedule as established by DPW- Environmental Division. Waterfowl hunting is closed two days per week to offset the opening of all three zones on Saturday to maximize opportunity and participation by hunters. Waterfowl and bald eagle habits are monitored daily to determine if changes in blind/zone schedules are necessary. A total of 26 blinds (25 stationary and one boat pull-in) are established and accommodate a maximum of 104 hunters (4 per blind). Hunters are required to provide the total number of ducks/geese harvested by species, as well as report any waterfowl containing leg-bands to DPW- Environmental Division. The most abundant waterfowl species harvested are Canada geese, mallard duck (*Anas platyrhynchos*), lesser scaup (*Aythya affinis*), and bufflehead (*Bucephala islandica*).

### **10.1.2.4 Fishing**

Fishing opportunities abound at Fort Belvoir, and require a Virginia state permit and a soon to-be-established Fort Belvoir fishing permit. Fishing is permitted at two ponds (Section 7.0), 3 streams (Dogue, Accotink, and Pohick Creeks), Potomac River, and Tompkins Basin. Shoreline access (walk-in) is limited to the two ponds, Tompkins Basin, and various locations along Accotink Bay, Accotink Creek, Gunston Cove, and Dogue Creeks. For those interested in fishing Accotink Bay and Creek, north of Tompkins Basin, access is permitted by using the various trail systems. Fishing is not permitted on Accotink Creek from the Poe Road Bridge north to Telegraph Road, and within the boundaries of FBNA. Shoreline access is not available to Pohick Bay or Pohick Creek, as well as Potomac River, access is only possible by watercraft. Non-motorized watercraft (kayak, canoe, car-top boat, etc.), as well as watercraft powered by electric motors, can be launched at three locations in Tompkins Basin (see Figure 10.1). Motorized watercraft (gas) can be launched at Fort Belvoir's Dogue Creek Marina or from various off-post marinas.

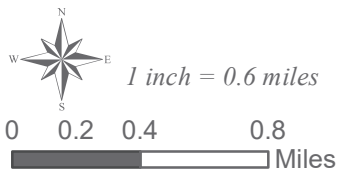
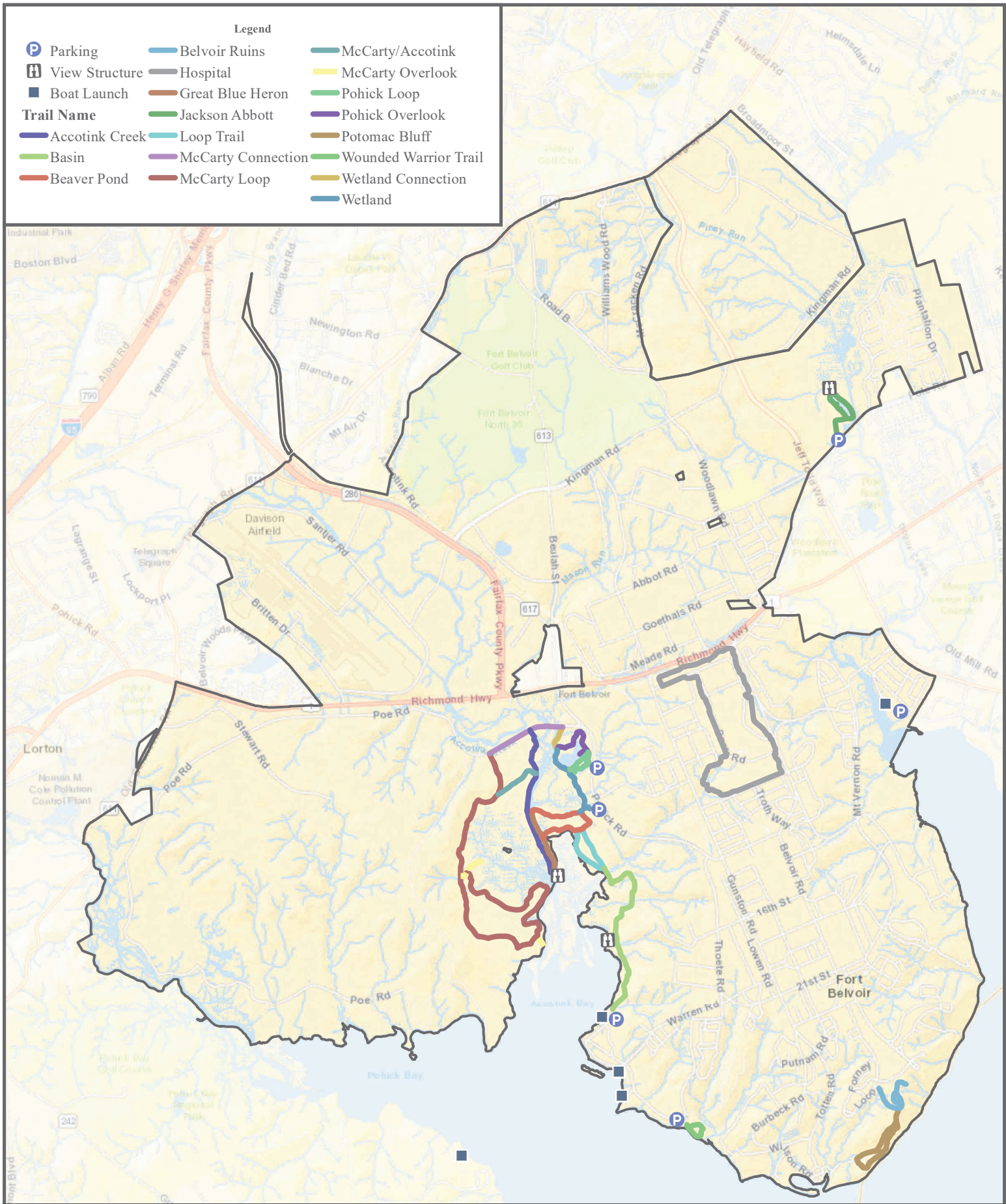
Two fishing piers at Tompkins Basin, and three at Mulligan Pond (see Figure 10.1), offer access to the general public and also accommodates those with



disabilities. Various fishing tackle and baits as well as canoe/kayak rentals are available in Tompkins Basin at Building 778- DFMWR Outdoor Recreation.

## **10.2 NON-CONSUMPTIVE OPPORTUNITIES**

Fort Belvoir offers numerous locations for non-consumptive recreational activities (Figure 10.3). The ABWR contains approximately 14 miles of trail systems that can be utilized for such activities as bird watching, photography, and hiking. The trail system contains two wildlife viewing structures, one at the end of the Basin Trail Overlook and one at the end of the Great Blue Heron Trail. These structures offer views of Accotink Bay where waterfowl, shorebirds, and raptors can be seen. These same opportunities exist at the JMAWR where a viewing platform overlooks the wetlands. For more information on these areas see the Special Natural Areas Section (Section 9).



## NON-CONSUMPTIVE OUTDOOR RECREATION

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**Figure 10.3**  
Source: Fort Belvoir GIS,  
Google road maps

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## 11.0 INTEGRATED PEST MANAGEMENT

In accordance with DoD Instruction 4150.07, DoD Pest Management Program and AR 200-1, Fort Belvoir operates under an Integrated Pest Management Program (IPMP). Fort Belvoir's IPMP is carried out by a designated Installation Pest Management Coordinator (IPMC) under the "Fort Belvoir Integrated Pest Management Plan" (Appendix D). Installation-specific IPMP policy is contained in Fort Belvoir Policy Memorandum #32, *Fort Belvoir Integrated Pest Management* (Appendix C). A new IPMC designation is done upon change of command or change in IPM personnel. The IPMP Policy Memorandum is reviewed annually and revised as needed.

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## **12.0 BIRD/WILDLIFE STRIKE HAZARD MANAGEMENT**

The Fort Belvoir Wildlife Hazard Management Plan (WHMP) for Davison Army Airfield (DAAF) (Appendix G) was established in June of 2015. The purpose of the plan is to minimize the potential of a bird/wildlife strike to aircraft, using an integrated approach of techniques and entities. The WHMP establishes a Wildlife Working Group (WWG) comprised of installation and airfield staff, and designates responsibilities to its members. It also establishes procedures for reporting hazardous bird/wildlife activity in and around DAAF and altering or discontinuing flying operations. Procedures are established to identify these hazards and to aid supervisors and aircrews in disseminating information, issuing alerts, and altering or discontinuing flying operations when required. To reduce hazards, the WHMP also establishes active and passive techniques to disperse birds/wildlife from the airfield as well as decreasing the attractiveness of the airfield to birds/wildlife.



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## **13.0 WILDLAND FIRE MANAGEMENT**

In accordance with DoDI 4715.03, which states that “all DoD Components shall manage fuel loads, and provide adequate planning for wildland fire management,” and AR 200-1, which states that “installations with unimproved grounds that present a wildfire hazard and/or installations that utilize prescribed burns as a land management tool will develop and implement an Integrated Wildland Fire Management Plan (IWFMP) that is compliant and integral with the INRMP,” Fort Belvoir DPW and Fort Belvoir DES have developed an IWFMP (Appendix D). The plan establishes roles and responsibilities, procedures, and requirements for planning and controlling wildland fires on Fort Belvoir. It contains installation- specific information on interagency cooperation, cultural resource considerations, the history of the installation’s wildland fires, and wildland firefighting equipment. The Department of the Army Wildland Fire Policy Guidance (U.S. Army, 2002) requires that the IWFMP be reviewed annually and revised at least once every five years.

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## **14.0 CONSERVATION LAW ENFORCEMENT**

Fort Belvoir has federal exclusive jurisdiction over its natural resources.

Federal and state Natural Resources law enforcement on the installation can only be performed by enforcement officers with federal commission. The Garrison Commander has authority to enforce federal and state (assimilated) law on the installation. A 2006 Memorandum of Agreement between the U.S. Department of the Interior, U.S. Fish and Wildlife Service, and Fort Belvoir delegates authority to the installation to enforce federal laws dealing with the protection and conservation of fish, wildlife, cultural, and natural resources (e.g., Migratory Bird Treaty Act, Endangered Species Act, etc.) (Appendix N). Fort Belvoir DES has the responsibility for conservation law enforcement on post.

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## 15.0 INSTALLATION RESILIENCY

Fort Belvoir has prepared this section based on the DoD Directive 4715.21, Climate Change Adaptation and Resilience. Fort Belvoir has also collected and reviewed as many documents as possible and has found that the following factors should be monitored regarding Climate Change/Mission Resiliency:

- **Wildland Fire:** With the prediction of longer, hotter, and drier summers, wildland fire is an increasing threat to the Mission. Fort Belvoir has prepared a Wildland Fire Management Plan to prepare for these potential impacts see Appendix D.
- **Invasive Species:** Fort Belvoir has a management plan to control invasive species and is actively treating select installation areas each year (Section 6 and Appendix D). In addition, staff members are watching for new invasive species that may be spreading into the region as reported by local, regional and state partners.
- **Endangered and Threatened Species:** Fort Belvoir is actively surveying for and managing listed endangered and threatened species with state and federal partners as found in Section 8. In addition, Fort Belvoir actively monitors and participates in the National Listing Workplan with state and federal partners.
- **Migratory Birds Nesting:** With the prediction of longer, hotter, and drier summers migratory birds may nest earlier, as Fort Belvoir has observed in 2017 with Common Grackles. The potential for birds nesting earlier will need to be continually monitored, so Fort Belvoir remains alert to these changing conditions and avoids mission impacts. (see *Fort Belvoir Conservation of Migratory Birds Policy Memorandum*, in Appendix C.)
- **Severe Weather:** With the global annual sea level rise estimated at three millimeters a year, Fort Belvoir does not foresee an issue over the next five to fifteen years but this needs to be monitored and noted for future development and training needs. Installation Resiliency incorporates the conservation of habitat in the face of climate-related threats, such as severe weather and sea level rise. As described in the Fort Belvoir Severe Weather Vulnerability Operations Order (Appendix O), Fort Belvoir is preparing to face an increase in number and magnitude of storm surge, flooding, and wind events. Estimated projections show potential impacts to 667 acres, approximately 8% of the installation, if sea levels rise 12 feet. This would impact resources such as piers and waterfront services, transportation infrastructure and routes, natural resources, historic and cultural resources, and housing.

As part of a severe weather vulnerabilities assessment, Fort Belvoir identified the following short-term and long-term actions:



- Short term: closing access to flooded areas to allow for natural drainage, coordinating with the private utility companies to ensure services continue.
- Long-term: consideration for flood hazard risks in land use planning, widening US Route 1 which raised the roadway and bridges.

Fort Belvoir plans to work with local, regional, state, and federal partners to monitor factors indicative of climate change in order to avoid mission impact.

## **16.0 IMPLEMENTATION**

All requirements set forth in this INRMP requiring the expenditure of Fort Belvoir's funds are expressly subject to the availability of appropriations and the requirements of the Anti-Deficiency Act (31 USC Section 1341). No obligation undertaken by Fort Belvoir under the terms of this INRMP will require or be interpreted to require a commitment to expend funds not obligated for a particular purpose. This INRMP continues the management philosophy, as well as the program management goals, objectives and strategies from the previous INRMP (U.S. Army, 2001). As such, there has not been a major change to the installation's natural resources management program between the 2001 INRMP and this INRMP

### **16.1 COMPONENT PLANS**

Each INRMP section that describes the day-to-day and long-term operational perspectives of a natural resources management program area (e.g., Fish and Wildlife Management; Rare, Threatened and Endangered Species Management) on Fort Belvoir represents a Component Plan. Each Component Plan is implemented through program-specific goals, objectives, and strategies to meet the overarching natural resources management requirement to protect and enhance natural resources for mission support, biodiversity conservation, and maintenance of ecosystem services, with no net loss of military training and testing capabilities.

### **16.2 NATURAL RESOURCES MANAGEMENT BUDGETING**

The INRMP provides long-term natural resources management direction in the form of scheduled practices (recurring and non-recurring projects and supporting actions) that are incorporated into annual budget proposals. Funds are allocated annually based on budget proposals and congressional intent. Management goals and objectives are long-term. Projects and supporting actions may occur on an annual basis or may occur at specific times. They may have short (5 year or less) or long (up to 15 year) timeframes. To fully implement the goals, objectives, and strategies of the INRMP, annual budgets are programmed into the Army's Conservation Budgets and Conservation Program Objective Memorandum. U.S. Army Headquarters policies and guidance resources direct installation level conservation programming and budgeting. Fort Belvoir shall implement this INRMP subject to the availability of funding.

### **16.3 NATURAL RESOURCES MANAGEMENT STAFFING**

To successfully implement the INRMP, a combination of government staff persons, contract labor, and partners (including volunteers) is required. In addition to the six government natural resources staff persons within Fort Belvoir Division, execution of Fort Belvoir's natural resources management program currently uses approximately six person-years of contractor services. Other person-years of support are provided by other installation organizations (e.g., NAF, DES conservation law enforcement personnel), other government agencies (e.g., MIPR to fund other agency staff or interns for natural resources management program work), and by partners and volunteers. The Fort Belvoir Environmental Division Chief is responsible for enforcing compliance with the INRMP.

### **16.4 ANNUAL REVIEW AND COORDINATION**

Natural resources management is a dynamic process, and as such, management plans often require frequent reviews and updates. Following completion of the INRMP, Fort Belvoir's Conservation Branch Chief will do periodic reviews and updates to account for changes in the military mission, changes to natural resources or ecosystem conditions, or changes to the regulatory requirements or policies. The Conservation Branch Chief, in coordination with USFWS and VDGIF staff, will do an annual review for INRMP implementation and effectiveness. The results of this review will be provided to Fort Belvoir senior leadership, and will be incorporated into the INRMP, as appropriate. Informational changes and minor modifications to implementation strategies may be included as annotations or edits to the INRMP.

### **16.5 DOCUMENTATION OF INRMP IMPLEMENTATION**

The results of the Annual Review cycle will be maintained as part of the administrative record for Sikes Act implementation.

### **16.6 NATURAL RESOURCES MANAGEMENT WORK PLAN**

Subject to the availability of funds, the following projects and supporting actions are identified for the Natural Resources Management Program at Fort Belvoir:

## 16.6.1 Annual Projects and Actions

Tables 16-2 through 16-6 refer to projects and actions that are completed by the installation staff and contractors on an annual basis.

### 16.6.1.1 Water Resources Projects and Actions

Table 16-1: Water Resources Tasks Performed Annually	
Project/Action	Description
Maintain water resources information in installation documents and databases	Maintain and update baseline information. Include in RPMPs, Small Area Plans, real property records, etc. as appropriate. Review, verify and update information in the GIS. Field verify wetland and RPA PLS boundaries, as needed.
Perform year-round surveillance of water resources	Review existing conditions in the field. Address wetlands, streams and ponds. Include fish and benthic communities. Evaluate presence and effect of stressors (e.g., invasive plants, excessive stormwater flows, ground disturbance) and propose action, as appropriate. Select representative sample to survey each year.
Review ongoing and proposed installation actions for potential to impact water resources	Assess water resources in planning actions (e.g., real property master planning, small area planning, stationing, real estate actions, privatization, siting, etc.); NEPA evaluations and mitigations; engineering planset development and review; environmental permitting; environmental restorations; military testing and training; operations and maintenance; excavation and demolition permitting; work order review; and all other installation project and activity review processes. Advise on strategies to avoid/minimize impact, and on regulatory compliance requirements, as appropriate.
Identify possible projects/actions to conserve/enhance water resources	Identify opportunities for stream restoration, riparian buffer restoration/enhancement, wetland restoration/enhancement, aquatic habitat, etc.

<b>Table 16-1: Water Resources Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Identify and conserve ecologically significant water resources	Continue to consider ecologically significant water resources as resources warranting special conservation efforts and designation as “Special Natural Areas” under DoDI 4715.03. Maintain existing Special Natural Area boundaries. Designate new Special Natural Areas where there is a legal requirement to do so.
Evaluate water resources in support of military mission	Perform localized/activity-specific water resources studies/monitoring/evaluations in support of ongoing or proposed mission activities. Identify and provide advice regarding regulatory compliance requirements, as well as for resource conservation.
Incorporate conservation projects/actions into operations and maintenance	Identify and incorporate water resource conservation initiatives into operations and maintenance work (e.g., re-planting/enhancing native vegetation in disturbed riparian/shoreline areas; clearing debris from culverts, etc.)
Identify and manage regulatory compliance actions	Develop and submit wetland permit applications. Monitor for permit compliance. Maintain records. Coordinate with regulatory agencies (e.g., USACE, VDEQ, VMRC), and prepare and submit reports as required. Advise, prepare corrective action plans, and report to regulatory agencies on permitted and unpermitted actions where corrective actions are required. Identify and recommend impact mitigation, and monitor and report to regulatory agencies on mitigation implementation.
Coordinate with regulatory and stewardship agencies and entities	Maintain regular professional coordination with regulatory agencies (e.g., USACE, VDEQ, VMRC) and stewardship agencies (e.g., DCR-NHP, Chesapeake Bay Program Office, Northern Virginia Soil and Water Conservation District). Include discussion of partnerships and cooperation on regional stewardship initiatives, as appropriate.
Prepare and maintain policies and guidance documents	Review and revise existing written policy and guidance documents on water resources (e.g., wetland permit process guidance for Fort Belvoir). Evaluate the need for additional Fort Belvoir-specific policy and guidance documents on wetlands, streams, riparian areas, etc. Prepare policy memorandum on riparian buffers.
Support emergency situations	Provide technical assistance to emergency situations, such as fuel spills, that could threaten water resources.

<b>Table 16-1: Water Resources Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Support regulatory compliance and enforcement	Perform compliance inspections to address federal and state laws and regulations, as applicable to Fort Belvoir, and DoD, DA and Fort Belvoir policies on water resources. Enforce federal and state water resources laws and regulations, applicable to Fort Belvoir, as well as DoD, DA and Fort Belvoir water resources policies.
Evaluate water resources conditions	Perform an annual survey of a representative sample of installation water resources (including streams, wetlands, ponds and riparian areas) to evaluate the effectiveness/success of management actions (including mitigations and corrective actions).
Provide education and training on water resources	Identify and provide opportunities for specialized training in water resources management/conservation for garrison, partner, tenant, and contractor staff, as appropriate.
Publish educational information on water resources	Write and publish articles for the Fort Belvoir website, Fort Belvoir newspaper (Belvoir Eagle), DoD Chesapeake Bay program publications, etc., as appropriate. Continue to respond to requests for information from on-post and off-post entities, as appropriate.
Provide technical information on water resources	Respond to requests from on-post and off-post entities, as appropriate. Manage water resources information to be accessible to installation natural resources managers, and other personnel, as appropriate.
Support public outreach	Participate in educational and service events/projects, as appropriate.

### 16.6.1.2 Vegetation Annual Projects and Actions

<b>Table 16-2: Vegetation Management Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Maintain vegetation resource information in	Maintain and update baseline information. Include in RMPs, small area plans, real property records, etc., as appropriate. Review, verify and update information in the GIS. Field verify vegetation communities, forest inventories, etc., as needed.



<b>Table 16-2: Vegetation Management Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
installation documents and databases	
Perform year-round surveillance of vegetation conditions (developed and undeveloped installation areas)	Review existing conditions in the field. Address vegetation communities, forest, urban forest, etc. Evaluate presence and effect of stressors (e.g., invasive vegetation, forest pests, disease, land disturbance, etc.) and propose action, as appropriate.
Review ongoing and proposed installation actions for potential to impact vegetation resources	Assess vegetation resources in planning actions (e.g., real property master planning, small area planning, stationing, real estate actions, privatization, siting, etc.); NEPA evaluations and mitigations; engineering planset development and review; environmental permitting; environmental restorations; military testing and training; operations and maintenance; excavation and demolition permitting; work order review; and, all other installation project and activity review processes. Advise on strategies to avoid/minimize impact, and on regulatory compliance requirements, as appropriate.
Identify possible projects/actions to conserve/enhance vegetation resources	Identify opportunities for replanting/reforesting (e.g., disturbed areas in FWC, riparian areas, shoreline, etc.). Incorporate into annual funding requests, annual work plans, mitigation planning, etc., as practicable.
Identify and conserve areas of ecologically significant vegetation resources	Continue to consider ecologically significant vegetation resources as resources warranting special conservation efforts and designation as “Special Natural Areas” under DoDI 4715.03. Maintain existing Special Natural Area boundaries. Designate new Special Natural Areas where there is a legal requirement to do so.
Evaluate vegetation resources in support of military mission	Perform localized/activity-specific vegetation studies/monitoring/evaluations in support of ongoing or proposed mission activities. Identify and provide advice regarding regulatory compliance requirements, as well as for resource conservation.

<b>Table 16-2: Vegetation Management Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Incorporate conservation projects/actions into operations and maintenance	Identify and incorporate projects into operations and maintenance work (e.g., replanting/enhancing vegetation in FWC, in riparian areas, and along shoreline, etc.), using conservation landscaping practices, controlling invasive vegetation, etc.)
Identify and manage regulatory compliance (nutrient management)	Develop and implement Nutrient Management Plans where required (e.g., golf course). Monitor for plan implementation. Keep records. Submit reports to the regulatory agency, as required.
Coordinate with regulatory and stewardship agencies and entities	Maintain regular professional coordination with regulatory agencies (e.g., DCR) and stewardship agencies. Include discussion of partnerships/cooperation on regional stewardship initiatives, as appropriate.
Prepare and maintain policies and guidance on vegetation resources	Review and revise existing written policy and guidance (e.g., Fort Belvoir <i>Tree Removal and Protection Policy</i> Memorandum, recommended seed mixes, recommended planting list, etc.) Evaluate the need for any additional Fort Belvoir-specific policy or guidance documents.
Support emergency situations	Provide technical assistance to emergency situations, such as wildland fire, that could threaten vegetation resources.
Support regulatory enforcement	Perform compliance inspections to address federal and state laws and regulations, as applicable to Fort Belvoir, and DoD, DA and Fort Belvoir policies on vegetation management. Enforce federal and state laws and regulations, as applicable to Fort Belvoir, as well as DoD, DA and Fort Belvoir policies on vegetation management.
Evaluate vegetation conditions	Perform an annual survey of a representative sample of installation area (including urban landscapes, riparian areas and undeveloped areas) to evaluate the effectiveness/success of management and mitigation and corrective actions.
Implement the integrated pest management program	Implement the Fort Belvoir integrated pest management program (e.g., invasive vegetation control, forest pest control, etc.). Maintain and implement the Integrated Pest Management Plan, and associated policy and guidance documents.

<b>Table 16-2: Vegetation Management Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Provide education and training on vegetation resources	Identify and provide opportunities for specialized training for garrison, partner, tenant, and contractor staff, as appropriate.
Publish educational information on vegetation resources	Write and publish articles on the Fort Belvoir website, Fort Belvoir newspaper (Belvoir Eagle), DoD Chesapeake Bay program publications, etc., as appropriate.
Provide technical information on vegetation resources	Respond to requests from on-post and off-post entities, as appropriate. Manage vegetation information to be accessible to installation natural resource managers, and to other personnel, as appropriate.
Support public outreach	Participate in educational and service events/projects, as appropriate.
Prepare and oversee execution of annual tree care work plans	Continue to execute hazard tree surveys to identify and prioritize removal of trees that pose potential threats to people, property or operations. Monitor urban trees for condition, and identify and prioritize work. Address pruning needs, as well as mulching, cabling, root treatment, etc. Develop and oversee implementation of annual tree planting plans, including planting follow-up actions such as surveys of planting survival, tree tube/tree stake removals, etc.).
Provide technical guidance to landscape design and maintenance	Provide guidance (e.g., recommended plant species, planting designs, etc.) for, and review of, landscape plans.
Provide technical guidance to mowing	Provide guidance on mowing strategies/locations. Identify locations where mowing is unnecessary and can be reduced. Incorporate wildlife considerations into mowing strategies in semi-improved installation areas.
Provide guidance to pest control	Inspect vegetation for pests and advise on treatment. Monitor effectiveness of treatment.
Control invasive vegetation	Survey/monitor areas for presence/effect of invasive vegetation, and advise on control. Monitor effectiveness of control.

<b>Table 16-2: Vegetation Management Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Replace trees lost to construction, in accordance with Fort Belvoir <i>Tree Removal and Protection Policy</i> memorandum	Mitigate for trees lost to construction, by re-planting trees at a 2:1 basis, or where not possible, following the alternative mitigation strategies specified in the Fort Belvoir <i>Tree Removal and Protection Policy</i> memorandum.

### 16.6.1.3 Fish and Wildlife Annual Projects and Actions

<b>Table 16-3: Fish &amp; Wildlife Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Maintain fish and wildlife information in installation documents and databases	Maintain and update baseline information. Include in RPMPs, small area plans, real property records, etc., as appropriate. Review, verify and update information in the GIS. Field verify fish and wildlife information (e.g., habitat, restoration/enhancement projects, mitigation projects, etc.), as needed.
Perform year-round surveillance of fish and wildlife conditions	Review existing conditions in the field. Evaluate presence and effect of stressors (e.g., invasive vegetation, land disturbance, impediments to fish passage, deer browse, etc.) and propose action, as appropriate.
Review on-going and proposed installation actions for potential to impact fish and wildlife	Assess vegetation resources for habitat value in planning actions (e.g., real property master planning, small area planning, stationing, real estate actions, privatization, siting, etc.); NEPA evaluations and mitigations; engineering planset development and review; environmental permitting; environmental restorations; military testing and training; operations and maintenance; excavation and demolition permitting; work order review; and, all other installation project and activity review processes. Advise on strategies to avoid/minimize impact, and on regulatory compliance requirements, as appropriate.
Identify possible projects/actions to	Identify opportunities for improving fish and wildlife habitat (e.g., replanting disturbed areas in FWC, selective clear cutting or mowing semi-improved grounds to manipulate habitats, etc.). Incorporate conservation strategies into installation

<b>Table 16-3: Fish &amp; Wildlife Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
conserve/enhance fish and wildlife resources	operations and maintenance activities (e.g., reduced and seasonal restrictions on mowing, using wildlife seed mixes in replanting disturbed areas, eliminating excess impervious area, etc.).
Identify and conserve habitat for fish and wildlife of high conservation priority	Continue to consider ecologically significant fish and wildlife resources as resources warranting special conservation efforts and designation as “Special Natural Areas” under DoDI 4715.03. Maintain existing Special Natural Area boundaries. Designate new Special Natural Areas where there is a legal requirement to do so.
Identify and conserve habitat for bald eagles	Include bald eagle nesting, roosting, and foraging habitat in the designated “shoreline buffer” and “nest buffer” management areas on post. Manage these areas to avoid impacting habitat, or eagles.
Identify and correct hazards to wildlife	Identify situations that pose potential hazard to wildlife (e.g., electrocution hazards, fences, windows, lighting, etc.) and advise on actions to eliminate/reduce the hazard. Address existing as well as proposed facilities.
Identify and correct impediments to fish passage	Identify fish passage blockages (e.g., excessive sedimentation at culverts) and advise on actions to eliminate/reduce the impediment.
Identify and manage regulatory compliance	Maintain VDGIF permits (Scientific Collector, Salvage, Display). Inform and enforce hunting and fishing regulations. Advise on actions for compliance with Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, etc.
Coordinate with regulatory and stewardship agencies and entities	Maintain regular professional coordination with regulatory agencies (e.g., USFWS, VDGIF) and stewardship agencies (e.g., (DCR-NHP). Include discussion of partnerships and cooperation on regional stewardship initiatives, as appropriate.
Prepare and maintain policy and guidance documents	Review and revise existing written policy and guidance documents (e.g., <i>Watercraft Recreation</i> , <i>Hunting and Fishing Policy</i> ; <i>Conservation of Migratory Birds Policy</i> , etc.). Evaluate the need for additional Fort Belvoir-specific policies on fish and wildlife.
Evaluate fish and wildlife resources in support of mission	Perform localized/activity-specific evaluations in support of ongoing or proposed mission activities. Identify and provide advice regarding regulatory compliance requirements, as well as for resource conservation.



<b>Table 16-3: Fish &amp; Wildlife Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Support emergency situations	Provide technical assistance to emergency situations, such as injured wildlife.
Support bird/wildlife hazard management at DAAF	Maintain the DAAF WHMP. Perform assigned functions as a member of Wildlife Working Group.
Support the integrated pest management program	Support the integrated pest management program, particularly the components pertaining to problematic wildlife and feral pets.
Evaluate/advise on situations of wildlife conflict with mission/installation operations	Survey, evaluate and advise on situations where wildlife pose a risk to mission/facilities (e.g., beaver blockages of culverts).
Support regulatory enforcement	Perform compliance inspections to address federal and state fish and wildlife laws applicable to Fort Belvoir, and DoD, DA and Fort Belvoir policies on fish and wildlife. Support enforcement of federal and state fish and wildlife laws and regulations applicable to Fort Belvoir, as well as DoD, DA and Fort Belvoir policies.
Evaluate fish and wildlife resources	Perform an annual survey of a representative sample of habitat areas to evaluate the effectiveness/success of management and mitigation and corrective actions.
Provide education and training on fish and wildlife	Identify and provide opportunities for specialized training for garrison, partner, tenant, and contractor staff, as appropriate.
Publish educational information on fish and wildlife	Prepare and publish articles on the Fort Belvoir website, newspaper (Belvoir Eagle), DoD natural resources management program publications, as appropriate.
Provide technical information on fish and wildlife	Respond to requests from on-post and off-post entities, as appropriate. Manage fish and wildlife information to be accessible to installation natural resource managers, and other personnel, as applicable.



<b>Table 16-3: Fish &amp; Wildlife Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Provide for public access to fish and wildlife resources	Identify and support opportunities for public access, consistent with military mission (e.g., hunting, fishing, viewing wildlife, etc.). Evaluate and advise on requests from the public for access.
Participate in DoD and DA regional conservation programs	Participate in DoD and DA regional programs (e.g., PIF, PARC, Chesapeake Bay Program, etc.), as applicable to Fort Belvoir
Maintain wildlife crossing structures	Monitor condition and wildlife use of wildlife crossing structures. Perform annual maintenance. Identify any needed repairs/modifications. Identify locations where new wildlife crossing structures may benefit wildlife conservation and installation operations.
Perform bird surveys	Perform annual surveys for land and shorebirds.
Perform deer surveys	Perform annual deer spotlight survey (late summer – early fall). Identify and perform other deer surveys (e.g., browse, herd health, etc.), as needed.
Perform bald eagle surveys	Perform annual bald eagle nest survey, as well as year-round surveillance of nest site conditions. Monitor eagle activity, year-round, addressing foraging, loafing and roosting activity, in addition to nesting.
Maintain nest structure program	Assess, and maintain as appropriate, the blue bird and wood duck nest box program, and the osprey nest platform program. Assess opportunities for additional nest structure programs.
Provide hunting programs	Provide a hunting program. Manage the deer component of the hunting program to reduce and stabilize the deer population.
Provide access to fishing	Provide access to installation shoreline and ponds for fishing, as appropriate. Maintain fishing piers. Maintain Mulligan Pond as fish habitat.
Participate in DMAP	Participate in VDGIF DMAP. Submit required information to VDGIF.
Maintain iSportsman	Maintain the iSportsman system annually, and update software as new technology becomes available.

#### **16.6.1.4 Endangered Threatened and Rare Species Annual Projects and Actions**

<b>Table 16-4: Endangered Threatened and Rare Species Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Maintain endangered, threatened, rare species and rare ecological communities information in installation documents and databases	Maintain and update baseline information in installation documents and databases, as appropriate (recognizing the need for protecting the locations of endangered, threatened and rare species). Review, verify, and update information in the GIS. Field verify, as needed.
Perform year-round surveillance of endangered, threatened species, and their habitats	Monitor known listed threatened and endangered species in the field.
Perform year-round surveillance of rare ecological communities	Review existing conditions in the field. Evaluate presence and effect of stressors (e.g., invasive plants, stormwater flows, sedimentation, etc.) and propose action, as appropriate. Select representative sample to survey each year.
Review ongoing and proposed installation actions for potential to impact threatened, endangered, or rare species, or rare ecological communities	Assess threatened, endangered and rare species, and rare ecological communities in planning actions (e.g., real property master planning, small area planning, stationing, real estate actions, privatization, siting, etc.); NEPA evaluations and mitigations; engineering planset development and review; environmental permitting; environmental restorations; military testing and training; operations and maintenance; excavation and demolition permitting; work order review; and, all other installation project and activity review processes. Advise on strategies to avoid impact, and on regulatory compliance requirements where there is a potential for impact.
Incorporate endangered/threatened species protection requirements into operations	Incorporate endangered/threatened species protection requirements (e.g., those pertaining to Northern Long-eared Bat) into installation practices.

<b>Table 16-4: Endangered Threatened and Rare Species Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Conserve endangered, threatened and rare species habitats, and rare ecological communities	Continue to consider threatened and endangered species and their habitat as resources warranting special conservation efforts and designation as “Special Natural Areas” under DoDI 4715.03. Maintain existing Special Natural Area boundaries. Designate new Special Natural Areas where there is a legal requirement to do so.
Identify and manage regulatory compliance	Utilize the NEPA process to insure compliance with federal and state law
Coordinate with regulatory and stewardship agencies	Maintain regular professional coordination with regulatory agencies (e.g., USFWS, VDGIF) and with stewardship agencies (e.g., DCR-NHP), as appropriate.
Prepare and maintain policies and guidance documents	Review and revise existing written policy and guidance (i.e., <i>Memorandum of Instruction - Northern Long-eared Bat Protection on Fort Belvoir</i> ). Evaluate the need for any additional Fort Belvoir-specific policy or guidance documents.
Support emergency situations	Provide technical assistance to emergency situations (e.g., trapped bat), under the direct supervision of an installation Special Agent with conservation law enforcement authority under a Memorandum of Agreement between U.S. Department of the Interior and Fort Belvoir.
Support regulatory enforcement	Enforce federal and state laws and regulations as applicable to Fort Belvoir, as well as DoD, DA and Fort Belvoir policies. (Enforcement is done by an installation Special Agent with conservation law enforcement authority under a Memorandum of Agreement between U.S. Department of the Interior and Fort Belvoir.)
Perform Invasive Species Removal	Identify locations where invasive species could impact rare, threatened and endangered species, or rare plant communities, and advise on actions to remove the invasive vegetation.
Provide endangered species awareness training	Provide training to garrison, partner, tenant, and contractor staff, as appropriate. Write and publish articles.
Perform installation-wide acoustic	Monitor installation bat population and their use of landscape.

<b>Table 16-4: Endangered Threatened and Rare Species Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
monitoring and mist netting of bats	
Perform winter/spring aquatic wood turtle surveys	Perform visual encounter surveys in aquatic habitat.
Perform summer terrestrial wood turtle surveys	Perform visual encounter surveys in terrestrial habitat.
Perform spotted turtle surveys	Perform population surveys and habitat usage surveys to identify significant resources.
Perform amphipod ( <i>Stygobromus</i> spp.) surveys	Monitor current populations and seep conditions. Survey additional areas to identify additional species and populations.
Perform acoustic and mist netting surveys of bat migratory patterns	Survey bat populations during important migratory periods - spring, winter and fall
Perform small whorled pogonia survey	Perform annual monitoring of known occurrence of small whorled pogonia.
Perform installation-wide rare species surveys	Survey to locate new (i.e., not previously documented on-site, or newly listed) rare species, and to monitor populations of species known on site.
Perform installation-wide threatened and endangered species surveys	Survey to locate potential presence of new (i.e., not previously documented on-site, or newly listed) threatened and endangered species, and to monitor populations of species known on site.
Perform installation-wide surveys for	Survey to identify new (i.e., not previously documented on-site, or newly listed) National Listing Workplan species, and to monitor current populations and habitat conditions

<b>Table 16-4: Endangered Threatened and Rare Species Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
National Listing Workplan species	
Perform freshwater mussel surveys	Monitor known mussel beds and survey aquatic areas to identify new beds and species.
Perform pollinator surveys	Develop and implement installation-wide survey to identify rare, threatened, and endangered pollinators.

#### **16.6.1.5 Special Natural Areas Annual Projects and Actions**

<b>Table 16-5: Special Natural Areas Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Identify and conserve areas of significant natural resources, in accordance with DoDI 4715.03	Continue to consider ecologically significant natural resources as resources warranting special conservation efforts and designation as “Special Natural Areas” under DoDI 4715.03. Maintain existing Special Natural Area boundaries. Designate new Special Natural Areas where there is a legal requirement to do so.
Maintain Special Natural Area (SNA) boundaries in installation documents and databases	Review, verify, publish existing SNA boundaries in RPMP, Small Area Plans, real property records, etc. Review, verify depict SNA boundaries in GIS.
Maintain signage and markers for SNA boundaries in the field	Review, install, and maintain SNA signage and markers, including boundary markers.
Monitor conditions in SNAs	Review existing SNA boundaries, overall natural resource conditions, and ongoing management actions, for effectiveness at conserving natural resources, without net loss of military training. Evaluate presence and effect of stressors, and propose action as appropriate. This includes fish and wildlife surveys done in conjunction



<b>Table 16-5: Special Natural Areas Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
	with the Fish and Wildlife program. Such surveys include wildlife movement and effectiveness of existing wildlife crossing structures.
Review ongoing and proposed installation actions for potential impact to SNAs	Assess SNAs in planning actions (e.g., real property master planning, small area planning, stationing, real estate actions, privatization, siting, etc.); NEPA evaluations and mitigations; engineering planset development and review; environmental permitting; environmental restorations; military testing and training; operations and maintenance; excavation and demolition permitting; work order review; and, all other installation project and activity review processes. Advise on strategies to avoid/minimize impact, and on regulatory compliance requirements, as appropriate.
Identify possible projects/actions to preserve/enhance natural resources within SNAs	Cross-walk with the water resources, vegetation, fish and wildlife, and endangered/threatened/rare species programs to address needs, and potential projects and actions within the SNAs. Incorporate results into annual funding requests, annual work plans, mitigation planning, etc.
Monitor use of SNAs	Obtain information on access and use of SNAs through such means as trail cameras, user surveys, use/access permits, etc. to evaluate type, magnitude, and effect of access and use
Maintain policies for access and use of SNAs	Review and revise existing policies regarding access to and use of SNAs. Include policies in such installation documents as Trail Pamphlets and Installation Policy Memos. Evaluate need for additional Fort Belvoir-specific policies, and prepare as necessary.
Review requests for non-routine access and use of SNAs	Review and respond to access and use requests. Balance public access with mission and resource conservation. Monitor for effect of such use on resource, and modify use policy as necessary.
Maintain existing hiking trail systems	Develop and execute annual maintenance plan for existing trails, access points and signage, including directional and interpretive signs.
Maintain existing fishing structures and	Develop and execute annual maintenance plan for existing fishing structures and wildlife viewing structures



<b>Table 16-5: Special Natural Areas Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
wildlife viewing structures	
Maintain existing outdoor conservation education displays	Develop and execute annual maintenance plan for existing conservation education displays
Maintain ABWR Environmental Education Center	Develop and execute annual maintenance plan for the ABWR Environmental Education Center building, and the conservation education displays and materials interior to the building
Operate ABWR Environmental Education Center	Hold natural resources conservation education programs and events
Host natural resources conservation and service events	Design and host such events as nature hikes, outdoor classrooms, celebrations/commemorations (e.g., Earth Day), volunteer service (e.g., shoreline clean ups, National Public Lads Day), as appropriate. Make available to the public, consistent with operations and security conditions
Support volunteer projects	Provide technical guidance (regarding natural resources conservation) and support such volunteer projects as Boy Scouts service and medal projects, Virginia Bluebird Society bluebird nest box program, etc., as appropriate. Investigate having a Qualified Volunteer Program to support natural resources stewardship. Investigate partnerships with outside organizations, such as universities.
Publish educational information on natural resources and natural resources conservation	Write and publish articles for Fort Belvoir website, newspaper (Belvoir Eagle), DoD Chesapeake Bay program publications, etc., as appropriate.
Provide technical information on Fort Belvoir's designated Special Natural Areas	Respond to requests from on-post and off-post entities, as appropriate. Maintain/manage installation Special Natural Areas information to be accessible to installation natural resource managers, and other personnel, as appropriate.

<b>Table 16-5: Special Natural Areas Tasks Performed Annually</b>	
<b>Project/Action</b>	<b>Description</b>
Provide technical information on natural resources and natural resources conservation	Respond to requests for technical information and presentations (e.g., Environmental Career Day at local school) from on-post and off-post entities, as appropriate.
Maintain Natural Resources Management coordination on a regional level	Coordinate with managers of off-post natural areas within the region. Include discussion of partnerships/cooperation on regional stewardship initiatives, as appropriate.

## 16.6.2 Planned Projects

Table 16-7 through 16-9 refer to future projects that are scheduled, or are in planning phases to be implemented in corresponding fiscal years. These projects are personnel, resource, and funding dependent and may vary or be implemented in earlier or later fiscal years as resources are available or become available.

### 16.6.2.1 Water Resources Planned Projects

<b>Table 16-6: Water Resource Management Projects Planned</b>		
<b>Implementation Years</b>	<b>Task</b>	<b>Projected Work</b>
FY20, FY25, FY30	Update watershed PLS	Survey and revise watershed and subwatershed data, including – boundaries, land use and cover (e.g., % impervious, % forested, etc.), stream channel conditions. Update GIS.
FY20, FY25, FY30	Update wetland PLS	Update wetland data, including planning level wetland boundaries, wetland type, locations of permitted work, and locations of mitigation sites. Update GIS.
FY20, FY25, FY30	Update RPA PLS	Perform installation-wide stream perennially determinations to identify RPAs. Complete approximately 1/3 of installation streams on 2-year cycle. Include locations of shoreline stabilization projects,

<b>Table 16-6: Water Resource Management Projects Planned</b>		
<b>Implementation Years</b>	<b>Task</b>	<b>Projected Work</b>
		riparian reforestation/replanting projects, and any other mitigation projects in the RPA. Update GIS.
FY20, FY30	Inventory marine systems	Perform baseline inventory of marine systems along the installation's shoreline. Address SAV, mollusks, anadromous fish, benthics, water quality, etc.
FY21, FY31	Forecast future changes to wetlands and near-shore conditions	Develop forecast trends and models utilizing baseline data. Include a threat assessment to ecologically valuable ecosystems from potential sea level and climate changes.
FY19, annual updates thereafter	Bring the wetland permit database on-line	Bring the wetland permit database on-line, integrating it with the GIS. Database includes wetland permit records in a searchable electronic format.
FY19, annual updates thereafter	Develop and implement a water resources database	Create a database that stores and organizes water resources information, including wetland, stream shoreline, macroinvertebrate, shellfish, mitigation sites, etc. Database should enable year-to-year comparisons of data, easy retrieval of information. Include mitigation sites.
FY19	Protect riparian buffers	Create a comprehensive Fort Belvoir riparian buffer policy. Include both regulatory driven RPAs, as well as buffers along waterways that are outside the RPA.
FY20, annual monitoring thereafter	Monitor high-rarity ranked wetland communities	Develop and implement a program to monitor conditions within the high-rarity ranked wetland communities.
FY18, FY19, FY20, FY21, FY22, FY23	Restore streams	Plan, design, construct and monitor stream restoration projects, in accordance with the RPMP.

<b>Table 16-6: Water Resource Management Projects Planned</b>		
<b>Implementation Years</b>	<b>Task</b>	<b>Projected Work</b>
FY21, FY23	Restore shoreline areas	Plan, design, construct and monitor shoreline restoration projects.

#### **16.6.2.2 Vegetation Planned Projects**

<b>Table 16-7: Vegetation Management Projects Planned</b>		
<b>Implementation years</b>	<b>Task</b>	<b>Projected Work</b>
FY20, FY30	Update plant communities PLS	Survey and revise the plant communities data. Update GIS.
FY20, FY30	Update ecological communities PLS	Survey and revise ecological communities data. Update GIS.
FY20, FY25	Update Natural Heritage inventory	Survey and revise natural heritage inventory, with emphasis on Accotink Creek Conservation Corridor in FBNA. Update GIS datalayer.
FY20, FY30	Update floristic inventory	Survey and revise floristic inventory.
FY20, annual updates thereafter	Prepare comprehensive invasive vegetation control plan	Survey and map existing areas of invasive vegetation. Prepare a comprehensive management plan to control existing invasive vegetation and to reduce risk of new introductions. Update GIS datalayer.
FY19, FY29	Complete forest (timber) inventory	Perform a forest (timber) inventory of the portion of the installation that was not inventoried in 2016. Follow same protocol as in 2016. Update GIS.
FY21, annual updates thereafter	Develop and implement vegetation	Create a database that stores and organizes vegetation resources data (e.g., ecological communities, reforestation sites, etc.) to enable

<b>Table 16-7: Vegetation Management Projects Planned</b>		
<b>Implementation years</b>	<b>Task</b>	<b>Projected Work</b>
	resources database	year-to-year comparative evaluation, and that supports forecasting of potential future conditions. Include mitigation project sites.
FY19, FY20, FY21	Control multi-acres areas of invasive vegetation	Treat multi-acre sites of invasive vegetation (e.g., Phragmites, kudzu, wisteria, princess tree/tree of heaven).
FY18, FY19, FY20, FY21, FY22, FY23, FY24, FY25	Perform timber stand improvements	Perform timber stand improvements at several multi-acre sites in the southwest training area and FBNA to support wildlife habitat enhancement.
FY18, FY19, FY20, FY21, FY22, FY23	Restore streams	Plan, design, construct and monitor stream restoration projects, in accordance with the RPMP.
FY21, FY23	Restore shoreline areas	Plan, design, construct and monitor shoreline restoration projects.
FY18, annual thereafter	Maintain and enhance forest cover in FWC	Replant, or allow regeneration to occur in, previously disturbed locations within FWC.

### 16.6.2.3 Fish and Wildlife Planned Projects

<b>Table 16-8: Fish and Wildlife Management Projects Planned</b>		
<b>Implementation Years</b>	<b>Task</b>	<b>Projected Work</b>
FY18, FY23, FY28	Update herpetofauna PLS	Survey and revise reptile and amphibian PLS. Update GIS.
FY18	Perform habitat improvement in W-5	Perform timber stand improvement.
FY18, FY20, FY22, FY24, FY26,	Perform habitat improvement at	Perform pine thinning to enhance habitats and evaluate past pine thinning projects for selective thinning.

<b>Table 16-8: Fish and Wildlife Management Projects Planned</b>		
<b>Implementation Years</b>	<b>Task</b>	<b>Projected Work</b>
FY28, FY30, FY32	multiple locations in southwest training area	
FY19, FY24	Update fish PLS	Survey fish populations in installation waterways and ponds, and assess habitat conditions.
FY19, FY29	Update small mammal inventory (part of wildlife PLS)	Survey and revise the small mammal inventory. Update GIS datalayer.
FY18	Modify chimneys to enhance chimney swift habitat	Remove unapproved chimney caps, and repoint chimneys as needed, to improve access and conditions for chimney swifts.
FY19, FY29	Perform aquatic survey of Mulligan Pond	Field survey for fish, benthics, reptiles and amphibians, etc. Prepare management recommendations to conserve/enhance resource conditions, and improve recreation value. Update GIS.
FY19, FY24	Perform insect and pollinator inventory and abundance survey	Survey for pollinators. Enter into GIS database.
FY19	Update bird checklist	Update the bird checklist to reflect the most-recent bird survey data.
FY20, FY25, FY30	Perform habitat enhancement in T-9	Thin and cut trees to maintain T-9 early successional habitat (an existing habitat project).
FY20, FY25, FY30	Perform fish and aquatic insect inventory and abundance surveys	Perform stream health surveys in multiple small streams throughout the installation.
FY22, FY27, FY32	Perform habitat enhancement at FBNA	Thin and cut trees to maintain early successional habitat at an existing habitat project.



<b>Table 16-8: Fish and Wildlife Management Projects Planned</b>		
<b>Implementation Years</b>	<b>Task</b>	<b>Projected Work</b>
FY22, FY27, FY32	Update wildlife crossing condition and use assessment	Survey and monitor existing wildlife crossings following the protocol used in the 2016 monitoring project. Include crossing structures that are constructed after the 2016 project.
FY20, FY30	Perform habitat enhancement of Mulligan Pond	Develop and execute projects to enhance fish and their habitat at Mulligan Pond.
FY19, annual updates thereafter	Develop and implement a fish and wildlife database	Create a database to store fish and wildlife data, that enables year-to-year comparative evaluations. Include habitat enhancement and mitigation project sites.

#### **16.6.2.4 Endangered, Threatened, and Rare Species Planned Projects**

<b>Table 16-9: Endangered, Threatened, and Rare Species Planned Projects</b>		
<b>Implementation Years</b>	<b>Task</b>	<b>Projected Work</b>
FY19	Update rare species PLS	Survey and revise the rare species PLS. Update GIS datalayer.
FY19	Update endangered and threatened species PLS	Survey and revise the endangered and threatened species PLS. Update GIS datalayer.
FY19, annual updates thereafter	Develop and implement an endangered, threatened, and rare species database	Create a database to store endangered, threatened and rare species data that enables year-to-year comparative evaluations. Include data associated with Endangered Species Act Section 7 consultations and data required to be reported to the regulatory agencies (e.g., USFWS, VDGIF).

### 16.6.2.5 Special Natural Areas Planned Projects

<b>Table 16-10: Special Natural Areas Management Projects Planned</b>		
<b>Implementation Years</b>	<b>Task</b>	<b>Projected Work</b>
FY18, FY20, FY22, FY24, FY26, FY28, FY30, FY32	Issue Trail Pamphlets	Revise ABWR Trail Pamphlet. Develop trail pamphlets for JMAWR and T-17 Refuge.
FY19, FY24, FY29	Issue Species Checklists	Revise Fort Belvoir Bird Checklist. Develop and publish species checklists for plants, wildlife.
FY19, FY27	Provide Outdoor Education Displays	Design replacement outdoor education displays for ABWR, JMAWR and T-17 Refuge.
FY20, FY28	Provide Outdoor Education Displays	Purchase and install replacement outdoor displays for ABWR, JMAWR and T-17 Refuge.
FY 20	Provide Outdoor Education Displays	Investigate development and use of educational applications for cell phones and other mobile devices.
FY20	Provide Indoor Education Displays and Materials	Design indoor education displays for ABWR Environmental Education Center.
FY21	Provide Indoor Education Displays and Materials	Purchase and install indoor education displays for ABWR Environmental Education Center facility.
FY18, FY28	Maintain ABWR Environmental Education Center	Execute repairs and improvements to ABWR Environmental Education Center.
FY20, FY25	Provide Nature Trails in Refuges	Execute major trail and associated facilities renovation in ABWR, JMAWR and T-17 Refuge.

<b>Table 16-10: Special Natural Areas Management Projects Planned</b>		
<b>Implementation Years</b>	<b>Task</b>	<b>Projected Work</b>
TBD	Provide Fishing Piers and Wildlife Viewing Structures	Execute major renovations to existing fishing piers and wildlife viewing structures at JMAWR and along Gunston Cove.
FY19, FY29	Maintain SNA Designations	Incorporate SNA area designations in next update to Fort Belvoir RPMP.
FY19	Assess Conservation Needs and Prepare Management Plan	Assess the conservation needs of the newest Special Natural Areas (i.e., T-17 Refuge and Accotink Creek Conservation Area), and prepare area-specific conservation strategies.
FY19	Develop and Maintain Database	Develop and maintain a database for the Special Natural Areas
FY19, and annual thereafter	Identify and Perform Resource Protection/Enhancement Projects	Identify and perform projects to protect/enhance resources of conservation emphasis within the Special Natural Areas. (These projects may be addressed Water Resources, Vegetation, Fish and Wildlife, and Threatened/Endangered Species.)
FY20, FY25, FY30	Survey Migratory Fish	Survey for presence, passage of migratory fish within/through ABWR, JMAWR and Accotink Creek Conservation Corridor
FY20, FY23, FY26, FY29	Monitor Ecological Condition of Special Natural Areas	Perform wildlife movement surveys within FWC, including surveys of use of wildlife crossing structures.

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## 18.0 ACRONYMS AND ABBREVIATIONS

ABWR	Accotink Bay Wildlife Refuge
ABWR EEC	Accotink Bay Wildlife Refuge Environmental Education Center
ACCC	Accotink Creek Conservation Corridor
ACQR	Air Quality Control Regions
ACSIM	Assistant Chief of Staff for Installation Management
AEC	Army Environmental Command
AMEDD	Army's Medical Department
ALOS	Advanced Land Observing Satellite
APHC	Army Public Health Command
APHIS	Animal and Plant Health Inspection Service
AQF	Air Quality Forecasting
AR	Army Regulation
ATV	All-Terrain Vehicle
BASOPS	Base Operations and Support
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BMP	Best Management Practice
BOID	Business Operations and Integration Division
BRAC	Base Realignment and Closure
CAA	Clean Air Act
CBP	Chesapeake Bay Program
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERL	Construction Engineering Research Laboratory
CFR	Code of Federal Regulations
CID	Criminal Investigation Division
CPAC	Civilian Personal Advisory Center
CWA	Clean Water Act
CWD	Chronic Wasting Disease
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
DA	Department of Army
DAAF	Davison Army Airfield
DBH	Diameter-at-Breast-Height
DCA	Washington Regan National Airport
DCR-NHP	Department of Conservation and Recreation-Natural Heritage Program
DERA	Defense Environmental Restoration Account
DERP	Defense Environmental Restoration Program
DES	Directorate of Emergency Services
DFMWR	Directorate of Family Morale, Welfare and Recreation

DHR	Directorate of Human Resources
DoD	Department of Defense
DoDI	Department of Defense Instruction
DPTMS	Directorate of Plans, Training, Mobilization and Security
DPW	Directorate of Public Works
DRM	Directorate of Resource Management
DVP	Dominion Virginia Power
E&S	Erosion and Sediment
EA	Environmental Assessment
EHD	Epizootic Hemorrhagic Disease
EIS	Environmental Impact Statement
EO	Executive Order
EPCRA	Emergency Planning and Community Right-to-Know Act
EPG	Engineer Proving Ground
ERDC	Engineer Research and Development Center
FBNA	Fort Belvoir North Area
FBRC	Fort Belvoir Residential Communities
FHWA	Federal Highway Administration
FNSI	Finding of No Significant Impact
FOIA	Freedom of Information Act
FR	Federal Register
FS	Feasibility Study
FWC	Forest and Wildlife Corridor
GFEBs	General Financial Enterprise Business System
GIS	Geographic Information System
GSA	General Services Administration
HEC	Humphreys Engineer Center
HQDA	Headquarters Department of Army
IAW	In Accordance With
IMCOM	Installation Management Command
INRMP	Integrated Natural Resources Management Plan
INSCOM	Army Intelligence and Security Command
IPMC	Integrated Pest Management Coordinator
IPMP	Integrated Pest Management Plan
IRP	Installation Restoration Program
ISA	Interagency Support Agreements
ISR	Installation Status Report
IWFMP	Integrated Wildland Fire Management Plan
JMAWR	Jackson Miles Abbott Wetland Refuge
LID	Low Impact Development
O&M	Operations and Maintenance
ORV	Off-Road Vehicle
MACOM	Major Command

MDW	Military District of Washington
MICC	Mission and Installations Contracting Command
MLRA	Major Land Resources Area
MMRP	Military Munitions Response Program
MOU	Memoranda of Understanding
MS4	Municipal Separate Storm Sewer Systems
MSL	Mean Sea Level
MSS	Mission Sensitive Species
NAAQS	National Ambient Air Quality Standards
NABCI	North American Bird Conservation Initiative
NCPC	National Capital Planning Commission
NDAA	National Defense Authorization Act
NEPA	National Environmental Policy Act
NGA	National Geospatial Intelligence Agency
NGO	Non-Government Organization
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Agency
NPS	National Park Service
NRCS	Natural Resources Conservation Services
NWS	National Weather Service
NWSG	Native Warm Season Grass
PALSAR	Phased Array type L-Band Synthetic Aperture Radar
PAO	Public Affairs Office
PARC	Partners in Amphibian and Reptile Conservation
PHNST	Potomac Heritage National Scenic Trail
PIF	Partners in Flight
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
RPA	Resource Protection Area
RPMP	Real Property Master Plan
RV	Recreational Vehicle
SF	Square Feet
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SJA	Staff Judge Advocate
SNA	Special Natural Area
spp	Species
SOC	Species of Concern
TMDL	Total Maximum Daily Load
UP	Utilities Privatization
USACE	United States Army Corps of Engineers
USALSA	United States Army Legal Services Agency

USC	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USO	United Service Organizations
VDACS	Virginia Department of Agriculture and Consumer Services
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VDHR	Virginia Department of Historical Resources
VDOF	Virginia Department of Forestry
VMRC	Virginia Marine Resources Commission
VPDES	Virginia Pollutant Discharge Elimination System
WHMP	Wildlife Hazard Management Plan
WIVA	Watershed Inventory for Vulnerability Assessment
WOUS	Waters of the United States
WWG	Wildlife Working Group