FINAL REPORT

Investigating Potential Risk to Threatened and Endangered Species from Per- and Polyfluoroalkyl Substances (PFAS) on Department of Defense (DoD) Sites

SERDP Project ER18-1626

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Federal and State threatened and endangered fauna species occupy many Department of Defense (DoD) sites. The diversity of the species is great ranging from invertebrates to higher trophiclevel predators. Importantly, many DoD sites are also impacted by historical activities that result in chemical contamination. One of those activities was widespread use of Aqueous Film Forming Foams (AFFF) to suppress fires and in fire training exercises that has resulted in Per- and Polyfluoroalkyl Substances (PFAS) distributed in many environmental compartments.
A species-specific exposure potential to PFAS was developed to provide an initial screen of impacted habitat using spatial analysis. Protected species (or taxa) can then be ranked by those that occupy the greatest proportion of PFAS impacted habitat. Those species may be prioritized for hazard and/or risk assessment. Here, we carry two species (northern pine snake and bald eagle) through to develop a probabilistic risk framework on site specific PFOS concentrations.

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LIST OF ACRONYMS AND ABBREVIATIONS

ac	acre
ADI	Average Daily Intake
AF	Assessment Factors
AFB	Air Force Base
AFFF	Aqueous Film Forming Foams
AUF	Area Use Factor
BAFB	Barksdale Air Force Base
BSAF	Biota-to-Soil-Accumulation Factors
C-F bond	Carbon-Fluorine Bond
DoD	Department of Defense
DOE	Department of Energy
Dom	Dominated
EPA	Environmental Protection Agency
ERSON	Environmental Restoration Statement of Need
ESA	Endangered Species Act
ESTCP	Environmental Security Technology Certification Program
FFTS	Former Fire Training Area
FMR	Field Metabolic Rate
GIS	Geographic Information System
INRMP	Integrated Natural Resource Management Plans
IPaC	Information for Planning and Consultation
JBMDL	Joint Base McGuire Dix Lakehurst
LC50	Lethal Concentration for 50 Percent of Organisms
LiDAR	Light Detection and Ranging
LOAEL	Lowest Observable Adverse Effect Level
MD DNR	Maryland Department of Natural Resources
MDP	Maryland Department of Planning
NAS	Naval Air Station
NJDEP	New Jersey Department of Environmental Protection
NLCD	National Land Cover Dataset
NRCS	National Resources Conservation Service
NWI	National Wetland Inventory
PA	Preliminary Assessment
PFAS	Per- and Polyfluoroalkyl substances
PFHxS	Perfluorohexanoic Acid
PFOS	Perfluorooctane sulfonate
BSAF	Biota-to-Soil Accumulation Factor
sd	Standard Deviation
SEEM	Spatially-Explicit Exposure Model
SERDP	Strategic Environmental Research and Development Program
SIR	Site Investigation Report
T&E	Threatened and Endangered

TRV	Toxicity Reference Values
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

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ABSTRACT

Introduction:
Federal and State threatened and endangered fauna species occupy many Department of Defense (DoD) sites. The diversity of the species is great ranging from invertebrates to higher trophic-level predators. Importantly, many DoD sites are also impacted by historical activities that result in chemical contamination. One of those activities was widespread use of Aqueous Film Forming Foams (AFFF) to suppress fires and in fire training exercises that has resulted in Per- and Polyfluoroalkyl Substances (PFAS) distributed in many environmental compartments.
Objectives and Technical Approach:
A species-specific exposure potential to PFAS was developed to provide an initial screen of impacted habitat using spatial analysis. Protected species (or taxa) can then be ranked by those that occupy the greatest proportion of PFAS impacted habitat. Those species may be prioritized for hazard and/or risk assessment. Here, we carry two species (northern pine snake and bald eagle) through to develop a probabilistic risk framework on site specific PFOS concentrations.
Results:
Investigating three DoD installations generally resulted in high exposure potential for those species that have smaller ranges (invertivores) compared to species that move great distances over the landscape (carnivorous mammals). Furthermore, exposure potential models provide a map that illustrates the overlap of critical habitat with areas of suspected PFAS contamination which is useful for natural resource managers in prioritizing environmental remediation. Results from the spatial exposure potential model and the statement of need (SON) requesting information on species that occupy multiple DoD sites, two species were selected for developing the risk framework; those were the state listed (New Jersey/Tennessee) northern pine snake and the federally protected bald eagle. These species were selected based on high exposure potential, occupancy on multiple installations and no available data on risk of PFAS to these receptors. Currently, there are no published data of PFAS risk to reptiles and importantly, there are many reptilian species that occupy DoD sites. Probabilistic risk frameworks were developed for the northern pine snake and the bald eagle that incorporates species-specific physiology and behavioral traits. Results of the risk model were compared to working Toxicity Reference Values (TRV) for each species. The risk frameworks focused on PFOS alone, as this is currently, the most frequently encountered and believed to be the most hazardous of the PFAS to wildlife. The probabilistic model indicates the northern pine snake is not likely to be affected even with 100% of dietary items captured from PFOS-contaminated habitats (~16 µg PFOS/kg soil) on Joint Base McGuire Dix Lakehurst (JBMDL). Conversely, the bald eagle model that focuses on the eaglet life-stage shows there may be risk resulting from PFOS exposures. Eaglets have small body-size with high energetic demands resulting in high energetic demands that drive exposure. Nests in closer proximity to PFAS-impacted water bodies are assumed to receive a greater proportion of PFOS-contaminated prey items. With 10% of prey items from an impacted water body, the eaglet model shows the TRV is exceeded regularly over the course of development to fledging (60-days). Although the models are comprehensive, further information on exposure estimates from field research would be useful in refining the probabilistic risk estimates. In addition, given the high exposure potential to invertebrates and invertivores, toxicity data and exposure/risk modeling to these receptors is needed.
Benefits:

This research benefits Department of Defense installations by applying a rapid screening-level approach to determine which wildlife receptors may be at greatest risk of exposure. Given the current limitations on toxicity (or hazard) information addressing exposure may be a more rapid route to take in determining if wildlife receptors are expected to come into contact with PFAS impacted habitat. Furthermore, the probabilistic risk framework developed for reptiles and avian predators illustrate an initial path forward in conducting full ecological risk assessments on DoD sites.

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EXECUTIVE SUMMARY

1. Introduction:

Per- and Polyfluoroalkyl Substances (PFAS) are emerging contaminants of concern and are found on many military installations that have airborne missions. These chemicals are extremely persistent and somewhat mobile in environmental media and have been measured in nearly all environmental compartments and biota (e.g. Houtz et al. 2013, Long and Porter, 2015, Geisy and Kannnan 2001, Custer et al. 2014). As such, there is growing interest regarding the potential effects of PFAS to public and environmental health, as well as concern from the Department of Defense (DoD) regarding liability under federal statutes such as the Endangered Species Act (ESA). The predominant source of PFAS on DoD sites originates from historical fuel-based fire suppression activities using Aqueous Film Forming Foam (AFFF) which contained a mixture of largely perfluorooctane sulfonate (PFOS) in combination with other PFAS (Houtz et al. 2013). The physicochemical properties that render PFAS compounds effective in fire suppression also translate to resistance to biodegradation, photooxidation, direct photolysis and hydrolysis.

Studies conducted by DoD and researchers at U.S. Air Force installations confirm PFAS detections in environmental compartments and transportation of PFAS from sites below AFFF training areas to surface water, sediment and groundwater (Lanza et al. 2017, Moody et al. 2002, Gewurtz et al. 2014, Karrman et al. 2011, Oakes et al. 2010). Biota may be exposed via direct and indirect pathways; such as, direct contact with soil or drinking water or bioaccumulation. Identifying exposure pathways to ecological receptors can be complex; however, determining risk may prove more challenging based on overall lack of toxicity data on many PFAS.

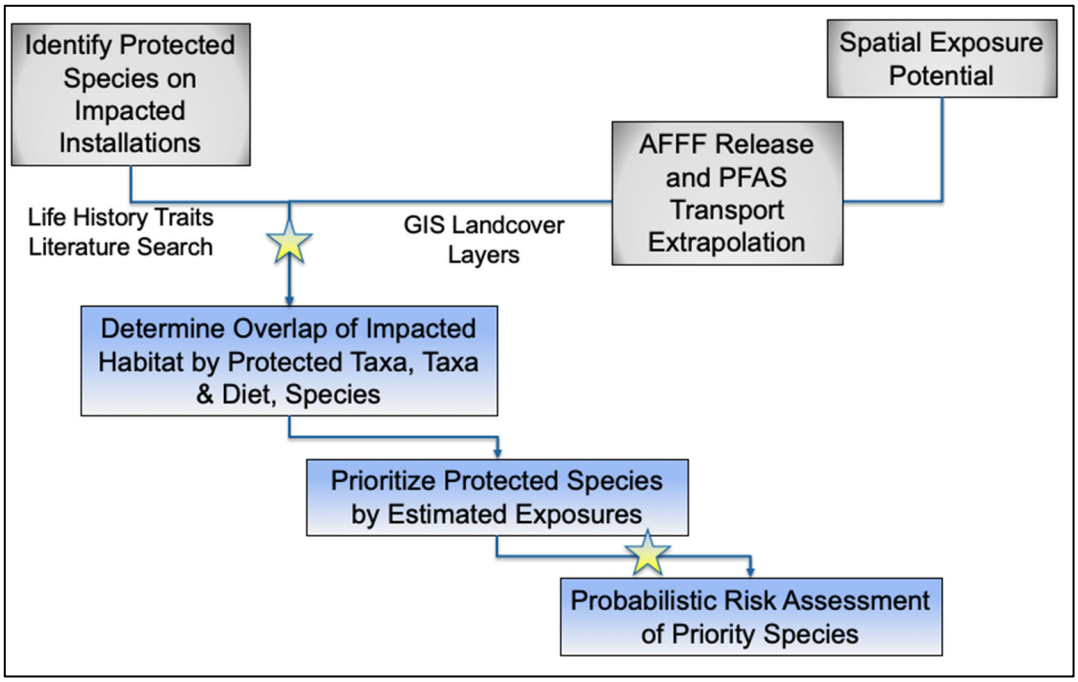
Given the lack of information concerning the potential risk of PFAS to federal and state listed Threatened &Endangered (T&E) species on DoD lands, we developed a framework to determine T&E species occurrence and potential overlap with PFAS contamination. This project provides immediate and useful insights into the potential for PFAS exposure to T&E species and points the way toward methods for location and species-specific assessments for PFAS risk.

2. Objectives:

The overall objective of this research was to develop a framework for natural resource managers to quickly assess on-site threatened and endangered species likelihood of PFAS exposure and risk. To address this objective, we developed (1) methodology for determining spatial overlap of T&E species on DoD sites with areas of AFFF release, (2) prioritization for T&E species with greatest exposure potential and (3) conducted a species-specific probabilistic risk assessment for T&E species to determine risk of PFOS exposure.

3. Technical Approach:

The technical approach followed the schematic below in two main phases with two decision points (as indicated by stars). Phase 1 (silver box) was used to develop the T&E (this point forward referred to as 'protected') species exposure potential on installations and Phase 2 (blue box) is the determination and/or development of the individual based probabilistic models. The decision points were used at particular junctures to (1) determine if there are enough data to move forward with generating the spatial exposure potential and (2) determine if there are any protected species that warrant a probabilistic exposure assessment to determine a risk.



Phase 1: Exposure Potential Modeling
To develop the spatial exposure potential modeling, installations with known AFFF release locations and environmental PFAS concentrations in the form of a Site Investigation Report (SIR) or published literature were identified. Using Geographic Information System (GIS), landscape layers were obtained from the installation or other publicly available sources, AFFF release locations from repeated fire training exercises or single use were digitized from the SIR creating a base map of land cover layers (habitat) and AFFF release sites. Transport of PFAS from AFFF release sites is expected, and therefore, using landscape topography, known conveyances and surface water flow direction areas impacted by AFFF and PFAS have been extrapolated out from the release locations terminating at the nearest surface water body. Those extrapolations cross landscape layers that allow for estimation of habitat specific PFAS impacts from AFFF release sites.

Site specific protected species were identified using the Integrated Natural Resource Management Plans (INRMP) and Federal/State/County T&E species lists. Habitat requirements

of each species were identified through literature searches and were matched with the available landscape layers on the base map in GIS to determine where those species may be located on the installation. Furthermore, species-specific dietary requirements were also incorporated into the spatial model to capture potential foraging areas.

Phase 2: Risk Assessment
Risk Assessment of two protected species were conducted. The bald eagle (*Haliaeetus leucocephalus*) and the northern pine snake (*Pituophis melanoleucus*) were selected based on the spatial exposure potential of the three installations evaluated and a broad application to multiple installations. Although the bald eagle is delisted from the Endangered Species Act (ESA) it continues to be a protected species under the Bald and Golden Eagle Protection Act (1940), the Migratory Bird Treaty Act (1918) and the Lacy Act (1900), given the number of laws in place to protect this species and the broad distribution of bald eagles on coastal installations it was prioritized for the risk assessment. The second species, the northern pine snake was selected because the exposure potential was relatively high compared to other protected taxa on Joint Base McGuire-Dix-Lakehurst (JBMDL), many DoD installations have one or more protected reptilian species and there is a significant gap in reptilian risk assessment (Weir et al. 2010) especially pertaining to PFAS (Conder et al. 2019). The northern pine snake is also a federally protected species at Arnold Air Force Base in Tennessee (Petersen et al. 2017).

A probabilistic exposure and risk model were used to estimate PFAS exposure to the bald eagle and the northern pine snake. The models were based on allometric equations to predict field metabolic rate (energy needs) in avian and reptilian receptors. For the bald eagle, an exposure model was developed, assuming a realistic diet of mammal and fish with a probability of PFOS contamination using published PFOS concentrations (Chang et al. 2012, Lanza et al., 2017). The study focused on the eaglet (day 0 -60, fledgling) as this may be the most vulnerable life stage because of the disproportionally high ingestion rates compared to body weights. Model simulations were comprised of 1000 replicate eaglets and the mean exposure over the developmental period was the average daily intake (ADI). The 1000 replicate estimates of ADI were averaged and compared to the Toxicity Reference Value (TRV) for raptors of 0.021 mg/kg/d (Newsted et al. 2005).

The probabilistic exposure model for the northern pine snake followed a similar construct to the bald eagle model. Where a probability of capturing PFOS-contaminated prey items, feeding frequency and PFOS concentration was incorporated into the exposure model. Model results were also comprised of 1000 simulation runs of individual snakes foraging for 90-days; the resulting mean PFOS exposure was the ADI. The overall mean ADI for snakes with varied exposure potential to PFOS was compared to the working PFOS TRV for reptiles of 2 mg/kg/d (Salice et al. *In prep*).

4. Results and Discussion:

Results indicate that a screening-level spatial exposure potential assessment will help installations identify protected species that are likely to be exposed to PFAS through historical

AFFF release. Moreover, this analysis provides a ranking of impacted landscapes and thus those protected species dependent on landscapes ranked higher may have comparably greater exposure potential to those on landscapes ranked lower. Broadly, this tool will aid in identifying habitat that supports non-protected ecological receptors as there is likely overlap in habitat selection by taxa. Using the exposure mapping also provides a spatial component for natural resource managers to visualize areas of potential concern based on habitat type.

Protected species at Joint Base McGuire-Dix-Lakehurst, Naval Air Station Patuxent River and Barksdale Air Force Base were prioritized by impacted habitat exposure potential by taxa, taxa and diet and individual species. Results indicate taxa with small home ranges have the greatest exposure potential as those that travel further are able to move across the landscape increasing their habitat range. Whereas the inverse is true for taxa with small home (i.e. invertebrates) ranges should their habitat be limited to an impacted area. In addition to providing a framework for ranking species-specific exposure potential our aim was to conduct full risk estimates on two species that were identified as having high exposure potential.

The risk estimates for the eaglet life-stage of the Bald Eagle indicate there may be significant risk from dietary PFOS exposures. The probabilistic model developed indicates that the life stage from hatching to fledgling (60-days) may be the most sensitive compared to adult exposures due to the high metabolic rate and smaller body size. As such, eaglets can receive a high PFOS exposure potential in dietary items from prey captured daily by parent eagles. Using available PFOS concentrations in fish at Barksdale AFB (Lanza et al. 2017), eaglets may receive PFOS exposures greater than the currently available TRV of 0.021 mg/kg/d on a daily basis. In comparison, the preliminary modeled exposure for the northern pine snake suggests PFOS exposures do not exceed the working TRV of 2 mg/kg/d for reptiles.

The spatial exposure potential assessment is dependent on a few key factors. First, accurate and available landscape layers in GIS is critical at identifying appropriate habitat suitable for protected species on the installation. Secondly, the spatial exposure analysis is limited to reported AFFF release locations. To account for environmental movement of PFAS we extrapolated the area of impact out from the known release site following topography, groundwater and surface water conveyances. Therefore, without environmental sampling of PFAS the true migration is unknown and thus we provide best estimation of migration. Furthermore, there may be other sites of AFFF release and measurable PFAS concentrations that are unknown or not available for this effort.

5. Implications for Future Research and Benefits:

There are some excellent opportunities for future research that have become apparent during this effort. To address uncertainties in extrapolated PFAS migration within the landscape environmental sampling along a gradient or at the expected surface water termination would be beneficial for proof-of-concept. Protected species are ranked based on the exposure potential which is a critical first step in understanding which species and/or taxa may be receiving the greatest exposure to PFAS. We acknowledge there are limitations to this based on historical

sampling of known AFFF release locations, however, using those limited data, environmental sampling could fill in the gaps of expected PFAS transport.

In addition to environmental sampling, *a critical need* in understanding true ecological receptor PFAS exposure scenarios is sampling of biota in concert with environmental compartment sampling. This is especially true for the reptilian model as there are very few (if any) data available for PFAS tissue concentrations. Our model suggests the northern pine snake may occupy a PFOS impacted site; however, exposures may not elicit an apical response. Sampling blood or tissue of a surrogate reptilian species would be notably informative to this model. Importantly, these data should be collected in conjunction with animal tagging so true PFAS exposure can be ascertained based on a temporal and spatial scale. Other avenues of research to determine exposure would be sampling of shedded reptilian skin as depuration of contaminants have been previously noted via this route of elimination. These data would then be incorporated into the snake model to refine expected reptile PFAS exposure scenarios.

Finally, and perhaps most important would be developing a field component to determining PFOS exposures to bald eagle eaglets. As the current probabilistic model suggests there may be risk to eaglets through high dietary exposures. We assumed proximity of nest location to PFAS impacted sites plays a role in the eaglet exposure profile and would suggest nest sampling at near and far distances including nests that are used in consecutive years. One non-lethal approach to determining PFOS exposure to eaglets would be to sample feathers that have been shed, this approach also results in minimum disturbance to the animals. In addition to feather sampling, droppings may also be sampled for PFOS, the concern with this approach alone is that fecal material may be from parent or the eaglet. Whereas feathers can be more easily identified as adult or juvenile.

The abovementioned additional effort could serve as a ‘ground truth’ to our models developed under this statement of need. Moreover, the risk assessment community frequently requests more information on observed field effects to those modeled and/or inferred by environmental sampling alone.

1. OBJECTIVES

The technical objectives of this research were developed in response to Strategic Environmental Research and Development Program's (SERDP), Environmental Restoration Statement Of Need (ER SON)-18-L2 that requested an approach for assessing risk of PFAS to federal and state threatened and endangered (T&E) species. The SON highlighted the need to assess PFAS risk of shared T&E species among installations and development of PFAS exposure factors. Our approach involved a thorough investigation of the available data on T&E species occurrence, life-histories, and habitat requirements to identify the likelihood and routes of potential PFAS exposure to prioritize T&E species for further risk assessment. Upon identification of those species with the greatest exposure potential probabilistic exposure models were developed on two candidate species. The objects and associated tasks are broken down as follows:

Objective 1: Develop Species-specific spatial PFAS exposure estimates on impacted Department of Defense (DoD) sites

- Task 1: Identification of DoD installations that are or may be contaminated with PFAS resulting from the historical use of Aqueous Film Forming Foam (AFFF) in fire suppression activities
- Task 2: Determine Locations, Occurrences, and Exposure of Rare, Threatened or Endangered Species on DoD Installations identified in Task 1 as PFAS-contaminated (or likely contaminated). Geographic Information System (GIS) geodatabase data layers and taxa specific exposure potentials will be used to rank T&E species for further investigation

Objective 2: Develop tiered assessment approach for T&E species risk assessments

- Task 3: Synthesize outcomes from Objective 1 into an overall conceptual framework for assessing risk to protected species that inhabit PFAS-contaminated installations
- Task 4: Develop two probabilistic exposure models for identified protected species from the tasks above

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2. BACKGROUND

Per- and Polyfluoroalkyl Substances (PFAS) are emerging contaminants of concern and are found on many military installations that have airborne missions. These chemicals are extremely persistent and somewhat mobile in environmental media and have been measured in drinking water (Hu et al. 2016), groundwater (Long and Porter, 2015, Houtz et al. 2013), surface water (Long and Porter, 2015, Awad et al. 2011), soils and sediment (Long and Porter, 2015; Higgins and Luthy 2007) and a wide variety of biota (Fish, Geisy and Kannnan 2001, Hoff et al. 2005; Birds, Kannan et al. 2001, Custer et al. 2014; Mammals, Falandysz et al. 2007). As such, there is growing interest regarding the potential effects of PFAS to public and environmental health, as well as concern from the Department of Defense (DOD) regarding liability under federal statutes such as the Endangered Species Act (ESA). The predominant source of PFAS on DOD sites originates from historical fuel-based fire suppression activities using Aqueous Film Forming Foam (AFFF) which contained a mixture of largely perfluorooctane sulfonate (PFOS) in combination with other PFAS (Houtz et al. 2013). The physicochemical properties (i.e. smothering surfactant layer) that render PFAS compounds effective in fire suppression also translate to resistance to biodegradation, photooxidation, direct photolysis and hydrolysis. Specifically, while carbon chain length and terminal group vary among PFAS, all share a carbon backbone that is either fully saturated with Fluorine (perfluoroalkyl substance) or partially saturated with Florine (polyfluoroalkyl substance) (Buck et al. 2011). The C-F bond is especially strong and imparts the salient properties for PFAS chemicals. AFFF has been used by the military since the 1960s, though the exact PFAS mixture that comprised the AFFF used over the years changed with respect to supplier. It has been estimated, however, that the 3M mixture was used predominantly since the 1980s and in 2004, 75% of the military stockpile was produced by 3M (Darwin 2004). Given the persistent nature of PFAS, continuous exposure occurs even though AFFF use in fire suppression and training exercises has been reduced. For example, PFAS detections in sediment and surface water near an accidental release of AFFF from a malfunctional fire alarm at L.B. Pearson Toronto International Airport in 2000 were detected nine years later (Awad et al. 2011). In addition to PFAS detections in multiple environmental compartments, PFAS are found within blood and tissue of humans and wildlife (Apelberg et al. 2007, Geisy and Kannan 2001, Kannan et al. 2004, Kannan et al. 2006). Accordingly, concentrations of PFAS in environmental compartments and in biota near the Toronto Airport release decreased with distance from the epicenter of release (Awad et al. 2011). Importantly, this highlights the ubiquitous nature of this class of chemicals and the need to further understand how they may be impacting wildlife, especially imperiled species. Studies conducted by DOD and researchers at U.S. Air Force installations confirm PFAS detections in environmental compartments and transportation of PFAS from sites below AFFF training areas to surface water, sediment and groundwater (Lanza et al. 2017, Moody et al. 2002, Gewurtz et al. 2014, Karrman et al. 2011, Oakes et al. 2010). Biota may be exposed via direct and indirect pathways; such as, direct contact with soil or drinking water or bioaccumulation. Identifying exposure pathways to ecological receptors can be complex; however, determining risk may prove more challenging based on overall lack of toxicity data on many PFAS.

Most studies investigating ecotoxicology of PFAS have focused on PFOS (Giesy et al. 2010, Ding et al. 2013) and PFOA (Hekster et al. 2003) within the aquatic environment.

Unfortunately, ecotoxicity data are significantly lacking with regard to terrestrial organisms and on the toxicity of other PFAS in general, such as Perfluorohexane sulfonic acid (PFHxS) and Perfluorohexanoic acid (PFHxA), which are routinely found in surface water, sediment, and soils together on DOD installations with AFFF contamination (Long and Porter 2015). Should taxa specific ecotoxicity data be available it does not necessarily reflect the classic taxa-exposure-response relationship, for example, Custer et al. 2014 found effects in hatching success of tree swallows correlated to PFOS concentrations (283 ng/g ww) lower than proposed Avian Toxicity Reference Values (TRV; 600 ng/g ww [Northern Bobwhite Quail and Mallard], Newsted et al. 2005). This highlights the importance of considering species-specific differences and life-history traits (e.g. foraging range) when quantifying exposure and risk scenarios to Threatened & Endangered (T&E) species.

Section 7(a)(2) of the ESA states "each federal agency shall, in consultation with the Secretary, insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of threatened and endangered species or destroy or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary…". Therefore, putting both proactive and responsive actions on federal agencies with respect to protection of T&E species. The United States Environmental Protection Agency (USEPA) conducts risk assessments on T&E species for unintentional pesticide exposures; the T&E risk assessments are species-specific and the majority are on *Rana draytonii* (California Red-legged frog; 39% of total assessments). The US Environmental Protection Agency (US EPA) frequently estimates exposures using allometric equations for food and water consumption from the Wildlife Exposures Factors Handbook (USEPA 1993); although dated at this point, the wildlife exposures factors handbook is still comprehensive in providing estimates of food and water ingestion rates for terrestrial and aquatic receptors through drinking water or diet. Commonly incorporated into protected species risk assessments are assessment factors (AF), which reflect confidence in the data being used, i.e. soundness of the study and relevance of the data to the assessment (USEPA 2003). For acute data, the AF is applied by multiplying the lethal concentration by 0.5; this is very close to the estimate of 0.63 that was derived from acute toxicity tests using standard models and endangered species (Dwyer et al. 2005). Dwyer et al. (2005) found that there were different sensitivities among species and there was not a dominantly sensitive species of the 20 tested. Importantly, PFAS exposures will not follow an acute duration and therefore, chronic exposures are most relevant to this research. As Part II of the Dwyer et al. (2005) research, Besser et al. (2005) conducted 30-day exposures on two commonly used test species and two protected species expanding the investigation on comparing sensitivities of common test species to those protected using two toxicants. The endangered fountain darter (*Etheostoma fonticola*) was the most sensitive to both toxicants compared to the two common and one endangered species (Besser et al. 2005). As expected, Besser et al. (2005) found that non-lethal endpoints were more sensitive than survival. Given the increased sensitivity of an endangered species to toxicant exposure compared to common laboratory models the inclusion of assessment factors for chronic studies is appropriate and likely the commonly used approach to protecting species on high concern.

Given the lack of information concerning the potential risk of PFAS to T&E species on DoD lands, we proposed to compile and synthesize data on species occurrence and potential overlap

with PFAS contamination and to outline a tiered approach to assess risk to T&E species with specific suggestions for data needs, as well as uncertainties related to each tier of the approach. This project provides immediate, useful insights into the potential for PFAS exposure to T&E species and points the way toward methods for location and species-specific assessments for PFAS risk.

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3. MATERIALS AND METHODS

3.1 PROTECTED SPECIES ON DOD SITES

Pursuant to the provisions of the Sikes Act (16 United States Code §670a et seq.), DoD is required to conserve and protect natural resources present on DoD lands. The Sikes Act requires that the DoD develop and implement Integrated Natural Resources Management Plans (INRMPs) for installations with natural resources conservation programs. These INRMPs serve as planning documents for an installation's management of natural resources in a manner that supports the military mission while promoting stewardship of natural resources and compliance with legal requirements. INRMPs also allow for stakeholder coordination and are developed and implemented in collaboration with the US Fish and Wildlife Service (USFWS) and State fish and wildlife agencies.

INRMPs provide detailed information and management strategies of federally- and state-protected species that are known to occur or have the potential to occur on an installation. The Sikes Act directs that INRMPs be reviewed and revised every 5 years. Installations with a recently updated INRMP provided an up-to-date species list for this research.

3.1.1 Species List Development

Protected species with potential and/or known occurrence at the study sites were developed to provide a geographically defined species list. Species-specific habitat type and ranges were determined through federal, state and/or published literature. These data provide the foundation for determining expected species locations on the study sites.

3.1.1.1 Joint Base McGuire-Dix-Lakehurst

To establish expected protected species on JBMDL, the INRMP was compared against the New Jersey Pinelands Commission Threatened & Endangered Animals of the New Jersey Pinelands (Revised June 2015) as well as the USFWS Information for Planning and Consultation (IPaC) system to identify federal T&E species potentially at JBMDL.

3.1.1.2 Naval Air Station Patuxent River

An updated INRMP was completed at Naval Air Station (NAS) Patuxent River in 2017 and includes a list of federal and state rare, threatened or endangered species with known or expected occurrence at the installation. Because this INRMP was developed in coordination with USFWS and provides site-specific species data, it was used to develop the species list for those expected to be found at NAS Patuxent River. In addition, the USFWS IPaC system was used to identify any federal species with the potential to occur on the installation.

3.1.1.3 Barksdale Air Force Base

Like NAS Patuxent River, the INRMP was completed in 2017. The only protected species known to be present is the Bald Eagle (*Haliaeetus leucocephalus*). However, there is potential for the federally-listed northern long-eared bat as this species has been found during mist net surveys in Winn and Grant Parishes, which are southeast of the Air Force Base.

3.1.2 Species Habitat Designation

Following species list development, species preferred habitat and home range information were collected from the New Jersey Department of Environmental Protection (NJDEP) Endangered and Non-Game Species Program website, Maryland Department of Natural Resources (MD DNR) website, USFWS IPaC system, NatureServe, and from the primary literature. Home range is defined here as the distance an organism may travel beyond the identified habitat preference.

3.2 DESKTOP GIS ANALYSIS

A geospatial desktop analysis was conducted using a Geographic Information System (GIS) (ArcGIS version 10.4.1 or newer) to identify AFFF release sites, fate and transport pathways, and protected species receptor habitats. This approach provided a quasi-quantitative PFAS exposure potential to T&E species which can be used to rank species for further risk analysis.

3.2.1 Existing Data

Data were obtained from the respective military installations and/or best available public data sources. Data gaps were identified if no publicly available data exists and/or the installation does not have sufficient data layers.

3.2.1.1 Joint Base McGuire-Dix-Lakehurst

The following GIS data layers were obtained from JBMDL in 2018:

- Installation boundary, military ranges, training areas, buildings, impervious surfaces, and emergency response sites
- U.S. Geological Survey (USGS) streams and waterbodies
- U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) wetlands

Publicly Available Sources:

- New Jersey Department of Environmental Protection (NJDEP) (2012) land use/land cover
- U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soils
- USGS and/or best available topography/Light Detection and Ranging (LiDAR) data

3.2.1.2 Naval Air Station Patuxent River

The following GIS data layers were obtained from NAS Patuxent River in 2018:

- Installation boundary, military ranges, training areas, buildings, impervious surfaces, environmental remediation sites, monitoring well locations, and previous sampling locations
- Streams and waterbodies
- Wetlands

Publicly Available Sources:

- Maryland Department of Planning (MDP) for St. Mary's County (2010) land use/land cover
- USDA NRCS soils
- USGS and/or best available topography/LiDAR data

3.2.1.3 Barksdale Air Force Base

The following GIS data layers were obtained from Barksdale AFB in 2019:

- Installation boundary, military ranges, road lines, restricted land use areas, environmental remediation sites, and previous sampling locations
- Prescribed burn and wildfire areas, natural resource survey areas, and bat survey areas
- Bald eagle habitat areas and nest locations
- Groundwater contours

Publicly Available Sources:

- USDA NRCS soils
- USGS streams and waterbodies
- USFWS NWI wetlands
- USGS National Land Cover Dataset (NLCD) (2011) land cover (2017)

3.2.2 Analysis Methodology for Spatial Exposure Potential

Data were imported into a GIS framework from sources previously identified or were obtained and revised from field site visits (NAS Patuxent River). AFFF release areas were obtained from the installation if available or digitized from the Site Investigation Report (Aerostar SES LLC 2018 [JBMDL], Amec Foster Wheeler 2019 [Barksdale]) and Preliminary Assessment for NAS Patuxent River (CH2M 2018). Those sites included historical fire extinguishing events, fire stations, fire training areas and emergency response sites. Additionally, suspected AFFF release sites were also identified based on the SIR, for example, landfill locations. If exact location of release was known a point was used to identify that AFFF site; however, if a general area was reported a polygon was assigned.

AFFF drainage areas were created to map the horizontal extent of aboveground PFAS migration. Drainage areas were created by referencing the surface water pathways identified in the SIRs and Preliminary Assessment (PA) Reports and hydrologic interpretation of surface and groundwater

flow direction (HydroGeoLogic, Inc. 2015a, b [JBMDL, Barksdale, respectively], CH2M 2018 [NAS Patuxent R.]). Extents were developed to include AFFF release areas and downgradient areas to the connection of the closest surface water features (i.e. streams and ditches).

AFFF drainage areas were overlain with T&E species habitat to calculate PFAS exposure potential impacts to T&E species as a percentage of overall habitat available at each site. Habitat by species, taxa, diet, and taxa-diet were calculated using this approach.

3.2.3 Data Reliability and Limitations for the Spatial Exposure Potential Estimate

The best available data for each site was variable based on scale, date of creation/collection, and methodology. To improve reliability, data layers were interpolated where data gaps were identified and/or collected from a field visit. Importantly, the spatial exposure potential estimates are not quantitative with respect to PFAS exposure concentrations within a given media (i.e. soils or surface water). The goal of this foundational step is to determine if exposure may occur within a species preferred habitat and if so, what is the percentage of habitat that may be impacted by PFAS.

3.2.3.1 Joint Base McGuire-Dix-Lakehurst

The land use/land cover data layer was obtained from NJDEP for the entire State (2012). Aerial photointerpretation and a review of the data layer at the site demonstrated that the habitat data layer boundaries and land use/land cover types were at an acceptable resolution and detail for use in creating the T&E species habitat layer. These data appear to be at a fine scale with distinctions between many habitat features, such as differences in water body types and forest cover based on crown closure (Figure C-1 and C-2). Importantly, the ability to visually differentiate between the landscapes is not critical, figures C-1 and C-2 are included to provide an overview of the level of detail and complexity within the landscape mosaic.

Groundtruthing was conducted at Lakehurst (only, Figure C-1) to determine the accuracy of the obtained data layer. The data layers were refined with the results of the groundtruthing and further desktop analysis. Habitat types and boundaries were also revised using aerial photointerpretation. As a result, several habitat types were removed from one or more of the bases that combine to make JBMDL. These included: agricultural wetlands (modified), bridge over water, industrial, orchards/vineyards/nurseries/horticultural areas, other agriculture, residential rural single unit, and severe burned upland vegetation. “Phragmites dominant interior” habitat type was added to increase detail.

Due to the large size of McGuire and Dix (Figure C-2), habitat types were not groundtruthed; however, data layers were refined using aerial photointerpretation. As a result, several habitat types were removed from one or more bases. These included: altered lands, bridge over water, extractive mining, former agricultural wetland, industrial, major roadway, mixed residential, orchards/vineyards/nurseries/horticultural areas, wetland rights-of-way.

The data layers were further refined by integrating developed areas (i.e. buildings, airfields, roads, and sidewalks) and hydrolines (i.e. streams and canals) provided by the military installation.

3.2.3.2 Naval Air Station Patuxent River

The land use/land cover data layer was obtained from MDP for St. Mary's County (2010). Aerial photointerpretation and a review of the data layer at the site revealed that the data layer boundaries and land use/land cover types were at an *unacceptable* resolution and detail for use in creating the T&E species habitat layer (Figure C-3). Comparatively, the habitat data layers are much coarser than those for JBMDL. The data layer boundaries were created at too low of a resolution, especially within the developed military areas, and a shoreline habitat type of a T&E shorebird species was absent.

Groundtruthing was conducted at NAS Patuxent River and those modifications were made to the data layers (Figure C-4). Also, habitat types and boundaries were revised using aerial photointerpretation. As a result, bare exposed rock, extractive, and industrial habitat types were removed and the varying qualifiers for residential density were consolidated into one habitat type called residential. Water was differentiated between nontidal and tidal water as species likely occupy one or the other unless euryhaline. Wetlands were differentiated between emergent and forested as canopy cover can influence species composition (Quesnelle et al. 2013). Sandy shoreline and old field habitat types were also added.

The data layer was further refined by integrating developed areas (i.e. buildings, airfields, and roads) and hydrology (i.e. streams and canals, waterbodies and wetlands) obtained from the military installation and publicly available data sources.

3.2.3.3 Barksdale Air Force Base

The land use/land cover data layer was obtained from Barksdale AFB (2017); it represented a slightly revised version of the USGS National Land Cover Dataset (NLCD) (2011). Aerial photointerpretation and a review of the data layer at the site revealed that the data layer boundaries and land use/land cover types were at too course of resolution and detail for use in creating the T&E species habitat layer (Figures C-5&C-6). Comparatively, the habitat data layers are much coarser than those for JBMDL which was determined to be at an acceptable resolution for this analysis. Habitat types and boundaries were revised using aerial photointerpretation. As a result, the "barren land" habitat type was removed and open water was refined as lakes/ponds or streams/canals.

The data layer was further refined by integrating developed areas (i.e. buildings, airfields, and roads) and hydrology (i.e. streams and canals, waterbodies, and wetlands) through digitizing data and publicly available data sources. USFWS NWI wetlands were grouped into USGS NLCD wetland types for consistency (Figures C-7&C-8).

3.2.4 Threatened and Endangered Species GIS Data Layers

T&E species habitat layers were created by using the best available and corrected land use/land cover data layer and performing a tabular data join with the list of species that may inhabit each land use/land cover type.

4. RESULTS AND DISCUSSION

Results of the spatial analyses are presented as (1) percent of impacted habitat and (2) percent of impacted habitat by taxa, dietary preference and individual T&E species. By incorporating the geographically influenced fate and transport of PFAS into the GIS analyses the likely pathways of chemical movement into defined landscapes become more apparent. Given this approach is limited to sampling locations from the Site Investigation Report (SIR) we believe it may be underestimating the total percent of impacted habitat. Furthermore, this approach was limited to the installation boundary, yet we know chemicals and wildlife may go beyond such boundaries.

4.1 SPATIAL ANALYSIS OF PFAS EXPOSURE POTENTIAL

4.1.1 Joint Base McGuire-Dix-Lakehurst

Using installation and habitat boundaries within GIS with the AFFF release and estimated PFAS migration pathway landscape layers we estimated the percent of impacted landscape on each base of JBMDL. The spatial analysis estimated 1,005 of the 42,151 available landcover acres (approximately 2.4%) are likely impacted by PFAS. The area of Dix has a disproportionate effect on this statistic given the large size (31,167 acres). Taken individually, results of expected PFAS contamination on each base are approximately 9.7, 1.4 and 3% of available landcover on McGuire, Dix and Lakehurst, respectfully (Table 1). Comparatively, we have estimated McGuire has the greatest percent of AFFF impacted landcover and Lakehurst has the greatest total estimated acres of impact (433 ac).

Table 1. Estimated landcover impacted by AFFF migration from release locations

Base	Total Acres	Impacted Acres	Percent Impacted (%)
McGuire	3,560	345	9.69
Dix	7,424	227	3.06
Lakehurst	31,167	433	1.39

For JBMDL there were 46 landcover types in GIS (Figure C-1&C-2). Twelve landcover types were identified as having a portion of impacted habitat across two or more bases (Appendix A). Additionally, landcover types that are expected to be impacted with approximately 10% or more of the available habitat on a base was identified and reported in Table 2 with the other bases of the installation for comparison.

Table 2. Landcover type by base that has ≥ 10% of available habitat impacted by AFFF migration

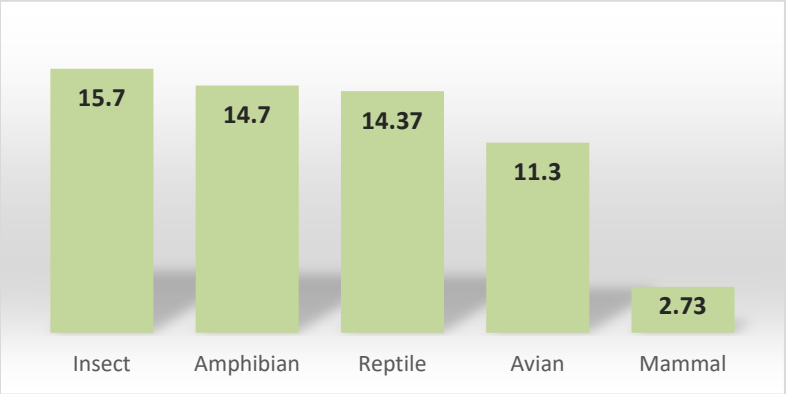
Landcover Type	McGuire	Dix	Lakehurst
Military Installations	13.5	<10	8.0*
Stormwater Basin	10.1	<10	<10
Deciduous Forest (10-50% Crown Closure)	11.6	<10	<10
Old Field (< 25% Brush Covered)	18.7	<10	<10
Deciduous Brush/Shrubland	10.6	<10	<10
Artificial Lakes	19.5	<10	<10
Coniferous Wooded Wetlands	14.8	<10	<10
Herbaceous Wetlands	14.5	<10	<10
Disturbed Wetlands (Modified)	10.6	<10	<10
Transitional Areas	21.4	16.5	<10
Recreational Land	<10	26.7	<10
Agricultural Wetlands (Modified)	<10	98.8	n/a

* greatest percent impacted landcover type on Lakehurst, n/a – removed from Lakehurst after identified as incorrect landscape cover for this base in GIS

Military Installation landcover type is a 'catchall' for landcover that does not fall into one of the listed categories and will include military fence lines and auxiliary land use. All other habitat layers are self-evident based on the name (i.e. Artificial Lake is a manmade lake).

Following the migration of AFFF through the landcover type, percent of impacted habitat specific to wildlife was evaluated (Table A-1). Results on protected taxa that occupy JBMDL indicate that insects appear to have the greatest percent (15.7%) impacted habitat, followed by herpetofauna (14%) (Fig. 1). These data suggest there are taxa specific constraints in movement that result in the likelihood of exposure. The only protected mammal on JBMDL is the bobcat (*Lynx rufus*) which can have a home range of 23 – 60 km^2 (Lovallo and Anderson 1996) compared to protected insects (Lepidoptera, approximately 0.75 km over lifetime, Schultz 1998). As such, taxa that have limited home ranges are likely going to have greater exposure potential if restricted to a location near AFFF release.

Figure 1. Percent of AFFF impacted habitat by protected taxa on JBMDL



McGuire has the greatest percent of estimated AFFF impacted habitat used by protected species that may occur on the installation, with exception to the state endangered bobcat (Figure 2, Appendix B). A dominant habitat (landcover layer) that the bobcat occupies is the coniferous forest (> 50% crown closure); importantly, it is not the case that this habitat is only available on Lakehurst but that the estimated AFFF impact to this habitat is greatest on Lakehurst (3.3%) compared to near zero percent impacted on McGuire and Dix. In total there are 10, 6,216 and 1,38 acres of coniferous forest (>50% crown closure) on McGuire, Dix and Lakehurst; respectively. Likewise, for the protected insects that have habitat preference for old fields and herbaceous wetlands, these habitat types are distributed across the entire installation; however, we estimate that these habitats are most impacted by historical AFFF activities on McGuire and therefore exposure potential is greatest for protected Lepidoptera on McGuire compared to Dix and Lakehurst bases. Given the comparatively small size of McGuire and yet similar number of known AFFF release locations on Dix and Lakehurst the PFAS exposure potential is disproportionately greater on this base (figure 2).

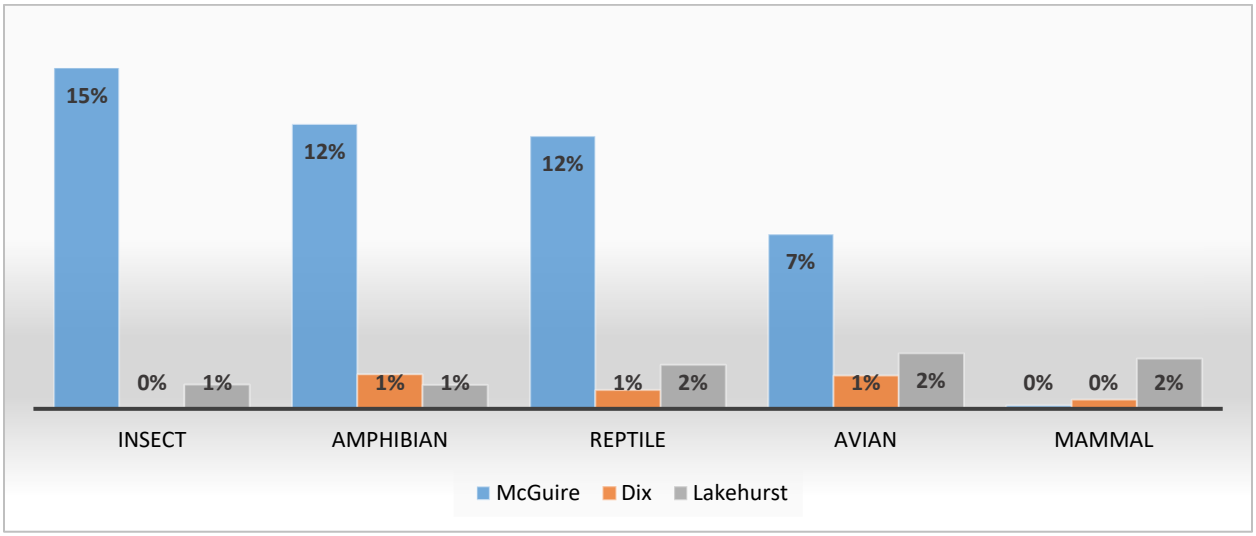


Figure 2. Percent of protected taxa-specific landcover estimated to be impacted by AFFF by base

Further investigation shows that there are differences in exposure potential to protected taxa by dietary requirements. For example, protected insectivorous avian taxa appear to have greater exposure potential based on preferred habitat type (Figure 3). Likewise, is true for protected reptilian taxa; where the estimated AFFF impacted habitat by dietary requirements are greatest for Omnivores (Squamates) > Carnivores (Serpentines) > Herbivores (Testudines). Again, the greatest estimated AFFF impacted habitat across reptile diet type is within McGuire compared to Dix and Lakehurst.

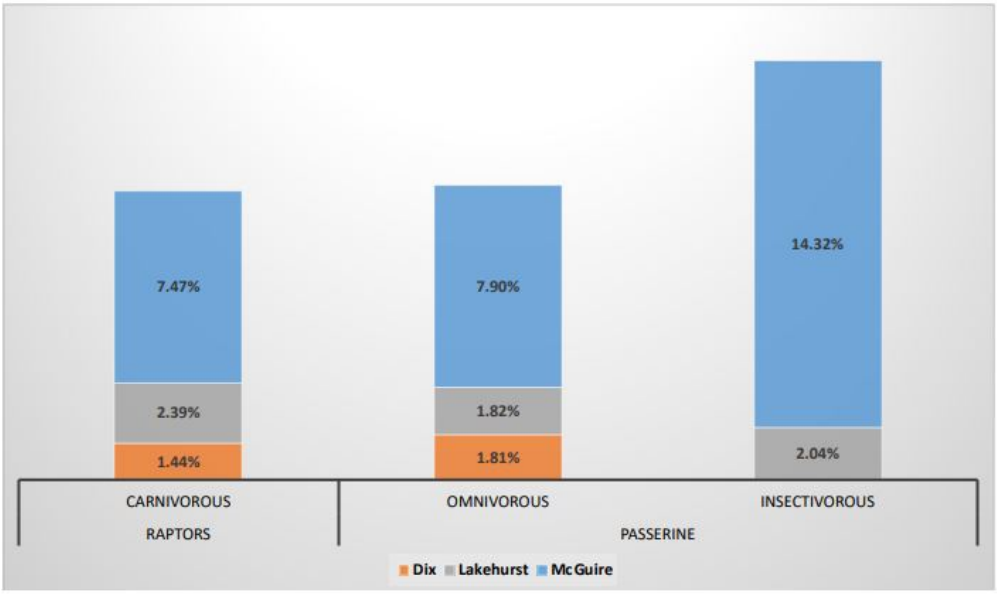


Figure 3. Percent of estimated AFFF impacted landscape of protected avian species by dietary requirements

Protected Species Ranking by Exposure Potential

Species exposure potential to PFAS is location specific, meaning species may be at greater risk of exposure on one site verses another. This is exactly the case at JBMDL where the species identified as having the greatest exposure potential to PFAS on McGuire are not the same as those identified on Dix nor Lakehurst (Table 3). This is due to a number of factors (1) habitat availability on the particular base (2) proximity of AFFF release to a given habitat and/or (3) best judgment in matching habitat preference with GIS landscape layer. For example, osprey (*Pandion haliaetus*) is identified as having greater exposure potential compared to the bald eagle (*Heliaeetus leucocephalus*) on McGuire base. Although there is habitat overlap among these species, osprey are almost exclusive piscivores and therefore habitats such as "wooded wetlands" which are assumed to have less fish than "lakes/ponds" were not designated as osprey habitat. Bald eagles may inhabit old growth forests and wooded wetlands and therefore the proportion of available habitat increases for Bald eagles but not for osprey (nearly obligate piscivores). Based on this type of spatial analyses it is not appropriate to draw commonalities in species ranking across the bases as habitat availability and AFFF release locations are variable. This approach is useful to identify species with greatest exposure potentials at a given location, the fine-scale GIS

landcover layer and ability to compartmentalize the large size of JBMDL allows for multiple lists of species ranking.

Table 3. Protected Species Exposure Potential to PFAS by base on JBMDL

Latin Name	Common Name	McGuire	Latin Name	Common Name	Dix	Latin Name	Common Name	Lakehurst
P. haliaetus	Osprey	19.47%	*F. sparverius*	American Kestrel	12.48%	*A. flammeus*	Short-eared Owl	3.65%
D. oryzivorus	Bobolink	18.72%	*D. oryzivorus*	Bobolink	9.97%	*C. cyaneus*	Northern Harrier	3.26%
P. gramineus	Vesper Sparrow	18.72%	*P. sandwichensis*	Savannah Sparrow	8.60%	*P. rubriventris (Adult)*	Red-bellied Turtle - Adult	2.82%
A. savannarum	Grasshopper Sparrow	17.00%	*C. cyaneus*	Northern Harrier	2.96%	*S. varia*	Barred Owl	2.17%
A. arogos arogos	Arogos Skipper	17.00%	*P. haliaetus*	Osprey	1.79%	*L. rufus*	Bobcat	2.16%
C. irus	Frosted Elfin	17.00%	*P. rubriventris (Adult)*	Red-bellied Turtle - Adult	1.63%	*E. guttata*	Corn Snake	2.16%
B. longicauda	Upland Sandpiper	16.99%	*P. rubriventris (Juvenile)*	Red-bellied Turtle-juvenile	1.50%	*C. platensis*	Sedge Wren	2.04%
A. henslowii	Henslow's sparrow	14.69%	*H. chrysocelis*	Southern Gray Tree Frog	1.47%	*A. gentilis*	Northern Goshawk	2.01%
P. montanus	Eastern Mud Salamander	14.37%	*P. gramineus*	Vesper Sparrow	1.02%	*B. lineatus*	Red-shouldered Hawk	2.01%
B. selene myrina	Silver-bodered Fritillary	14.35%	*B. longicauda*	Upland Sandpiper	0.95%	*M. erythrocephalus*	Red-headed woodpecker	2.01%
C.muhlenbergii	Bog Turtle	14.35%	*S. varia*	Barred Owl	0.89%	*L. ludovicianus*	Loggerhead Shrike	2.00%
C. platensis	Sedge Wren	14.32%	*A. flammeus*	Short-eared Owl	0.85%	*A. otus*	Long eared owl	1.97%
B. lentiginosos	American bittern	14.22%	*A. gentilis*	Norther Goshawk	0.72%	*C. horridus*	Timber Rattlesnake	1.92%
H. andersonii	Pine Barrens Tree Frog	14.15%	*B. lineatus*	Red-shouldered Hawk	0.72%	*C. insculpta*	Wood Turtle	1.79%
P. m melanoleucus	Northern Pine Snake	13.65%	*M. erythrocephalus*	Red-headed woodpecker	0.72%	*N. violaceus*	Yellow-crowned night heron	1.61%
P. podiceps	Pied-billed Grebe	12.52%	*A. otus*	Long eared owl	0.62%	*C. muhlenbergii*	Bog Turtle	1.52%
P. rubriventris (Juvenile)	Red-bellied Turtle-juvenile	12.19%	*P. montanus*	Eastern Mud Salamander	0.50%	*H. leucocephalus*	Bald Eagle	1.45%
H. chrysocelis	Southern Gray Tree Frog	12.13%	*N. violaceus*	Yellow-crowned night heron	0.44%	*N. nycticorax*	Black-crowned night heron	1.45%
C. guttata	Spotted Turtle	11.95%	*C. guttata*	Spotted Turtle	0.43%	*B. lentiginosos*	American bittern	1.44%
C. insculpta	Wood Turtle	11.92%	*H. leucocephalus*	Bald Eagle	0.43%	*B. selene myrina*	Silver-bodered Fritillary	1.43%
H. leucocephalus	Bald Eagle	11.91%	*N. nycticorax*	Black-crowned night heron	0.43%	*C. guttata*	Spotted Turtle	1.42%
N. violaceus	Yellow-crowned night heron	11.91%	*L. rufus*	Bobcat	0.41%	*P. podiceps*	Pied-billed Grebe	1.15%
N. nycticorax	Black-crowned night heron	11.91%	*E. guttata*	Corn Snake	0.38%	*H. chrysocelis*	Southern Gray Tree Frog	1.14%
L. ludovicianus	Loggerhead Shrike	9.73%	*C. insculpta*	Wood Turtle	0.38%	*P. rubriventris (Juvenile)*	Red-bellied Turtle-juvenile	1.07%
C. cyaneus	Northern Harrier	9.08%	*C. horridus*	Timber Rattlesnake	0.34%	*H. andersonii*	Pine Barrens Tree Frog	0.93%
P. rubriventris (Adult)	Red-bellied Turtle - Adult	8.10%	*P. podiceps*	Pied-billed Grebe	0.27%	*A. arogos arogos*	Arogos Skipper	0.24%
A. flammeus	Short-eared Owl	7.53%	*H. andersonii*	Pine Barrens Tree Frog	0.24%	*C. irus*	Frosted Elfin	0.24%
A. otus	Long eared owl	4.33%	*L. ludovicianus*	Loggerhead Shrike	0.18%	*P. montanus*	Eastern Mud Salamander	0.23%
F. sparverius	American Kestrel	4.16%	*A. arogos arogos*	Arogos Skipper	0.13%	*D. oryzivorus*	Bobolink	0.19%
P. sandwichensis	Savannah Sparrow	4.15%	*C. irus*	Frosted Elfin	0.13%	*A. savannarum*	Grasshopper Sparrow	0.19%
E. guttata	Corn Snake	3.10%	*A. savannarum*	Grasshopper Sparrow	0.13%	*A. henslowii*	Henslow's sparrow	0.16%
C. horridus	Timber Rattlesnake	2.15%	*A. henslowii*	Henslow's sparrow	0.11%	*P. sandwichensis*	Savannah Sparrow	0.12%
A. gentilis	Norther Goshawk	1.31%	*P. m melanoleucus*	Northern Pine Snake	0.07%	*P. gramineus*	Vesper Sparrow	0.11%
B. lineatus	Red-shouldered Hawk	1.31%	*C. platensis*	Sedge Wren	0.05%	*B. longicauda*	Upland Sandpiper	0.11%
M. erythrocephalus	Red-headed woodpecker	1.31%	*B. selene myrina*	Silver-bodered Fritillary	0.03%	*F. sparverius*	American Kestrel	0.09%
L. rufus	Bobcat	0.16%	*C. muhlenbergii*	Bog Turtle	0.03%	*P. m melanoleucus*	Northern Pine Snake	0.08%
S. varia	Barred Owl	0.00%	*B. lentiginosos*	American bittern	0.03%	*P. haliaetus*	Osprey	0.07%

4.1.2 Naval Air Station Patuxent River

Analysis on estimating impacts of AFFF to NAS Pax River habitat resulted in approximately 2% of the installation identified as PFAS impacted (Table A-2). Greatest estimated impacts (8%) were to evergreen forests, all other habitats had 4% or less of the available landscape impacted. As noted above in the "data reliability" section, the spatial scale of the available GIS layers were not well defined. Habitat (landscape layer) was updated following the in-field habitat assessment and GIS was updated with new landscapes and boundaries. Although, this update did not change the total estimated impacted landscape on NAS Patuxent River, it does influence the estimates of impacted habitat per species and per taxa. The exposure potential for most taxa using the original GIS was lower than the respective exposure potentials using the updated GIS landscapes (Figure 4).

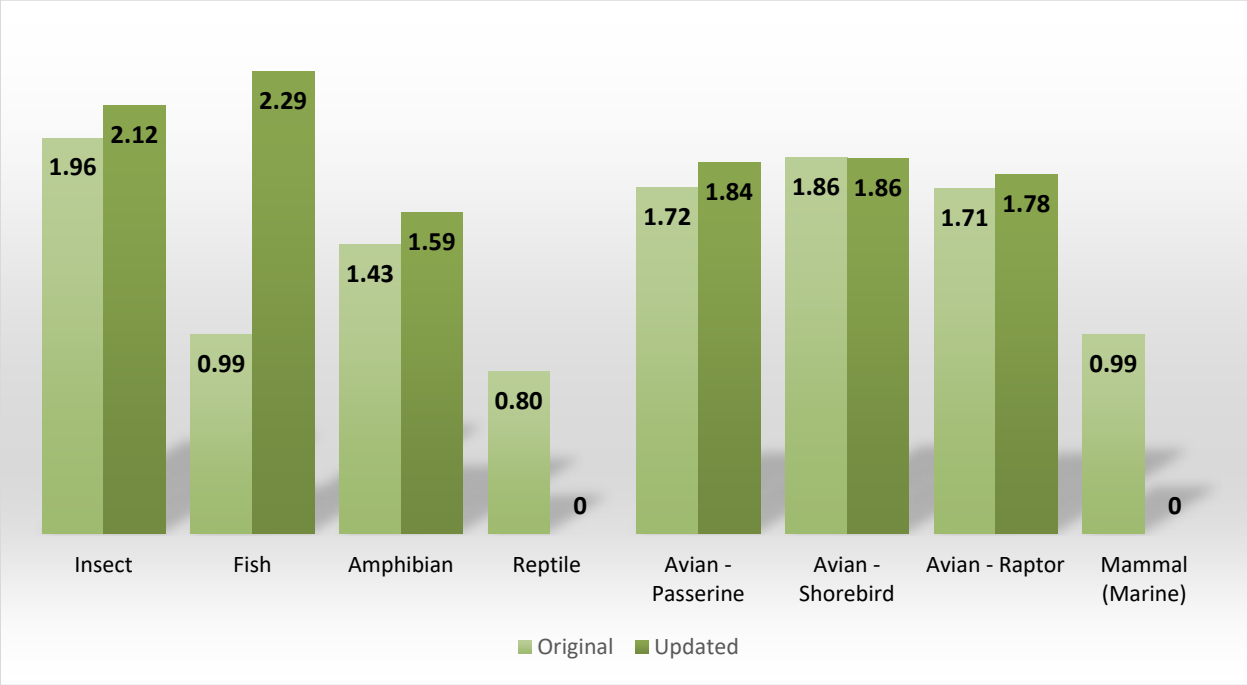


Figure 4. Percent impacted habitat by taxa on NAS Patuxent River before and after GIS updates

The greatest difference in exposure potential can be seen in fish that jumps from <1% of the habitat exposed to 2.29%. Importantly, this estimate of impacted freshwater habitat is likely conservative as the migration of PFAS from the AFFF release site terminates at the surface water body and therefore the model does not include downstream portions of that landcover layer. There is a loss of habitat exposure potential in reptiles and marine mammals as the original GIS landscape has only one "water" landcover layer that is broken down into "tidal water", "non-tidal water", "emergent wetland" and "forested wetland" in the updated GIS. There were no AFFF

releases that resulted in PFAS impacts to the tidal water habitat in the updated GIS and therefore, no exposure potential to marine mammals and reptiles, which included only protected sea turtles. In comparison with the estimated impacted habitat of JBMDL, NAS Patuxent River has lower percentage of protected species exposure potential to PFAS. Interestingly, the insect taxa appear to have a high exposure potential at both installations indicating that further hazard/risk assessment may be warranted to those terrestrial receptors using non-traditional species (i.e. crickets). Furthermore, insectivorous species such as passerine birds may also experience greater exposure potential as resources may occupy impacted habitat. Further supporting the need to investigate, not only direct toxicity to terrestrial invertebrates but also PFAS accumulation potential. Non-traditional invertebrates are of interest as insectivores prey upon other invertebrate orders (i.e. Coleoptera, Diptera, etc., Nyffeler et al. 2018) more frequently than Lumbriculida (earthworms) a standard ecotoxicity test organism.

Protected Species Ranking by Exposure Potential

Protected species on NAS Patuxent River were ranked by potential exposure to PFAS using the GIS spatial analysis. Ranking is provided as pre- and post-site visit where GIS landscape layers were updated to reflect the change in exposure potential by species (Table 4). The olive sided fly catcher was identified as having the greatest PFAS exposure potential following the site-visit; where pre-site visit it was the frosted elfin (non-migratory butterfly), which was still ranked comparatively high (2.1%) in the post-site visit. Freshwater fish, Ironcolor shiner and Flier were ranked as having greater exposure potential in the post-site visit compared to the pre-site visit where the "water" GIS landcover layer was redefined as "tidal" and "nontidal" water landcover. This update resulted in greater exposure potential to "nontidal" habitats and no exposure potential to "tidal" habitat thus, reduced exposure potentials to protected marine species (e.g. sea turtles and marine mammals). Furthermore, exposure potentials for the Common Gulled-billed Tern, Royal Tern and Black Skimmer were also reduced as these species occupy tidal coastal regions.

Importantly, there are a number of species (i.e. Henslow's Sparrow, Short-eared Owl) where exposure potential is relatively similar in the pre- and post-site visit GIS analysis. This is due to little or no change in those GIS landcover layers following updates. Although, updating the GIS landscape layers did not alter exposure potentials of some protected species, it would be imprudent to assume this is always the case. The spatial exposure potential analyses is very specific to geographic location and therefore any generic assumptions such as "wooded wetlands are always well defined" should not be made.

Table 4. Protected Species Exposure Potential to PFAS on NAS Patuxent River

Latin Name	Common Name	Patuxent River (pre-site visit)	Patuxent River (post-site visit)
C. cooperi	Olive sided Fly catcher	1.62%	2.44%
C. macropterus	Flier	0.99%	2.29%
N. chalybaeus	Ironcolor Shiner	0.99%	2.29%
C. platensis	Sedge Wren	1.34%	2.23%
C. d. dorsalis	tiger beetle	0.00%	2.19%
C. irus	Frosted Elfin	1.97%	2.12%
A. henslowii	Henslow's Sparrow	1.91%	2.02%
B. longicauda	Upland Sandpiper	1.97%	1.99%
L. ludovicianus	Loggerhead shrike	1.78%	1.90%
A. flammeus	short eared owl	1.89%	1.89%
G. philadelphia	Mourning warbler	1.44%	1.84%
S. fusca	Blackburnian warbler	1.45%	1.69%
H. leucocephalus	Bald Eagle	1.43%	1.61%
G. carolinensis	Narrow-mouthed toad	1.43%	1.59%
A. gentilis	Northern Goshawk	1.45%	1.58%
S. antillarum	Least Tern	0.83%	0.90%
C. melodus	Piping Plover	1.31%	0.45%
A. oxyrhynchus	Atlantic Sturgeon	0.99%	0.00%
E. glacialis	North Atlantic Right Whale	0.99%	0.00%
M. novaeangliae	Humpback Whale	0.99%	0.00%
G. nilotica	Common gulled-billed tern	0.83%	0.00%
R. niger	Black Skimmer	0.83%	0.00%
T. maximus	Royal Tern	0.83%	0.00%
L. kempii	Kemp's Ridley Sea Turtle	0.83%	0.00%
D. coriacea	Leatherback Sea Turtle	0.80%	0.00%
C. caretta	Loggerhead Sea Turtle	0.80%	0.00%

4.1.3 Barksdale Air Force Base

Spatial exposure estimates of AFFF on Barksdale AFB have resulted in approximately 110 of the 22,000 acres identified as impacted. All exposure scenarios are confined to the western portion of the base near the runway and other developed land (Figure C-8). The greatest exposure potential per landscape type was streams and canals at approximately 8% of those estimated to be impacted by PFAS (Table A-3). Currently, the only protected species found on this installation is the Bald Eagle. Estimated bald eagle impacted habitat on Barksdale AFB is less than 1% of total available. Given the large range of a bald eagle, nest locations relative to impacted sites is paramount as prey capture frequency from nearby water/field is likely greater than obtaining prey from locations further from the nest. Thus, PFAS exposure potential is expected to be correlated to nest locations near impacted sites, as seen in bald eagles near Lake Superior in Wisconsin where nestlings closer to the area of impact had higher contaminate loads compared to those at further distances (Kozie and Anderson 1991).

4.2 SPECIES-SPECIFIC PROBABILISTIC EXPOSURE MODELS

The objective for this phase of the project was to develop probabilistic exposure models and preliminary risk estimates for two ecological receptors that are federally or state protected and whose habitat overlaps with PFAS contamination at our case study installations. The two species chosen were the Northern Pine Snake (*Pituophis melanoleucus*) and the Bald Eagle (*Heliaeetus leucocephalus*). These species represent two very different receptors and each present certain challenges with regard to estimating PFAS exposure and therefore illustrate important species-specific traits that might need to be considered when conducting PFAS exposure estimation.

The overlap of species habitat and estimated PFAS contamination suggests a potential for exposure. As a preliminary risk screen, those species whose habitat most overlaps with potential PFAS contamination are also most likely to be exposed to PFAS. At McGuire (of JBMDL) the Northern Pine Snake had a percent habitat impacted by PFAS of 13.6% which was among the highest for the reptilian taxa. Other herpetofauna had similarly high percentage of habitat overlap with PFAS contamination and importantly, herpetofauna occupy many DoD sites in general (Petersen et al. 2017). The pine snake was chosen as the receptor of interest because it represents a high-end PFAS exposure and, hence, if no exposure or risk was identified, it seems likely that risk of PFAS exposure to other terrestrial herpetofauna may be similarly low. The bald eagle was chosen as the other receptor of interest because it is federally protected and is widespread (common at the three installations studied here) and, hence, likely to be an important receptor at many DoD installations in North America. As well, percent impacted habitat was relatively high for avian raptors and these species have a relatively low TRV (Newsted et al., 2005) which is used to determine if there is concern of eliciting an affect at a particular exposure concentration. The sections below describe the methods and results for each of these focal receptors.

Arguably, the most commonly used approach for risk estimation is a deterministic approach in which a measure of effect is divided by a measure of exposure (or vice versa) and the resulting quotient compared to an established threshold (U.S EPA 1997) . If the quotient exceeds the threshold, then the assessor concludes that there is a potential for adverse effects or risk (e.g., U.S. EPA 1997). While this type of deterministic approach is fairly easy to implement is it not an actual estimate of risk and suffers from some critical assumptions that impact both the result and inferences of the analysis. As an example, the measure of exposure in a quotient-based assessment is a point estimate which might be the mean or a higher confidence limit. Several significant research efforts have pointed to the problems and uncertainties associated with the deterministic approach and have suggested probabilistic methods that more explicitly incorporate spatial, temporal, and organismal variability which therefore generate actual risk estimates where risk is the probability of an adverse outcome.

We use a probabilistic exposure framework here along the lines of what has been conducted for song birds (Johnson et al. 2007) and small mammals (Williams et al. 2014) exposed to lead from small arms firing ranges. The premise of these and similar studies on probabilistic risk assessment is that the landscape is heterogenous with respect to contaminant distribution and in how organisms use the habitat. By more explicitly accounting for these heterogeneities, more accurate exposure estimates can be generated.

Implementation of probabilistic exposure estimation involves the use of Monte-Carlo simulations whereby receptor exposure is simulated through time and, in some cases, space (e.g., Hope 2000, Johnson et al. 2007, Williams et al. 2014). When many virtual receptors are simulated, the resulting distribution of exposure can be used to generate the probability that effects thresholds are exceeded (e.g., Hope 2000). This approach also lends itself well to explicit analysis of uncertainties whereby the effects of uncertain parameters can be explored via simulation. Probabilistic exposure estimation can therefore be helpful when exploring the potential risk of PFAS to threatened and endangered species.

Probabilistic exposure estimation approaches are most useful in cases where the ecological receptor of interest has a relatively large foraging range and/or where contaminant distribution is heterogenous with respect to the foraging range (Williams et al. 2014). The receptors chosen for this this case-study exploration of PFAS risk to threatened and endangered species, the bald eagle and northern pine snake, both can forage over a relatively large area and are not restricted to very specific habitat features at a small spatial scale. These species also present unique challenges with regard to exposure estimation and methods presented here may help for other, similar species whose critical habitat may overlap PFAS (or other)-contaminated areas.

4.2.1 Probabilistic exposure and risk framework for *Pituophis melanoleucus*

Species Background

The Northern pine snake, is a large-bodied colubrid. There are three subspecies of pine snakes with all three limited to the eastern United States and all considered rare. The Northern pine snake is the only pine snake found in New Jersey where JBMDL is also located. The range of this species in New Jersey is limited to a narrow fringe of pinelands. Hence, any reference to "pine snake" in the current document is in reference to the Northern pine snake. Pine snakes are large, nonvenomous snakes that are excellent at digging hibernacula. Adults can be as long as 2m and have a white-gray base color with brown or black blotching. In New Jersey, pine snakes are generally active mid-April to mid-October spending the remainder of the year in hibernacula. Females are oviparous and produce clutches that are typically 4-16 eggs that are laid in underground hibernaculum (Tennant and Barlett 2000). Pine snakes have been documented to live for up to 23 years in the wild (Golden et al. 2009). Nests are found almost exclusively in open areas with loose sandy soils which are easier to excavate compared to clay-soil compositions. The burrowing abilities of pine snakes clearly aids in nesting but also in the pursuit of subterranean prey such as moles, voles, and shrews. As a general rule, these snakes prefer well-drained, sandy, upland pine and pine-oak forests (Burger and Zappalorti 1986, Zappalorti et al. 2009, Golden et al. 2009). Mating occurs in mid-May and female snakes excavate nests and lay eggs from mid-June to early July. Pine snakes frequently reuse nesting sites which suggests that suitable nesting sites may be limited (Burger and Zappalorti 1992). Pine snakes overwinter in underground hibernacula they share with other pine snakes and sometimes other species of snakes. Pine snakes consume small

mammals, birds, and bird eggs. Juvenile or smaller pine snakes also consume invertebrates.

As mentioned, the pine snake preferred habitat characteristics include soil and forest types common only to the pine barren habitats in New Jersey. The population that occupies the pine barrens is totally isolated from other pine snake populations throughout the country (Golden et al. 2009). This isolation adds to the importance and vulnerability of this population as no natural recolonization or immigration is possible.

PFAS Exposure Conceptual Framework for the Northern Pine Snake

There are no existing published studies that we are aware of in which any species of terrestrial snake has been collected and analyzed for PFAS. Similarly, there are limited data available for other reptiles. Several studies; however, have been published in which PFAS tissue concentrations were reported for several testudine species (turtles, e.g. Bangma et al. 2019, De Silva et al. 2011) but these animals have vastly different life histories, physiology and habitat requirements compared to the pine snake. Nevertheless, we can infer that the most likely PFAS exposure routes for snakes would be dietary, dermal, and possibly drinking water. Of these, dietary and dermal are likely to be most significant for pine snakes given the close contact with soils and PFAS contaminated food sources.

There is considerable uncertainty regarding PFAS uptake from direct dermal contact. At the time of this report, there are insufficient data to effectively estimate or model dermal exposure of PFAS to snakes. Given that pine snakes construct and use burrows dermal exposure likely warrants additional research attention.

For the purposes of this case-study risk assessment, dietary exposure is assumed to be the most likely and most important route of PFAS exposure. Pine snakes consume prey whole and are also, given their prey preference, likely to consume some soil (Beyer et al. 1994). Although there are no published estimates for incidental soil ingestion rates for snakes, estimates for other wildlife species range from <2% to approximately 10% (or more). Consumption of actual prey items (e.g., rodents) can be determined by allometric equations in which food ingestion rate or field metabolic rate are estimated from receptor body weight (US EPA 1993). Because snakes consume prey items whole, it is very possible that an individual snake could obtain several days worth of energetic content from a single prey item. Using the allometric equation for field metabolic rate (FMR) of snakes seems most appropriate and would allow modeling of intermittent feeding. Field metabolic rate estimates are obtained from organisms in the field and as such include energetic demands associated with activities such as foraging, predator avoidance, and mating in addition to basal and resting metabolic rates.

The equation for field metabolic rates in snakes was obtained from the Wildlife Exposure Factors Handbook (U.S. EPA 1993):

*FMR (kcal/day) = 0.0535 * (body mass (g))^0.799*

Table 5. Exposure model parameters for *P. m. melanoleucus*

Exposure model parameter	***Value (variability), distribution***	***Reference***
Snake body mass	2000 g (sd = 500), normal	Golden et al. 2009
Prey mass (rodent)	30 g (sd = 5), normal	Assumed (reasonable wild rodent)
Gross energy prey	1.7 kcal/g (sd = 0.28), normal	US EPA 1993
Assimilation efficiency	0.8	US EPA 1993
Soil-to-Biota Accumulation Factor (SBAF)	19.7	D'Hollander et al. 2014, Bogdanska et al. 2011, Brown et al. 1997
Exposure Duration	90 days	Period of activity/exposure duration of PFOS studies
Incidental Soil Ingestion	0.07 (min) – 0.13 (max), uniform	Beyer et al. 1994, US EPA 1993
PFOS soil concentration (mean±sd surface soil at McGuire)	16.86 (sd=75.69), lognormal	JBMDL Site Investigation Report (Aerostar SES LLC 2018)

Concentrations of PFAS in prey items can be based on actual measured concentrations if available for site-specific assessments or can be estimated from PFAS soil concentrations using biota-to-soil-accumulation factors (BSAF). There are actually few BSAF estimates for rodents and small birds for PFAS including PFOS (Conder et al. 2019). D'Hollander et al. (2014) conducted a field study on terrestrial receptors occupying habitats near a Fluorochemical plant in Belgium. They focused on PFOS and reported soil concentrations of 69±9 ng/g and liver concentrations in co-located rodents (wood mice) of 5,810±1,300 ng/g. Colubrids consume prey in their entirety (Figure 5), therefore, liver PFOS concentrations should be converted to whole-body PFOS. There are few data, however, where tissue and whole-body concentrations of PFAS have been reported in rodents. Bodanska et al. (2011) reported tissue distributions of PFOS in laboratory mice and showed that 45% of the PFOS was recovered in the liver followed by ~15% in bone, 10% in blood, 10% in skin and 10% in muscle. Brown et al. (1997) provided body weight and organ weights for rodents including mice. The liver, bone, blood, skin and muscle comprised 0.055, 0.11, 0.08, 0.16, and 0.38 of the total bodyweight of mice. The data from D'Hollander et al. (2014), Bodanska et al. (2011), and Brown et al. (1997) were combined to generate a Biota-to-Soil Accumulation Factor (BSAF) of 19.7.

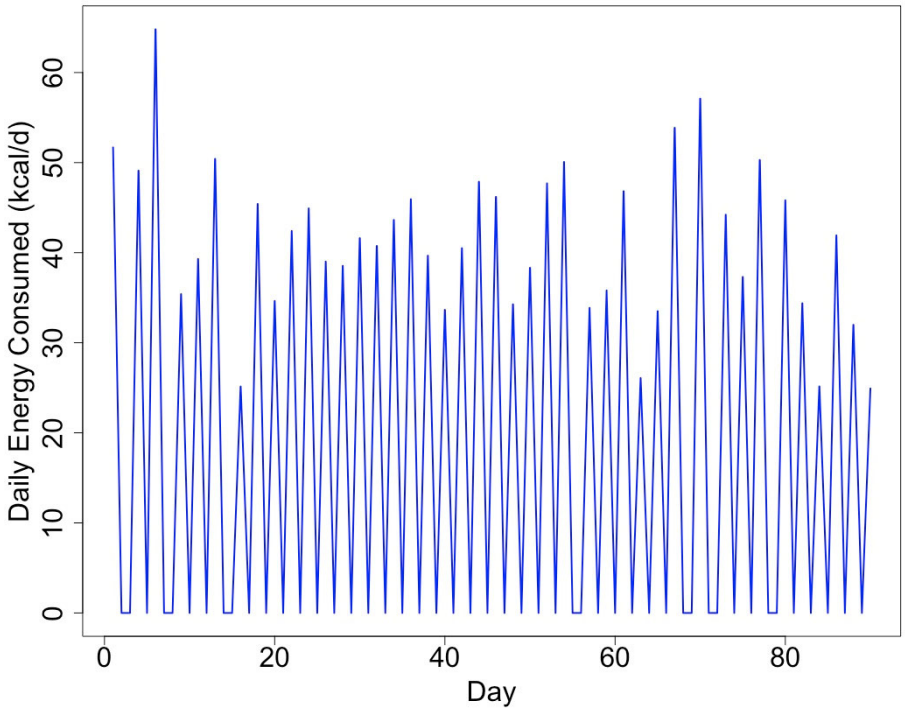


Figure 5. Daily energy consumed for an individual snake. Consumption is not constant because snakes consume whole prey which can exceed their daily energy requirements.

Pine snake exposure on PFAS-contaminated sites is assumed to occur primarily via the diet since data on dermal exposure are limited although studies in the Salice lab are ongoing. Further, the prevailing hypothesis is that dermal exposure may be unlikely to contribute strongly to total PFAS exposure because the chemical structures of many PFAS are not conducive to significant uptake across lipid barriers (Conder et al. 2007). For diet items, the BSAF is used to estimate a whole body PFAS contaminant load in rodent prey items from soil PFAS data which are commonly available for sites in which PFAS monitoring has occurred. For most DoD installations where AFFF has been used, the dominant soil PFAS is PFOS (East et al., in preparation). Ongoing monitoring data continues to support this statement as do data from JBMDL. Also, because PFOS is among the most toxic PFAS studied thus far, this assessment focuses on estimating exposure and risk to PFOS only; this focus has been applied to recently published ecological risk assessments on DoD installations (e.g., Salice et al. 2018, Larson et al. 2018).

The pine snake occurs at JBMDL and has been observed occupying a range of habitats on the base (personal communication). Importantly, overlying PFAS contamination layers with pine snake habitat and range layers, shows a potential for overlap of 13.65% for McGuire, specifically (Figure C-9). Because pine snakes can move and forage over a relatively large area a significant challenge for exposure modeling lies in the fact that there will be considerable variability as to whether snakes consume PFOS-contaminated prey. To account for this uncertainty, a random value from a binomial distribution was chosen to determine on each day that a snake would feed, whether that individual snake would consume a PFOS-contaminated prey. In the absence of detailed, individual-based data we cannot know exactly whether and how often pine snakes consume PFOS-contaminated prey. The binomial distribution was populated with values ranging from 0.05 to 1.0 with 0.05 representing a very low likelihood of consuming PFOS-contaminated prey and 1.0 representing 100% probability of consuming contaminated prey. Because the overlap of pine snake habitat and PFOS-contaminated soil was estimated at 13.65%, it seems reasonable to conclude that some snakes are likely to have relatively high exposure but not likely 100% and some are likely to have much lower exposures. Figure 6 provides output for the PFOS exposure model for simulated individual snakes with different probabilities of encountering and consuming PFOS-contaminated prey.

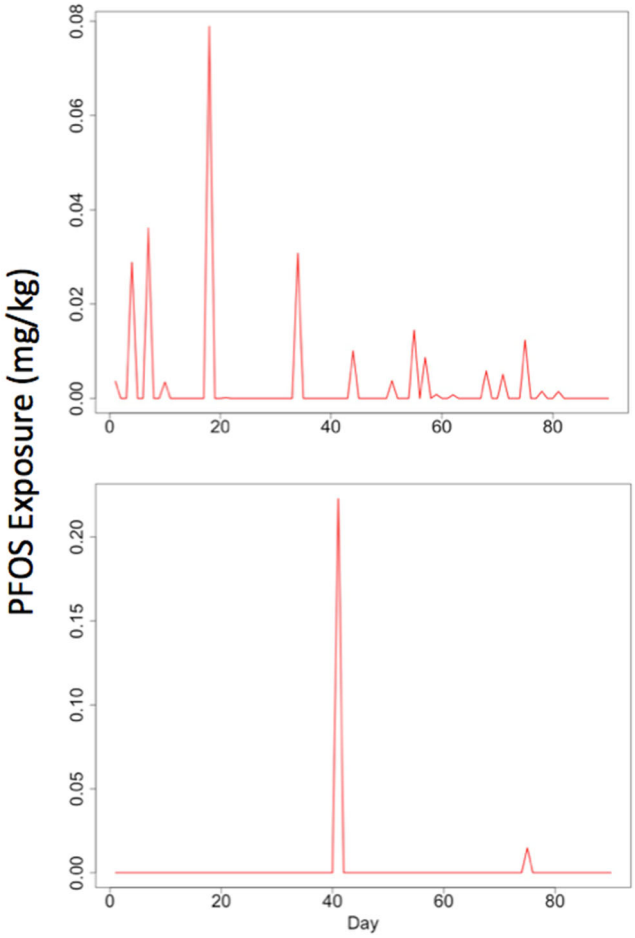


Figure 6. Estimated PFOS exposure for individual snakes with a probability of consuming PFOS-contaminated prey of 0.5 (top) and 0.1365 (bottom).

As expected, as the proportion of snake habitat that overlaps PFOS-contaminated areas on McGuire increases so too does PFOS exposure (Figure 7). Preliminary estimates of risks of PFOS to pine snakes can be obtained by comparing estimated PFOS exposure to available Toxicity Reference Values (TRVs). At the time of this report, there are no available TRVs for reptilian receptors. However, Salice et al. are currently in the process of submitting a manuscript for review on the toxicity of PFOS to juvenile and adult male brown anoles, *Anolis sagrei*. This represents the first available toxicity data for reptiles. The predominant effect of PFOS on lizards appears to be on growth or size. A PFOS exposure of 0.25 mg/kg/d is associated with a 10% decrease in growth of juvenile brown anoles. Although toxicity studies are ongoing and further consideration is needed to develop final reptilian TRVs, we used an exposure level of 0.25 mg/kg/d as an available threshold to obtain a sense of whether and under what circumstances pine snakes at McGuire might be exposed to PFOS at levels that would exceed current effect

concentrations. The red horizontal line in Figure 7 corresponds to the 0.25 mg/kg/d effects level. The Avian Level IV Predator TRV (Newsted et al. 2005) was also included on the figure as avian toxicity data can sometimes be used for reptilian risk assessments. Only for snakes in which a high proportion of their habitat was contaminated with PFOS did some exceedances of the avian TRV occur. There were no exceedances of the current toxicity threshold for reptilian species even with 100% overlap between habitat/forage area and PFOS contamination.

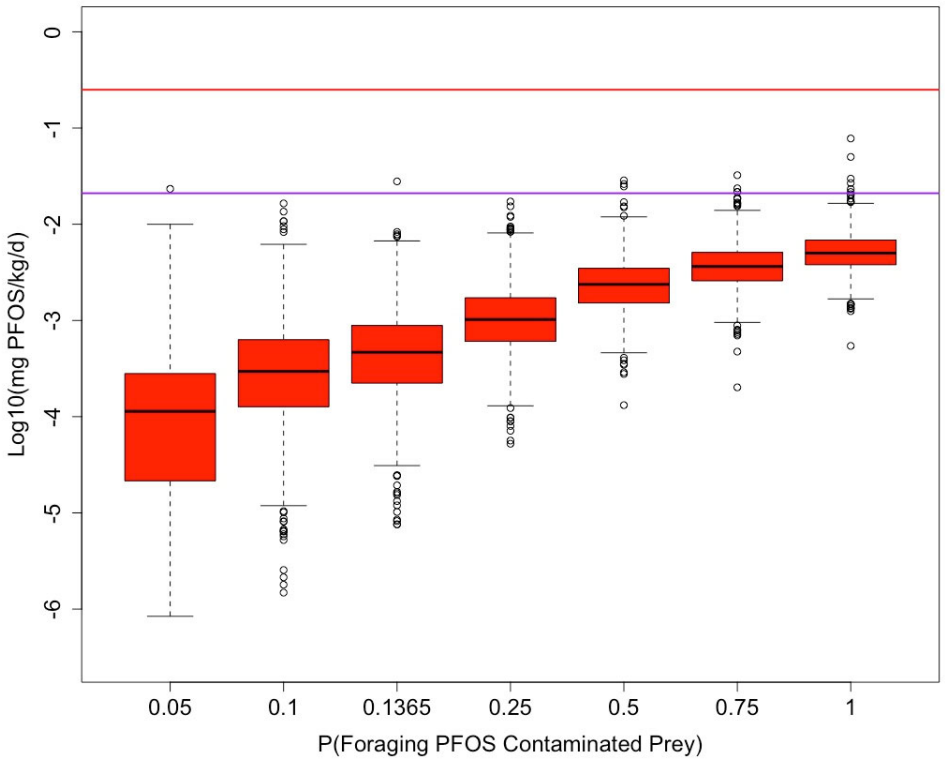


Figure 7. Log10 estimated PFOS exposure for 1000 snakes exposed for 90 days. Red horizontal line corresponds to 0.25 mg/kg/d PFOS, the existing toxicity threshold for reptiles; purple line corresponds to 0.021 mg/kg/d which is the avian predator TRV provided for comparison purposes

To our knowledge, this represents a first attempt to estimate risk to a reptilian receptor exposed to PFOS. Further, we did not locate any published studies in which risks of any chemical stressor to snakes had been assessed. Our results suggest that PFOS exposure to pine snakes is likely to be below current toxicity thresholds, even under circumstances when a high proportion of prey items are from PFOS-contaminated habitats. However, it is critical to consider that there are many uncertainties that can reduce confidence in the risk estimates.

A critical uncertainty lies in the lack of data that allows us to generate reliable estimates of PFOS concentrations in prey items from PFOS concentrations in soil. We located only a single study (D'Hollander et al. 2014) in which co-located soil and biota samples were analyzed for PFOS. The lack of this type of data has also been echoed by Conder et al. (2019). Further complicating

the analysis for pine snakes, is that these animals consume their prey whole and D'Hollander et al. (2014) reported only liver concentration in wood mice. A series of extrapolations and analysis using PFOS tissue distribution data (Bodanska et al. 2011) combined with relative organ weights in mice (Brown et al. 1997) were used to estimate a BSAF. Given the limited data and the need to use several sources, the current BSAF should be considered preliminary and highly uncertain. More data on PFAS concentrations in co-located soil and terrestrial prey species is needed to increase confidence in the current estimates.

In addition to the SBAF, snake movement patterns, foraging and burrowing are likely critical for accurate exposure estimation. Here, only foraging was explicitly modeled. The assumption was that as the overlap of pine snake habitat and PFOS-contamination increased, so too would exposure to PFOS-contaminated prey. This is often modeled as an area use factor (AUF) adjustment whereby an exposure estimate is simply multiplied by the proportion of the habitat that is contaminated. Instead, in the current effort, individual snakes were modeled for 90 days with the probability of encountering and consuming PFOS-contaminated prey dictated by the overlap of habitat. While not spatially explicit, *per-se*, this construct provides the framework for including greater spatial detail as well as providing a better representation of how exposure occurs. Moreover, the current analysis generates a probabilistic output that translates to an actual estimate of risk (probability of adverse outcome). This effort differed compared to Johnson et al. (2007) and efforts under ESTCP project ER-0197 (Williams et al. 2014) in that habitat suitability was not explicitly incorporated. In this case, available information and personal communications suggest that Northern pine snakes use and forage over a wide range of habitats and can be found on roads and in fields. Also, we do not have PFAS biota data matched to soil concentrations. The lack of strong habitat preferences and robust spatial PFAS data would obviate the utility of a true spatially-explicit modeling effort. Instead, we captured uncertainties that relate to habitat use and PFOS in prey by simulating exposure over a range of different probabilities of consuming PFOS-contaminated prey. Because we generated only a few estimates where exposure exceeded the existing toxicity threshold, it seems unlikely that better spatial data would alter apparent risk conclusions.

As mentioned, pine snakes are excellent excavators and can consume subterranean prey (e.g., moles). If snakes happened to burrow in PFAS-contaminated soils, it seems this could result in a significant exposure. No data are available concerning dermal exposure in reptiles although the Salice Lab has conducted a preliminary study in which brown anoles were maintained on PFOS-amended sand. The resulting data showed an apparent uptake of PFOS from dermal exposure and/or incidental soil ingestion although the data were not robust enough to confirm that dermal exposure occurs and is an important exposure route. Nonetheless, the data do suggest that dermal exposure is possible and that additional studies may be warranted. Incidental soil ingestion may also be higher than was used here (~10%) given pine snake behaviors and preferred prey. Although increasing the incidental soil ingestion to 25% had little impact on risk estimates (data not shown).

Another important uncertainly is that there are few relevant toxicity data for reptiles exposed to PFOS or any other PFAS. As mentioned, the Salice lab has conducted a series of experiments in which brown anoles were exposed to PFOS. The resulting toxicity data suggests that adverse

effects on growth or size occur in the sub mg/kg/d range (~0.25 or perhaps lower). It is possible that the toxicity data being developed using a lizard model is not suitable for snakes or turtles although no robust comparisons for any chemical class had been conducted to determine how responses among reptiles differ. This remains an ongoing and important uncertainty.

This assessment focused on PFOS because the existing data from JBMDL has indicated that PFOS has been detected most frequently and at the highest concentrations. Similarly, an analysis of a large dataset of PFAS soil concentrations on US Air Force Bases shows that PFOS is the dominant PFAS. Nonetheless, it is important to consider and acknowledge that other PFAS may be present but not included as analytes and this could be an important uncertainty. Available toxicity data, however, also supports a focus on PFOS as it tends to be more toxic than other commonly studied and/or commonly occurring PFAS.

4.2.2 Probabilistic exposure and risk framework for *Haliaeetus leucocephalus*

Species background

The bald eagle, is a large raptor with a range that extends over much of North America. Adult birds range from about 3000 to 6300g (Buehler 2000). Bald Eagles nest in forested areas adjacent to large bodies of water with nest usually placed in trees. The majority of bald eagle diet consists of fish that may be captured live, stolen from other animals, or as carrion. Bald eagles are opportunists, however, an also consume other animals and carrion. Although the species was once declining due to pesticides such as DDT and poaching, with protection the species has made an impressive comeback but is still protected in North America by the Bald Eagle Protection Act (USFWS), the Migratory Bird Species Act, and the Lacey Act.

Given the extensive range of Bald Eagles, it is likely that habitat layers that meet the requirements for Bald Eagles overlap with many DoD installations. For example, Bald Eagles appeared on the protected species lists for the three installations used for the case studies described above. It was, in fact, the only species of conservation interest for Barksdale Air Force Base (BAFB). Bald Eagles represent a potentially important and common predatory receptor for exposure to contaminants on DoD installations.

PFAS Exposure Conceptual Framework for the Bald Eagle

The dietary exposure route for any contaminant, including PFAS, is generally considered the most relevant for bald eagles. Indeed, several published risk assessments for bald eagles have focused entirely on the dietary route (Rumbold 2005). Eagles spend a considerable portion of time in trees or airborne and, hence, dermal exposure is likely very low. A key driver of dietary exposure is the daily energetic requirement which determines the quantity of food needed and, hence, the delivery of contaminants. Specifically, field metabolic rate (FMR) is a reasonable determinant of energetic requirements of free-living animals compared to basal or resting metabolic rate. In an analysis of FMR for mammal and birds, Nagy (1987) showed that FMR was specific to body mass but generally similar among taxa although endothermic animals had considerably higher FMR than ectothermic animals, as expected. For avian species, developing

nestlings, in particular, have very high energetic demands because of the need to meet basal metabolic requirements as well as growth. For bald eagles, eaglets were selected as the most vulnerable life stage because of their high energetic needs and relatively long exposures. Eaglets take approximately 60 days to develop into a 4 kg subadult (Bortolotti 1984). Several studies on growth and metabolic demands of eaglets are available (e.g. Bortolotti 1984) and have been used to generate eaglet exposure models for ecological risk assessment (Rumbold 2005).

Unlike adult birds, growing eaglets show drastic changes in metabolic demands and mass through time. Rumbold (2005) provides a framework (used here) for estimating exposure to eaglets to methylmercury via consumption of contaminated fish from a constructed wetland in Southern Florida. The values and equations used to estimate exposure to eaglets and these were incorporated into the current case-study assessment (Table 2 *in* Rumbold 2005).

First, a generic growth model based on empirical data for eaglets is used to provide a daily mass estimate. The growth equation is:

$dW/dt = -kaW\ (\log_e W)$

Where W is mass in g, k is a growth coefficient, and a is the asymptotic weight of an eaglet.

Figure 8 is a representation of eaglet growth from the equation described above. Body weight for any given day from this growth model eventually is used to calculate a daily intake of PFAS (mg PFAS/kg body mass/day).

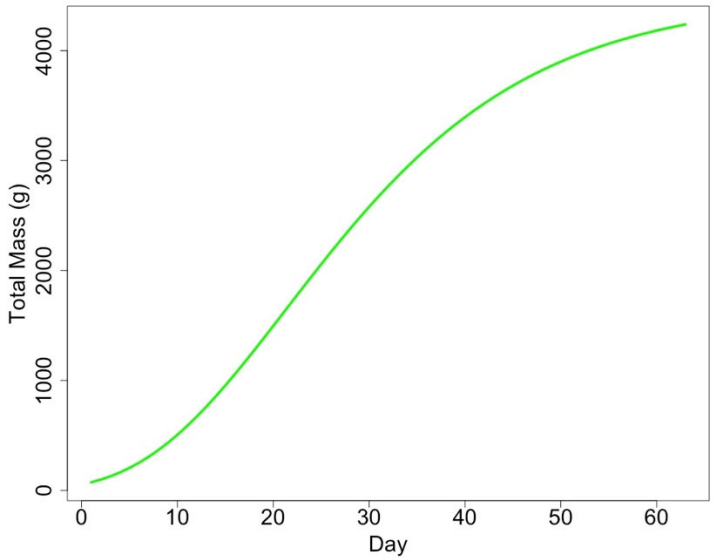


Figure 8. Post-hatch growth of eaglets until fledging ~62-days.

As mentioned, FMR of eaglets is the driving element to determine food consumption and PFAS exposure. For eaglets, available studies on eaglet metabolism were focused either on earlier

development (days 1-38) or later development (days 39-60). Energetic needs, in kilojoules are then converted to ingestion of prey using energetic content of prey items combined with assimilation efficiency for avian species (US EPA, 1993). Figure 9 shows a realization of eaglet ingestion rate through the developmental period.

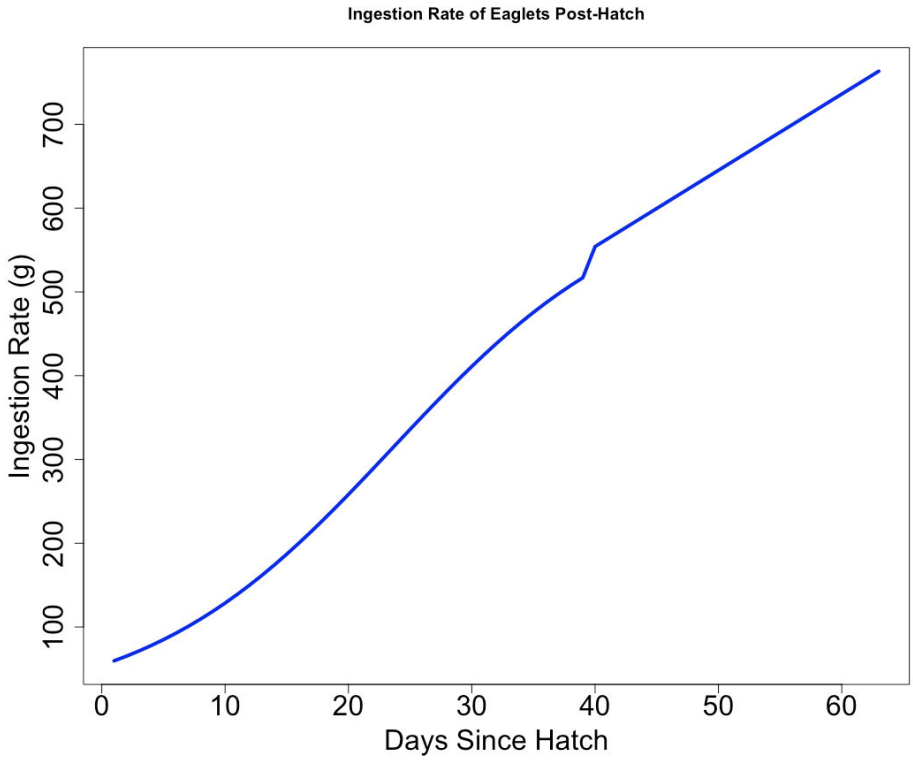


Figure 9. Realization of eaglet ingestion rate through the 60-day developmental period

Bald Eagles were the only species of conservation interest at BAFB for which there was potential overlap with PFAS-contaminated habitat. For the case-study assessment using eaglets as the receptor, we assumed that the diet was 80% fish and 20% mammals, although for any given day, the probability that a fish was consumed was determined from a binomial random number generator. The primary PFAS of interest was PFOS because previous field studies identified this PFAS as the most frequently detected and occurring at the highest magnitude in environmental media and in fish tissues (e.g., Lanza et al., 2017, Salice et al. 2018). Moreover, this is the only relevant PFAS for which an avian TRV is available (Newsted et al. 2005). In particular, Cooper Bayou was apparently contaminated via groundwater discharge from two former fire training areas (Salice et al. 2018). The former fire training areas have since been repurposed and concentrations of PFOS in surface soils are minimal thereby reducing likely exposures of Bald Eagles to PFOS-contaminated terrestrial prey items. Lanza et al. (2017) and Lanza (2015) reported fish tissue concentrations for fish collected over the course of a year from Cooper Bayou. These PFOS data in whole fish were used to estimate exposure; a reasonable mean PFOS concentration in whole fish was 2000 ng/g dry weight (sd = 1000). The potential distribution of whole body PFOS concentrations in fish was modeled as a lognormal distribution

and if a foraging eagle obtained a fish from Cooper Bayou, the PFOS concentration in that fish was assigned based on a random draw from the lognormal distribution. In essence, the model was construed such that eaglets consumed sufficient quantities of fish or mammals to meet their daily energy requirements. Eaglets were exposed to PFOS only by consuming PFOS-contaminated fish from Cooper Bayou.

A significant uncertainty in estimating PFOS exposure to Bald Eagles at BAFB lies whether any fish consumed were from PFOS-contaminated Cooper Bayou. A key determinant of where eagles may obtain prey is their home range size or foraging area. There are not data on foraging area for eagles at BAFB. Garrett et al. (1993) conducted a study of eagles on the Columbia River in Oregon and Washington. They fortunately provided estimates of use area for breeding eagles and determined that 25th, 50th, and 75th harmonic contours were 0.4, 1.3, and 4.5 km^2, respectively, for breeding pairs of eagles. The 95th percentile harmonic contour was almost 22 km^2. These data indicate that eagles can forage over a very large range but also that a significant proportion of foraging time is spent foraging over a relatively small area (0.4-1.3 km^2). Moreover, eagle pairs tend to forage more closely to nesting sites. Figure 10 is a map of BAFB with contours placed at 0.5 km intervals. The area extending East of Cooper Bayou is more likely to contain Eagle nests given the lack of anthropogenic activity. Because we do not know the proportion of the Eagle diets that might come from Cooper Bayou, we varied the probability of obtaining fish from Cooper Bayou from 0.10 to 0.9 in increments of 0.1. This was modeled as a binomial such that for any given day of foraging, whether the eagle obtained prey from Cooper Bayou was determined by the outcome of a binomial random number generator. Importantly, for each day of foraging during the developmental period, there was an independent probability of obtaining prey from Cooper Bayou.

Figure 10. BAFB. Contours are 0.5km and extend East from Cooper Bayou. These are used to provide context for modeled probabilistic foraging from Cooper Bayou by Eagles nesting at different locations within BAFB.

Collectively, parents foraging in and around Cooper Bayou determined PFOS exposure to eaglets. For any given day, probabilistic algorithms were used to assign whether foraging eagles obtained fish or mammals, whether fish were from Cooper Bayou, and the PFOS concentration in fish if obtained from Cooper Bayou. An example PFOS exposure profile is provided in Figure 11 for a hypothetical nest that was assigned a probability of obtaining fish from Cooper Bayou of 0.5. In days where there was no PFOS exposure, foraging parents either provided mammalian food to eaglets or obtained a fish from somewhere other than Cooper Bayou (not specified). Exposures are higher early in development because of the relatively higher metabolic demands and low weight of young eaglets. PFOS exposure per individual eaglet was determined by taking the mean PFOS exposure over the 62-day development period. This estimate is akin to dosing or feed studies in which the average dose or approximate daily intake (ADI) is used as the exposure metric (Newsted et al. 2007).

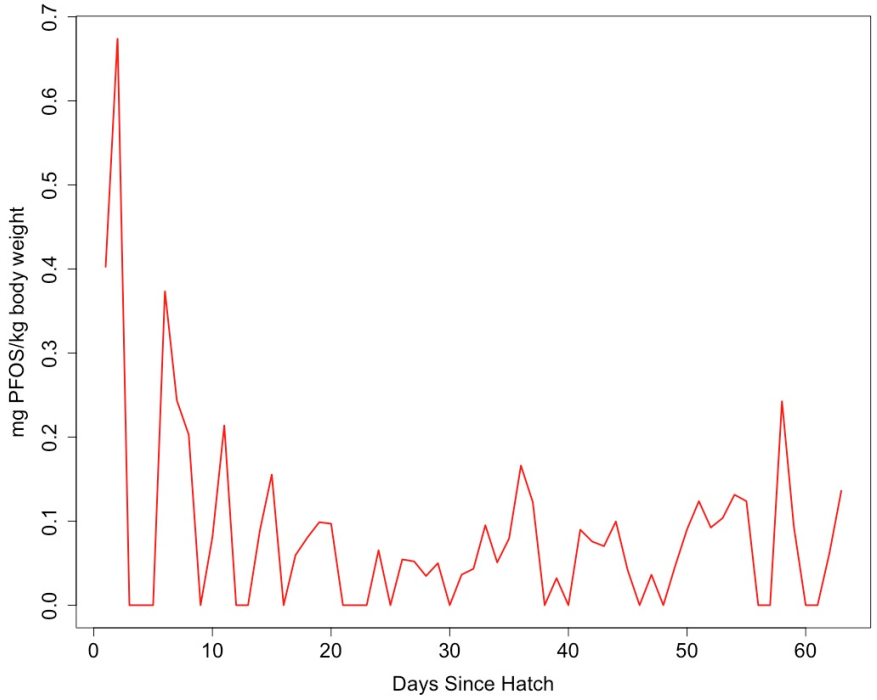


Figure 11. Representative PFOS Dietary Exposure to Post-hatch Eaglet

A preliminary estimate of risk to eaglets at BAFB is summarized in figure 12. Again, the probability of obtaining fish prey from Cooper Bayou was explored as an uncertainty and characterization exercise. At the lowest probability of 0.10, for any given day, there was a 10% chance that prey would be obtained from Cooper Bayou. The 0.10 was included in a function to estimate a binomial (1 or 0) outcome; if a '1' was randomly drawn, the foraging eagle obtained a fish from Cooper Bayou. At the highest probability of 0.90, there was a 90% chance that every day foraging eagles would obtain prey from Cooper Bayou. If a fish was obtained from Cooper Bayou, the PFOS concentration was determined from a lognormal random number generation

the distribution of which was defined by whole body PFOS concentrations in fish from Lanza et al (2017). The ADI of PFOS for simulated eaglets at BAFB exceeded the existing Level IV predatory avian species TRV (Newsted et al. 2005); there were some exceedances even at the lowest probability of obtaining prey from Cooper Bayou (0.10). Above a probability of obtaining prey from Cooper Bayou of 0.20, the TRV was frequently exceeded. Note that the existing Level IV Avian Predator Lowest Observable Adverse Effect Level (LOAEL) was not exceeded even at the highest probability of foraging in Cooper Bayou (0.90).

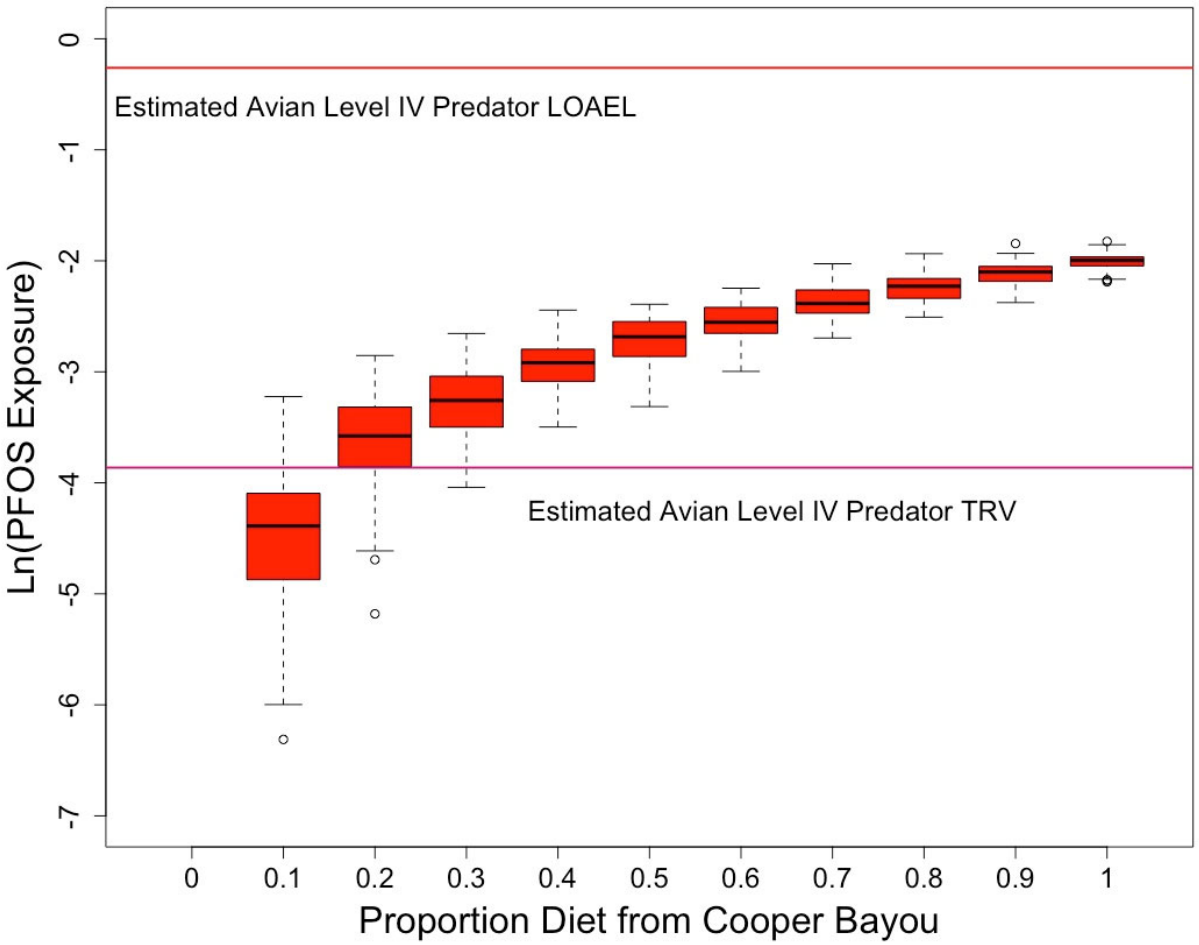


Figure 12. Estimate of PFOS risk to eaglets at Barksdale Air Force Base

This analysis (Figure 12) suggests that there it is possible for eaglets at BAFB to be exposed to PFOS at levels that exceed existing Level IV predator avian TRV (Newsted et al. 2005). Importantly, the actual likelihood that eagles obtain prey from Cooper Bayou is unknown. Cooper Bayou is a relatively small bayou (3-5 m across) and therefore, by area, likely comprises a small proportion of eagle foraging range. Alternatively, in sampling Cooper Bayou for over a year for fish, large and varied fish species were frequently obtained (Lanza et al. 2017). In

comparison to nearby Flat River, which was larger, more and larger fish were routinely obtained from Cooper. Hence, while Cooper Bayou may be small, it is possible that piscivorous raptors may preferentially forage there because of the availability of prey. Very detailed data on eagle foraging behaviors are not available but given their wide ranging tendencies, it seems unlikely that there would be a probability higher than 0.20 that eagles would obtain prey from Cooper Bayou on a daily basis.

There are no laboratory toxicity data for the effects of PFOS on avian raptor species. The best available avian toxicity data for PFOS was obtained from studies on standard test species such as bobwhite quail and mallard ducks (Newsted et al. 2007, Newsted et al. 2005). Hence, the existing TRV for raptor species was obtained through the use of adjustment factors and represents, to some extent, an uncertain estimate. Existing field data for avian receptors exposed to PFOS and PFOS + other PFAS provides evidence that exposure and accumulation of PFAS occur in adults (e.g., Bustnes et al. 2013, Custer et al. 2014) and that PFAS are offloaded to eggs (e.g., Custer et al. 2014). One study in which plasma samples from bald eagles in the Midwest U.S. were analyzed for a variety of organic contaminants showed that PFOS had the highest mean and maximum measured concentrations compared to eighteen other organic contaminants (Elliott et al. 2019). Plasma concentrations of PFOS were several hundred times greater than most other measured organic contaminants and the maximum was about a thousand times greater than most other organic contaminants (Elliott et al. 2019). The PFOS plasma concentrations reported by Elliott et al. (2019) can be compared to the Level IV Avian Predator serum TRV that is 3.9 and 0.24 µg PFOS/ml for male and female avian predators, respectively (Newsted et al. 2005). The mean PFOS in plasma of Bald Eagles was 0.335 µg PFOS/ml which exceeds the avian TRV for females. The maximum plasma PFOS concentration was 4.2 µg PFOS/ml which exceeds both male and female avian predator TRVs. This study suggests strongly that bald eagles are exposed to organic contaminants like PFOS, potentially at concentrations high enough to exceed existing TRVs. Of note is that the plasma samples were obtained from eaglets from 159 eagle nests covering a wide area of the Midwest over the course of several years. No nests were located near known former (or current) fire training areas.

The current modeling construct is not spatially explicit in the sense that individual eagles are modeled as moving within a virtual landscape and then using habitat areas following specified habitat use rules. Johnson et al. (2007) implemented a spatially-explicit exposure and risk estimation study using the Spatially-Explicit Exposure Model (SEEM) for songbirds in which habitat suitability values were assigned to patches within the landscape and these were used to create occupancy rules for simulated birds. In this case, the occupancy rules that guided receptor habitat use had an impact on exposure to Pb at former small arms ranges (Johnson et al. 2007). In a follow-up study (Williams et al. 2014), Johnson and colleagues conducted a similar analysis using SEEM for small mammals. Interestingly, in that effort they concluded that the spatially-explicit approach did not yield estimates that were considered “better” than deterministic or point estimates because the forage area of small mammals was not large enough to encompass salient heterogeneities such as habitat or contaminant differences across the landscape. Hence, the net benefit of a full, spatially-explicit assessment depends on specifics of the receptor and contaminant distribution. Eagles forage over a wide area and are somewhat opportunistic often consuming carrion, when available. A detailed habitat suitability index that could be used to set

spatial use rules for eagles would be unlikely to improve exposure estimates. In this case, and for similar species, a broader assessment approach that includes the probability of encountering PFAS-contaminated prey may be more appropriate. Our analysis suggests that even a 0.1 probability of obtaining prey from PFAS-contaminated Cooper Bayou may result in exposures to eaglets that exceed the existing avian TRV (Newsted et al. 2005). For eaglets occupying nests in or around BAFB, some field studies may be warranted to establish whether eaglets are exposed. Comparisons between field data and model results is a powerful means of understanding how and when to best apply probabilistic and spatially-explicit exposure models (Johnson et al. 2007, Williams et al. 2014).

This current assessment focused on PFOS although we acknowledge that there are many PFAS that ecological receptors could be exposed to. The field data from BAFB and analyses of surface water samples from many US Air Force Base Installations (East et al., in review) suggest that PFOS is the dominant PFAS in surface waters followed by PFHxS. Any site-specific assessment for protected species must consider the site-specific data as much as possible to aid in identifying likely relevant PFAS. As it stands, an a-priori hypothesis is that most DoD installations that have had fire training or suppression activities are likely contaminated with PFOS. Moreover, thus far, PFOS appears to be the most toxic and among the most bioaccumulative. Future research and assessment efforts should more explicitly consider other PFAS, particularly, PFHxS.

The results of this assessment suggest that it is possible that eaglets may be exposed to PFOS at levels that exceed existing TRVs at BAFB. Our risk estimates would decrease if eagles did not obtain prey items from Cooper Bayou, which is possible. Additional, site- and species-specific studies are warranted to better understand potential risk of PFAS to protected raptor species. In particular, studies similar to Elliott et al. (2019) for raptor nests near DoD installations would prove extremely insightful.

5. CONCLUSIONS AND IMPLICATIONS FOR FUTURE RESEARCH

Development of the habitat exposure potential using GIS spatial analysis provides a ranking of installation and protected-species specific PFAS exposure potentials. The goal of this research was to provide a framework for determining risk to protected species, which is a function of hazard and exposure. Given that hazard data are limited for PFAS and especially with regard to protected species, our approach sought to focus on identifying protected species that may be exposed to PFAS and then estimate exposure as an initial step in determining if there is a potential risk. This approach is useful in prioritizing protected species (and wildlife taxa, in general) for further assessment should the potential for PFAS exposure be high. It should be noted that this analysis is suitable for evaluation of exposure potentials at specific sites and that broad categorizations should not be made. For example, species identified as having high exposure potentials were not the same across the three bases at JBMDL as habitat is variable on this large installation and thus, species occupancy is variable. Furthermore, AFFF release sites and estimated drainage areas are not correlated with any specific landscape.

Applying the spatial analysis to three case-study installations we found that the quality of GIS landcover layers contributes to the overall species-specific exposure potential. At JBMDL the high quality of the spatial data allowed for a comprehensive analysis and ranking of protected species based on estimated PFAS exposure potential. There were few updates made to the GIS landscape layer and therefore, little to no changes resulted in species exposure potentials. Although, exposure potential did not change drastically for grouped taxa from the updated GIS landscape layers at Naval Air Station Patuxent River, it did modify species-specific exposure potential (i.e. freshwater species). The GIS landcover layers at Barksdale Air Force Base (BAFB) also suffered from poor quality; however, this was a result of low resolution, not missing landscapes as seen for NAS Patuxent River. There was only one protected species (bald eagle) at BAFB so a comparison of exposure potentials in pre- and post-GIS updates could not be made.

Once a list of species with exposure potential was generated, two species were chosen from the installations to further develop and demonstrate exposure estimation methods that may be useful for future risk assessments. The northern pine snake (*Pituophis m. melanoleucus*) and the bald eagle (*Haliaeetus leucocephalus*) were identified as receptors of interest. The pine snake was identified as having moderate-high exposure potential at McGuire and reptilian taxa frequently occur on DoD sites. The bald eagle is a protected species that occupies all three installations and has moderate exposure potential at JBMDL and NAS Patuxent River. These species were chosen based on likelihood of exposure (habitat overlap with PFAS contamination), conservation interest, and because they presented several unique challenges with regard to exposure estimation. The results of the case-study exposure assessments indicated a very low likelihood that the pine snake would be exposed to PFOS at levels that would exceed existing toxicity thresholds but that eaglets may be exposed to PFOS at levels that exceed existing avian Level IV predator TRVs. The assessments for both species highlighted important uncertainties. For example, for pine snakes a significant uncertainty was the estimation of PFOS concentrations in whole rodents based on soil PFOS concentrations. For eagles, more detailed data on foraging behaviors within BAFB would help refine exposure estimates.

There are some excellent opportunities for future research that have become apparent during this effort. To address uncertainties in extrapolated PFAS migration within the landscape, environmental sampling along a gradient, or at the expected surface water termination would be beneficial for proof-of-concept. Protected species are ranked based on their exposure potential, which is driven by habitat overlap with PFAS contamination. This is a critical first step in identifying the species that warrant further consideration. We acknowledge there are limitations to this based on historical sampling of known AFFF release locations because sampling is often from specific, dispersed locations. More detailed field sampling over a wider range of space and habitats would be helpful as a proof-of-concept to inform how PFAS concentrations vary over a contaminated landscape. This could then inform approaches in GIS used to extrapolate across future site assessments.

In addition to environmental sampling, ***a critical need*** in understanding true ecological receptor PFAS exposure scenarios is sampling of biota in concert with environmental compartment sampling. This is especially true for the reptilian model as there are very few (if any) data

available for PFAS tissue concentrations in reptiles, or importantly, in their food items. For example, there are no available BSAF for terrestrial species. This includes terrestrial invertebrates that may be critical for exposures to reptilian and avian insectivores. Our model suggests the northern pine snake may occupy a PFOS impacted site and/or habitat but that exposure is not likely to elicit an adverse apical response. Sampling blood or tissue of a surrogate terrestrial reptilian species would be notably informative to this model. Importantly, these data should be collected in conjunction with animal tagging so robust PFAS exposure can be ascertained based on a temporal and spatial scale. These data would then be incorporated into the probabilistic snake model developed under this statement of need to refine expected reptile PFAS exposure scenarios. This combined modeling and field-based research can provide considerable insights into the actual and estimated PFAS exposure and risk (e.g., Johnson et al. 2017, Williams et al. 2014).

Finally, and perhaps most important would be developing a field component to determining PFOS exposures to bald eagle eaglets. As the current probabilistic model suggests and as some existing field data indicates, there may be risk to eaglets through exposures to dietary items with high PFAS concentrations. We assume proximity of nest location to PFAS impacted sites plays a role in the eaglet exposure profile and would suggest sampling nests along a spatial gradient from near to further distances from impacted sites. One non-lethal approach to determining PFOS exposure to eaglets would be to sample feathers that have been shed, this approach also results in minimum disturbance to the animals. In addition to feather sampling, droppings may be sampled for PFOS, the concern with this approach alone is that fecal material may be from parent or the eaglet whereas feathers can be more easily identified as adult or juvenile. Plasma samples of eaglets would be more informative and can be compared to existing plasma-based TRVs although obtaining plasma would be more labor intensive.

The abovementioned additional effort could serve as a 'ground truth' to the models developed under this statement of need. Moreover, the risk assessment community frequently requests more information on observed field effects to those modeled and/or inferred by environmental sampling alone.

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Appendix A

Table A-1. Estimated exposure potential of landscapes at Joint Base McGuire Dix Lakehurst

	McGuire			Dix			Lakehurst		
Landscape Feature	**Habitat Impacted (ac)**	**Habitat Overall (ac)**	**Percent Impacted**	**Habitat Impacted (ac)**	**Habitat Overall (ac)**	**Percent Impacted**	**Habitat Impacted (ac)**	**Habitat Overall (ac)**	**Percent Impacted**
CEMETERY	0.00	0.01	0.00	0.00	3.47	0.00	0.00	0.00	0.00
RESIDENTIAL, HIGH DENSITY OR MULTIPLE DWELLING	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.73	0.00
RESIDENTIAL, RURAL, SINGLE UNIT	0.00	0.00	0.00	0.00	9.13	0.00	0.00	0.00	0.00
RESIDENTIAL, SINGLE UNIT, LOW DENSITY	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00
RESIDENTIAL, SINGLE UNIT, MEDIUM DENSITY	0.00	0.00	0.00	0.00	1.05	0.00	0.00	0.00	0.00
COMMERCIAL/SERVICES	0.00	1.31	0.00	0.00	0.42	0.00	0.00	2.62	0.00
MILITARY INSTALLATIONS	178.12	1,317.90	13.52	31.35	3,132.47	1.00	94.59	903.70	10.47
TRANSPORTATION/COMMUNICATION/UTILITIES	0.05	5.11	0.89	1.36	220.36	0.62	0.00	2.43	0.00
UPLAND RIGHTS-OF-WAY UNDEVELOPED	0.00	3.10	0.00	0.00	81.09	0.00	0.00	3.42	0.00
STORMWATER BASIN	0.70	6.95	10.05	0.00	33.27	0.00	0.00	23.49	0.00
OTHER URBAN OR BUILT-UP LAND	86.57	1,194.66	7.25	16.61	1,250.32	1.33	75.42	1,729.81	4.36
MANAGED WETLAND IN MAINTAINED LAWN GREENSPACE	0.00	4.78	0.00	0.00	4.17	0.00	0.04	10.38	0.43
ATHLETIC FIELDS (SCHOOLS)	0.00	11.30	0.00	0.00	2.51	0.00	0.00	0.00	0.00
RECREATIONAL LAND	6.03	249.30	2.42	114.81	429.81	26.71	0.00	82.29	0.00
AGRICULTURAL WETLANDS (MODIFIED)	0.00	0.00	0.00	92.84	93.97	98.80	0.00	0.00	0.00
CROPLAND AND PASTURELAND	0.00	0.01	0.00	0.00	14.17	0.00	0.00	0.00	0.00
DECIDUOUS FOREST (10-50% CROWN CLOSURE)	2.67	23.08	11.58	2.46	297.32	0.83	0.00	0.73	0.00
DECIDUOUS FOREST (>50% CROWN CLOSURE)	0.00	114.79	0.00	39.15	1,522.35	2.57	0.03	146.32	0.02
CONIFEROUS FOREST (10-50% CROWN CLOSURE)	0.04	2.72	1.52	0.00	3,476.78	0.00	0.00	184.15	0.00
CONIFEROUS FOREST (>50% CROWN CLOSURE)	0.00	10.32	0.00	7.15	6,216.02	0.12	45.68	1,381.20	3.31
PLANTATION	0.00	0.00	0.00	10.95	341.48	3.21	0.00	104.26	0.00
MIXED FOREST (>50% CONIFEROUS WITH 10-50% CROWN CLOSURE)	0.00	2.01	0.00	0.00	209.19	0.00	0.00	10.91	0.00
MIXED FOREST (>50% CONIFEROUS WITH >50% CROWN CLOSURE)	0.00	5.17	0.00	34.29	1,819.31	1.88	15.13	904.40	1.67
MIXED FOREST (>50% DECIDUOUS WITH 10-50% CROWN CLOSURE)	0.00	3.45	0.00	0.00	100.33	0.00	0.00	14.62	0.00
MIXED FOREST (>50% DECIDUOUS WITH >50% CROWN CLOSURE)	0.00	2.57	0.00	10.93	865.23	1.26	1.38	375.12	0.37
OLD FIELD (< 25% BRUSH COVERED)	5.72	30.56	18.73	1.19	830.21	0.14	0.36	124.81	0.29
DECIDUOUS BRUSH/SHRUBLAND	1.41	13.30	10.59	0.00	78.60	0.00	0.00	1.15	0.00
CONIFEROUS BRUSH/SHRUBLAND	0.00	0.00	0.00	0.00	679.92	0.00	5.44	200.94	2.71
MIXED DECIDUOUS/CONIFEROUS BRUSH/SHRUBLAND	0.00	24.11	0.00	5.77	734.89	0.79	3.92	80.91	4.85
STREAMS AND CANALS	3.43	45.00	7.63	6.73	452.34	1.49	4.45	67.79	6.56
NATURAL LAKES	0.00	0.00	0.00	0.00	4.54	0.00	0.00	0.95	0.00
ARTIFICIAL LAKES	0.37	1.88	19.47	7.17	396.28	1.81	0.07	91.55	0.08
DECIDUOUS WOODED WETLANDS	2.26	75.92	2.97	9.80	2,334.37	0.42	2.58	63.59	4.05
CONIFEROUS WOODED WETLANDS	0.62	4.15	14.84	0.00	1,607.30	0.00	2.06	289.14	0.71
ATLANTIC WHITE CEDAR WETLANDS	0.00	0.00	0.00	0.00	298.97	0.00	0.00	109.14	0.00
DECIDUOUS SCRUB/SHRUB WETLANDS	0.00	0.64	0.00	0.00	371.69	0.00	3.34	83.03	4.02
CONIFEROUS SCRUB/SHRUB WETLANDS	0.00	0.00	0.00	0.00	292.71	0.00	0.00	51.98	0.00
MIXED SCRUB/SHRUB WETLANDS (DECIDUOUS DOM.)	0.00	2.75	0.00	0.00	635.15	0.00	0.65	60.14	1.08
MIXED SCRUB/SHRUB WETLANDS (CONIFEROUS DOM.)	0.00	0.00	0.00	0.00	101.91	0.00	0.00	63.10	0.00
HERBACEOUS WETLANDS	54.96	379.58	14.48	0.74	843.63	0.09	0.00	21.06	0.00
MIXED WOODED WETLANDS (DECIDUOUS DOM.)	0.00	5.56	0.00	12.13	523.83	2.32	1.44	47.03	3.06
MIXED WOODED WETLANDS (CONIFEROUS DOM.)	0.00	0.23	0.00	0.00	635.50	0.00	0.00	78.97	0.00
DISTURBED WETLANDS (MODIFIED)	1.46	13.80	10.56	0.00	47.03	0.00	0.79	32.13	2.44
TRANSITIONAL AREAS	0.84	3.91	21.41	27.51	166.61	16.51	0.00	14.34	0.00
UNDIFFERENTIATED BARREN LANDS	0.00	0.00	0.00	0.00	4.34	0.00	0.00	34.78	0.00
PHRAGMITES DOMINANT INTERIOR WETLANDS	0.00	0.00	0.00	0.00	2.67	0.00	0.38	7.23	5.27

Table A-2. Estimated exposure potential of landscapes at NAS Patuxent River

Landscape Feature	Habitat Impacted (ac)	Habitat Overall (ac)	Percent Impacted
Residential	0.00	19.80	0.00
Institutional	21.68	723.50	3.00
Transportation	10.13	503.97	2.01
Open Urban Land	37.57	1,917.60	1.96
Agriculture	0.00	149.09	0.00
Deciduous Forest	0.02	633.81	0.00
Evergreen Forest	8.90	99.75	8.92
Mixed Forest	24.78	1,323.13	1.87
Old Field	5.26	221.84	2.37
Brush	5.26	127.32	4.13
Nontidal Water	0.98	42.79	2.29
Tidal Water	0.00	47.41	0.00
Emergent Wetland	0.00	109.79	0.00
Forested Wetland	5.53	270.12	2.05
Sandy Shoreline	0.00	18.28	0.00

Table A-3. Estimated exposure potential of landscapes at Barksdale AFB

Landscape Feature	Habitat Impacted (ac)	Habitat Overall (ac)	Percent Impacted
Developed	26.32	3,160.15	0.83
Open Urban Land	4.39	1,750.40	0.25
Cultivated Crops	0.00	24.98	0.00
Pasture/Hay	0.00	27.70	0.00
Deciduous Forest	0.00	78.67	0.00
Evergreen Forest	0.00	6,572.84	0.00
Mixed Forest	0.00	606.28	0.00
Shrub/Scrub	0.00	461.84	0.00
Grassland/Herbaceous	0.00	436.50	0.00
Lakes and Ponds	1.25	737.58	0.17
Streams and Canals	56.56	722.51	7.83
Emergent Herbaceous Wetlands	0.00	25.73	0.00
Woody Wetlands	21.31	7,381.27	0.29

Appendix B

Table B-1. Spatial Exposure Potential of Protected Species at McGuire of Joint Base McGuire-Dix-Lakehurst

Feature Description	Habitat Status	Area (Ac)	*Clemmy guttata*	*Pseudemys rubriventris* (Juvenile)	*Pseudemys rubriventris* (Adult)	*Hyla andersonii*	*Hyla chrysocelis*
Cemetery	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.01	NA	NA	NA	NA	NA
Residential, High Density or Multiple Dwelling	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Rural, Single Unit	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Low Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Medium Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Commercial/Services	Impacted	0.00	NA	NA	NA	NA	NA
	Available	1.31	NA	NA	NA	NA	NA
Military Installations	Impacted	178.12	NA	NA	NA	NA	NA
	Available	1,317.90	NA	NA	NA	NA	NA
Transportation/Communication/Utilities	Impacted	0.05	NA	NA	NA	NA	NA
	Available	5.11	NA	NA	NA	NA	NA
Upland Right-of-Way Undeveloped	Impacted	0.00	NA	NA	NA	NA	NA
	Available	3.10	NA	NA	NA	NA	NA
Stormwater Basin	Impacted	0.70	NA	NA	NA	NA	0.70
	Available	6.95	NA	NA	NA	NA	6.95
Other Urban or Built-up Land	Impacted	86.57	NA	NA	NA	NA	NA
	Available	1,194.66	NA	NA	NA	NA	NA
Managed Wetland in Maintained Lawn Greenspace	Impacted	0.00	NA	0.00	NA	NA	0.00
	Available	4.78	NA	4.78	NA	NA	4.78
Athletic Fields (Schools)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	11.30	NA	NA	NA	NA	NA
Recreational Land	Impacted	6.03	NA	NA	NA	NA	NA
	Available	249.30	NA	NA	NA	NA	NA
Agricultural Wetlands (Modified)	Impacted	0.00	NA	0.00	NA	NA	0.00
	Available	0.00	NA	0.00	NA	NA	0.00
Cropland and Pastureland	Impacted	0.00	NA	0.00	NA	NA	0.00
	Available	0.01	NA	0.01	NA	NA	0.01
Deciduous Forest (10-50% Crown Closure)	Impacted	2.67	NA	NA	NA	NA	NA
	Available	23.08	NA	NA	NA	NA	NA
Deciduous Forest (>50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	114.79	NA	NA	NA	NA	NA
Coniferous Forest (10-50% Crown Closure)	Impacted	0.04	NA	NA	NA	NA	NA
	Available	2.72	NA	NA	NA	NA	NA
Coniferous Forest (>50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	10.32	NA	NA	NA	NA	NA
Plantation	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	2.01	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	5.17	NA	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	3.45	NA	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	2.57	NA	NA	NA	NA	NA
Old Field (< 25% Brush Covered)	Impacted	5.72	NA	NA	NA	NA	NA
	Available	30.56	NA	NA	NA	NA	NA
Deciduous Brush/Shrubland	Impacted	1.41	NA	NA	NA	NA	NA
	Available	13.30	NA	NA	NA	NA	NA
Coniferous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA

Feature Description	Habitat Status	Area (Ac)	*Clemmy guttata*	*Pseudemys rubriventris* (Juvenile)	*Pseudemys rubriventris* (Adult)	*Hyla andersonii*	*Hyla chrysocelis*
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	24.11	NA	NA	NA	NA	NA
Streams and Canals	Impacted	3.43	3.43	NA	3.43	NA	NA
	Available	45.00	45.00	NA	45.00	NA	NA
Natural Lakes	Impacted	0.00	0.00	0.00	0.00	NA	NA
	Available	0.00	0.00	0.00	0.00	NA	NA
Artificial Lakes	Impacted	0.37	0.37	0.37	0.37	NA	NA
	Available	1.88	1.88	1.88	1.88	NA	NA
Deciduous Wooded Wetlands	Impacted	2.26	2.26	2.26	NA	NA	2.26
	Available	75.92	75.92	75.92	NA	NA	75.92
Coniferous Wooded Wetlands	Impacted	0.62	0.62	0.62	NA	0.62	0.62
	Available	4.15	4.15	4.15	NA	4.15	4.15
Atlantic White Cedar Wetlands	Impacted	0.00	0.00	0.00	NA	0.00	0.00
	Available	0.00	0.00	0.00	NA	0.00	0.00
Deciduous Scrub/Shrub Wetlands	Impacted	0.00	0.00	0.00	NA	0.00	0.00
	Available	0.64	0.64	0.64	NA	0.64	0.64
Coniferous Scrub/Shrub Wetlands	Impacted	0.00	0.00	0.00	NA	0.00	0.00
	Available	0.00	0.00	0.00	NA	0.00	0.00
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted	0.00	0.00	0.00	NA	0.00	0.00
	Available	2.75	2.75	2.75	NA	2.75	2.75
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted	0.00	0.00	0.00	NA	0.00	0.00
	Available	0.00	0.00	0.00	NA	0.00	0.00
Herbaceous Wetlands	Impacted	54.96	54.96	54.96	NA	54.96	54.96
	Available	379.58	379.58	379.58	NA	379.58	379.58
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted	0.00	0.00	0.00	NA	0.00	0.00
	Available	5.56	5.56	5.56	NA	5.56	5.56
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted	0.00	0.00	0.00	NA	0.00	0.00
	Available	0.23	0.23	0.23	NA	0.23	0.23
Disturbed Wetlands (Modified)	Impacted	1.46	NA	1.46	NA	NA	1.46
	Available	13.80	NA	13.80	NA	NA	13.80
Transitional Areas	Impacted	0.84	NA	NA	NA	NA	NA
	Available	3.91	NA	NA	NA	NA	NA
Undifferentiated Barren Lands	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Phragmites Dominant Interior Wetlands	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Species Habitat Impacted (ac)			61.63	59.66	3.80	55.58	59.99
Species Habitat Available Overall (ac)			515.70	489.30	46.88	392.91	494.37
Percent Impacted Over Available			11.9512%	12.1925%	8.1015%	14.1452%	12.1348%
Percent Available, Not Impacted			88.0488%	87.8075%	91.8985%	85.8548%	87.8652%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (Ac)	*Pseudotriton montanus*	*Accipiter gentilis*	*Ammodramus henslowii*	*Ammodramus savannarum*	*Asio flammeus*
Cemetery	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	0.01	NA	NA	NA	NA	0.01
Residential, High Density or Multiple Dwelling	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Rural, Single Unit	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Low Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Medium Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Commercial/Services	Impacted	0.00	NA	NA	NA	NA	NA
	Available	1.31	NA	NA	NA	NA	NA
Military Installations	Impacted	178.12	NA	NA	NA	NA	NA
	Available	1,317.90	NA	NA	NA	NA	NA
Transportation/Communication/Utilities	Impacted	0.05	NA	NA	NA	NA	NA
	Available	5.11	NA	NA	NA	NA	NA
Upland Right-of-Way Undeveloped	Impacted	0.00	NA	NA	0.00	0.00	NA
	Available	3.10	NA	NA	3.10	3.10	NA
Stormwater Basin	Impacted	0.70	NA	NA	NA	NA	NA
	Available	6.95	NA	NA	NA	NA	NA
Other Urban or Built-up Land	Impacted	86.57	NA	NA	NA	NA	86.57
	Available	1,194.66	NA	NA	NA	NA	1,194.66
Managed Wetland in Maintained Lawn Greenspace	Impacted	0.00	NA	NA	NA	NA	NA
	Available	4.78	NA	NA	NA	NA	NA
Athletic Fields (Schools)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	11.30	NA	NA	NA	NA	NA
Recreational Land	Impacted	6.03	NA	NA	NA	NA	NA
	Available	249.30	NA	NA	NA	NA	NA
Agricultural Wetlands (Modified)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Cropland and Pastureland	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	0.01	NA	NA	NA	NA	0.01
Deciduous Forest (10-50% Crown Closure)	Impacted	2.67	NA	NA	NA	NA	NA
	Available	23.08	NA	NA	NA	NA	NA
Deciduous Forest (>50% Crown Closure)	Impacted	0.00	NA	0.00	NA	NA	NA
	Available	114.79	NA	114.79	NA	NA	NA
Coniferous Forest (10-50% Crown Closure)	Impacted	0.04	NA	NA	NA	NA	NA
	Available	2.72	NA	NA	NA	NA	NA
Coniferous Forest (>50% Crown Closure)	Impacted	0.00	NA	0.00	NA	NA	NA
	Available	10.32	NA	10.32	NA	NA	NA
Plantation	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	2.01	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted	0.00	NA	0.00	NA	NA	NA
	Available	5.17	NA	5.17	NA	NA	NA
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	3.45	NA	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted	0.00	NA	0.00	NA	NA	NA
	Available	2.57	NA	2.57	NA	NA	NA
Old Field (< 25% Brush Covered)	Impacted	5.72	NA	NA	5.72	5.72	5.72
	Available	30.56	NA	NA	30.56	30.56	30.56
Deciduous Brush/Shrubland	Impacted	1.41	NA	NA	NA	NA	NA
	Available	13.30	NA	NA	NA	NA	NA
Coniferous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA

Feature Description	Habitat Status	Area (Ac)	*Pseudotriton montanus*	*Accipiter gentilis*	*Ammodramus henslowii*	*Ammodramus savannarum*	*Asio flammeus*
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	24.11	NA	NA	NA	NA	NA
Streams and Canals	Impacted	3.43	NA	NA	NA	NA	NA
	Available	45.00	NA	NA	NA	NA	NA
Natural Lakes	Impacted	0.00	0.00	NA	NA	NA	NA
	Available	0.00	0.00	NA	NA	NA	NA
Artificial Lakes	Impacted	0.37	0.37	NA	NA	NA	NA
	Available	1.88	1.88	NA	NA	NA	NA
Deciduous Wooded Wetlands	Impacted	2.26	NA	2.26	NA	NA	NA
	Available	75.92	NA	75.92	NA	NA	NA
Coniferous Wooded Wetlands	Impacted	0.62	NA	0.62	NA	NA	NA
	Available	4.15	NA	4.15	NA	NA	NA
Atlantic White Cedar Wetlands	Impacted	0.00	0.00	0.00	NA	NA	NA
	Available	0.00	0.00	0.00	NA	NA	NA
Deciduous Scrub/Shrub Wetlands	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.64	NA	NA	NA	NA	NA
Coniferous Scrub/Shrub Wetlands	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	2.75	NA	NA	NA	NA	NA
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Herbaceous Wetlands	Impacted	54.96	54.96	NA	54.96	NA	NA
	Available	379.58	379.58	NA	379.58	NA	NA
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted	0.00	NA	0.00	NA	NA	NA
	Available	5.56	NA	5.56	NA	NA	NA
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted	0.00	NA	0.00	NA	NA	NA
	Available	0.23	NA	0.23	NA	NA	NA
Disturbed Wetlands (Modified)	Impacted	1.46	1.46	NA	NA	NA	NA
	Available	13.80	13.80	NA	NA	NA	NA
Transitional Areas	Impacted	0.84	NA	NA	NA	NA	NA
	Available	3.91	NA	NA	NA	NA	NA
Undifferentiated Barren Lands	Impacted	0.00	NA	NA	0.00	0.00	NA
	Available	0.00	NA	NA	0.00	0.00	NA
Phragmites Dominant Interior Wetlands	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	0.00	NA	NA	NA	NA	0.00
Species Habitat Impacted (ac)			56.78	2.87	60.68	5.72	92.29
Species Habitat Available Overall (ac)			395.26	218.70	413.24	33.66	1,225.24
Percent Impacted Over Available			14.3665%	1.3138%	14.6853%	17.0029%	7.5325%
Percent Available, Not Impacted			85.6335%	98.6862%	85.3147%	82.9971%	92.4675%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (Ac)	*Asio otus*	*Batramia longicauda*	*Botaurus lentiginosos*	*Buteo lineatus*	*Circus cyaneus*
Cemetery	Impacted	0.00	0.00	0.00	NA	NA	0.00
	Available	0.01	0.01	0.01	NA	NA	0.01
Residential, High Density or Multiple Dwelling	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Rural, Single Unit	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Low Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Medium Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Commercial/Services	Impacted	0.00	NA	NA	NA	NA	NA
	Available	1.31	NA	NA	NA	NA	NA
Military Installations	Impacted	178.12	NA	NA	NA	NA	NA
	Available	1,317.90	NA	NA	NA	NA	NA
Transportation/Communication/Utilities	Impacted	0.05	NA	NA	NA	NA	NA
	Available	5.11	NA	NA	NA	NA	NA
Upland Right-of-Way Undeveloped	Impacted	0.00	NA	0.00	NA	NA	0.00
	Available	3.10	NA	3.10	NA	NA	3.10
Stormwater Basin	Impacted	0.70	NA	NA	NA	NA	NA
	Available	6.95	NA	NA	NA	NA	NA
Other Urban or Built-up Land	Impacted	86.57	NA	NA	NA	NA	86.57
	Available	1,194.66	NA	NA	NA	NA	1,194.66
Managed Wetland in Maintained Lawn Greenspace	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	4.78	NA	NA	NA	NA	4.78
Athletic Fields (Schools)	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	11.30	NA	NA	NA	NA	11.30
Recreational Land	Impacted	6.03	NA	NA	NA	NA	NA
	Available	249.30	NA	NA	NA	NA	NA
Agricultural Wetlands (Modified)	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	0.00	NA	NA	NA	NA	0.00
Cropland and Pastureland	Impacted	0.00	0.00	0.00	NA	NA	0.00
	Available	0.01	0.01	0.01	NA	NA	0.01
Deciduous Forest (10-50% Crown Closure)	Impacted	2.67	2.67	NA	NA	NA	NA
	Available	23.08	23.08	NA	NA	NA	NA
Deciduous Forest (>50% Crown Closure)	Impacted	0.00	0.00	NA	NA	0.00	NA
	Available	114.79	114.79	NA	NA	114.79	NA
Coniferous Forest (10-50% Crown Closure)	Impacted	0.04	0.04	NA	NA	NA	NA
	Available	2.72	2.72	NA	NA	NA	NA
Coniferous Forest (>50% Crown Closure)	Impacted	0.00	0.00	NA	NA	0.00	NA
	Available	10.32	10.32	NA	NA	10.32	NA
Plantation	Impacted	0.00	NA	0.00	NA	NA	NA
	Available	0.00	NA	0.00	NA	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted	0.00	0.00	NA	NA	NA	NA
	Available	2.01	2.01	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted	0.00	0.00	NA	NA	0.00	NA
	Available	5.17	5.17	NA	NA	5.17	NA
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted	0.00	0.00	NA	NA	NA	NA
	Available	3.45	3.45	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted	0.00	0.00	NA	NA	0.00	NA
	Available	2.57	2.57	NA	NA	2.57	NA
Old Field (< 25% Brush Covered)	Impacted	5.72	5.72	5.72	NA	NA	5.72
	Available	30.56	30.56	30.56	NA	NA	30.56
Deciduous Brush/Shrubland	Impacted	1.41	NA	NA	NA	NA	NA
	Available	13.30	NA	NA	NA	NA	NA
Coniferous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA

Feature Description	Habitat Status	Area (Ac)	*Asio otus*	*Batramia longicauda*	*Botaurus lentiginosos*	*Buteo lineatus*	*Circus cyaneus*
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	24.11	NA	NA	NA	NA	NA
Streams and Canals	Impacted	3.43	NA	NA	NA	NA	NA
	Available	45.00	NA	NA	NA	NA	NA
Natural Lakes	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Artificial Lakes	Impacted	0.37	NA	NA	NA	NA	NA
	Available	1.88	NA	NA	NA	NA	NA
Deciduous Wooded Wetlands	Impacted	2.26	NA	NA	NA	2.26	NA
	Available	75.92	NA	NA	NA	75.92	NA
Coniferous Wooded Wetlands	Impacted	0.62	NA	NA	NA	0.62	NA
	Available	4.15	NA	NA	NA	4.15	NA
Atlantic White Cedar Wetlands	Impacted	0.00	NA	NA	NA	0.00	NA
	Available	0.00	NA	NA	NA	0.00	NA
Deciduous Scrub/Shrub Wetlands	Impacted	0.00	NA	NA	0.00	NA	0.00
	Available	0.64	NA	NA	0.64	NA	0.64
Coniferous Scrub/Shrub Wetlands	Impacted	0.00	NA	NA	0.00	NA	0.00
	Available	0.00	NA	NA	0.00	NA	0.00
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted	0.00	NA	NA	0.00	NA	0.00
	Available	2.75	NA	NA	2.75	NA	2.75
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted	0.00	NA	NA	0.00	NA	0.00
	Available	0.00	NA	NA	0.00	NA	0.00
Herbaceous Wetlands	Impacted	54.96	NA	NA	54.96	NA	54.96
	Available	379.58	NA	NA	379.58	NA	379.58
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted	0.00	NA	NA	NA	0.00	NA
	Available	5.56	NA	NA	NA	5.56	NA
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted	0.00	NA	NA	NA	0.00	NA
	Available	0.23	NA	NA	NA	0.23	NA
Disturbed Wetlands (Modified)	Impacted	1.46	NA	NA	1.46	NA	NA
	Available	13.80	NA	NA	13.80	NA	NA
Transitional Areas	Impacted	0.84	NA	NA	NA	NA	0.84
	Available	3.91	NA	NA	NA	NA	3.91
Undifferentiated Barren Lands	Impacted	0.00	0.00	0.00	NA	NA	0.00
	Available	0.00	0.00	0.00	NA	NA	0.00
Phragmites Dominant Interior Wetlands	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	0.00	NA	NA	NA	NA	0.00
Species Habitat Impacted (ac)			8.44	5.72	56.42	2.87	148.09
Species Habitat Available Overall (ac)			194.69	33.68	396.77	218.70	1,631.30
Percent Impacted Over Available			4.3339%	16.9901%	14.2197%	1.3138%	9.0781%
Percent Available, Not Impacted			95.6661%	83.0099%	85.7803%	98.6862%	90.9219%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (Ac)	*Cistothorus platensis*	*Dolichonyx oryzivorus*	*Falco sparverius*	*Haliaeetus leucocephalus*	*Lanius ludovicianus*
Cemetery	Impacted	0.00	NA	NA	0.00	NA	0.00
	Available	0.01	NA	NA	0.01	NA	0.01
Residential, High Density or Multiple Dwelling	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Rural, Single Unit	Impacted	0.00	NA	NA	0.00	NA	NA
	Available	0.00	NA	NA	0.00	NA	NA
Residential, Single Unit, Low Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Medium Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Commercial/Services	Impacted	0.00	NA	NA	NA	NA	NA
	Available	1.31	NA	NA	NA	NA	NA
Military Installations	Impacted	178.12	NA	NA	NA	NA	NA
	Available	1,317.90	NA	NA	NA	NA	NA
Transportation/Communication/Utilities	Impacted	0.05	NA	NA	NA	NA	NA
	Available	5.11	NA	NA	NA	NA	NA
Upland Right-of-Way Undeveloped	Impacted	0.00	NA	NA	0.00	NA	0.00
	Available	3.10	NA	NA	3.10	NA	3.10
Stormwater Basin	Impacted	0.70	NA	NA	NA	NA	NA
	Available	6.95	NA	NA	NA	NA	NA
Other Urban or Built-up Land	Impacted	86.57	NA	NA	NA	NA	NA
	Available	1,194.66	NA	NA	NA	NA	NA
Managed Wetland in Maintained Lawn Greenspace	Impacted	0.00	NA	NA	0.00	NA	NA
	Available	4.78	NA	NA	4.78	NA	NA
Athletic Fields (Schools)	Impacted	0.00	NA	NA	0.00	NA	NA
	Available	11.30	NA	NA	11.30	NA	NA
Recreational Land	Impacted	6.03	NA	NA	6.03	NA	NA
	Available	249.30	NA	NA	249.30	NA	NA
Agricultural Wetlands (Modified)	Impacted	0.00	NA	0.00	0.00	NA	NA
	Available	0.00	NA	0.00	0.00	NA	NA
Cropland and Pastureland	Impacted	0.00	NA	0.00	0.00	NA	0.00
	Available	0.01	NA	0.01	0.01	NA	0.01
Deciduous Forest (10-50% Crown Closure)	Impacted	2.67	NA	NA	NA	NA	NA
	Available	23.08	NA	NA	NA	NA	NA
Deciduous Forest (>50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	114.79	NA	NA	NA	NA	NA
Coniferous Forest (10-50% Crown Closure)	Impacted	0.04	NA	NA	NA	NA	NA
	Available	2.72	NA	NA	NA	NA	NA
Coniferous Forest (>50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	10.32	NA	NA	NA	NA	NA
Plantation	Impacted	0.00	NA	NA	0.00	NA	NA
	Available	0.00	NA	NA	0.00	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	2.01	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	5.17	NA	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	3.45	NA	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	2.57	NA	NA	NA	NA	NA
Old Field (< 25% Brush Covered)	Impacted	5.72	NA	5.72	5.72	NA	5.72
	Available	30.56	NA	30.56	30.56	NA	30.56
Deciduous Brush/Shrubland	Impacted	1.41	NA	NA	NA	NA	1.41
	Available	13.30	NA	NA	NA	NA	13.30
Coniferous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	0.00	NA	NA	NA	NA	0.00

Feature Description	Habitat Status	Area (Ac)	*Cistothorus platensis*	*Dolichonyx oryzivorus*	*Falco sparverius*	*Haliaeetus leucocephalus*	*Lanius ludovicianus*
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	24.11	NA	NA	NA	NA	24.11
Streams and Canals	Impacted	3.43	NA	NA	NA	3.43	NA
	Available	45.00	NA	NA	NA	45.00	NA
Natural Lakes	Impacted	0.00	NA	NA	NA	0.00	NA
	Available	0.00	NA	NA	NA	0.00	NA
Artificial Lakes	Impacted	0.37	NA	NA	NA	0.37	NA
	Available	1.88	NA	NA	NA	1.88	NA
Deciduous Wooded Wetlands	Impacted	2.26	NA	NA	NA	2.26	NA
	Available	75.92	NA	NA	NA	75.92	NA
Coniferous Wooded Wetlands	Impacted	0.62	NA	NA	NA	0.62	NA
	Available	4.15	NA	NA	NA	4.15	NA
Atlantic White Cedar Wetlands	Impacted	0.00	NA	NA	NA	0.00	NA
	Available	0.00	NA	NA	NA	0.00	NA
Deciduous Scrub/Shrub Wetlands	Impacted	0.00	0.00	NA	NA	0.00	0.00
	Available	0.64	0.64	NA	NA	0.64	0.64
Coniferous Scrub/Shrub Wetlands	Impacted	0.00	0.00	NA	NA	0.00	0.00
	Available	0.00	0.00	NA	NA	0.00	0.00
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted	0.00	NA	NA	NA	0.00	0.00
	Available	2.75	NA	NA	NA	2.75	2.75
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted	0.00	NA	NA	NA	0.00	0.00
	Available	0.00	NA	NA	NA	0.00	0.00
Herbaceous Wetlands	Impacted	54.96	54.96	NA	NA	54.96	NA
	Available	379.58	379.58	NA	NA	379.58	NA
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted	0.00	NA	NA	NA	0.00	NA
	Available	5.56	NA	NA	NA	5.56	NA
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted	0.00	NA	NA	NA	0.00	NA
	Available	0.23	NA	NA	NA	0.23	NA
Disturbed Wetlands (Modified)	Impacted	1.46	1.46	NA	NA	1.46	1.46
	Available	13.80	13.80	NA	NA	13.80	13.80
Transitional Areas	Impacted	0.84	NA	NA	0.84	NA	NA
	Available	3.91	NA	NA	3.91	NA	NA
Undifferentiated Barren Lands	Impacted	0.00	NA	0.00	0.00	NA	NA
	Available	0.00	NA	0.00	0.00	NA	NA
Phragmites Dominant Interior Wetlands	Impacted	0.00	NA	NA	NA	0.00	NA
	Available	0.00	NA	NA	NA	0.00	NA
Species Habitat Impacted (ac)			56.42	5.72	12.59	63.09	8.59
Species Habitat Available Overall (ac)			394.02	30.57	302.97	529.51	88.29
Percent Impacted Over Available			14.3190%	18.7205%	4.1555%	11.9149%	9.7288%
Percent Available, Not Impacted			85.6810%	81.2795%	95.8445%	88.0851%	90.2712%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (Ac)	*Melanerpes erythrocephalus*	*Nyctanassa violaceus*	*Nycticorax nycticorax*	*Pandion haliaetus*	*Passerculus sandwichensis*
Cemetery	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	0.01	NA	NA	NA	NA	0.01
Residential, High Density or Multiple Dwelling	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Rural, Single Unit	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Low Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Medium Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Commercial/Services	Impacted	0.00	NA	NA	NA	NA	NA
	Available	1.31	NA	NA	NA	NA	NA
Military Installations	Impacted	178.12	NA	NA	NA	NA	NA
	Available	1,317.90	NA	NA	NA	NA	NA
Transportation/Communication/Utilities	Impacted	0.05	NA	NA	NA	NA	NA
	Available	5.11	NA	NA	NA	NA	NA
Upland Right-of-Way Undeveloped	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	3.10	NA	NA	NA	NA	3.10
Stormwater Basin	Impacted	0.70	NA	NA	NA	NA	NA
	Available	6.95	NA	NA	NA	NA	NA
Other Urban or Built-up Land	Impacted	86.57	NA	NA	NA	NA	NA
	Available	1,194.66	NA	NA	NA	NA	NA
Managed Wetland in Maintained Lawn Greenspace	Impacted	0.00	NA	NA	NA	NA	NA
	Available	4.78	NA	NA	NA	NA	NA
Athletic Fields (Schools)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	11.30	NA	NA	NA	NA	NA
Recreational Land	Impacted	6.03	NA	NA	NA	NA	6.03
	Available	249.30	NA	NA	NA	NA	249.30
Agricultural Wetlands (Modified)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Cropland and Pastureland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.01	NA	NA	NA	NA	NA
Deciduous Forest (10-50% Crown Closure)	Impacted	2.67	NA	NA	NA	NA	NA
	Available	23.08	NA	NA	NA	NA	NA
Deciduous Forest (>50% Crown Closure)	Impacted	0.00	0.00	NA	NA	NA	NA
	Available	114.79	114.79	NA	NA	NA	NA
Coniferous Forest (10-50% Crown Closure)	Impacted	0.04	NA	NA	NA	NA	NA
	Available	2.72	NA	NA	NA	NA	NA
Coniferous Forest (>50% Crown Closure)	Impacted	0.00	0.00	NA	NA	NA	NA
	Available	10.32	10.32	NA	NA	NA	NA
Plantation	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	2.01	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted	0.00	0.00	NA	NA	NA	NA
	Available	5.17	5.17	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	3.45	NA	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted	0.00	0.00	NA	NA	NA	NA
	Available	2.57	2.57	NA	NA	NA	NA
Old Field (< 25% Brush Covered)	Impacted	5.72	NA	NA	NA	NA	5.72
	Available	30.56	NA	NA	NA	NA	30.56
Deciduous Brush/Shrubland	Impacted	1.41	NA	NA	NA	NA	NA
	Available	13.30	NA	NA	NA	NA	NA
Coniferous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA

Feature Description	Habitat Status	Area (Ac)	*Melanerpes erythrocephalus*	*Nyctanassa violaceus*	*Nycticorax nycticorax*	*Pandion haliaetus*	*Passerculus sandwichensis*
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	24.11	NA	NA	NA	NA	NA
Streams and Canals	Impacted	3.43	NA	3.43	3.43	NA	NA
	Available	45.00	NA	45.00	45.00	NA	NA
Natural Lakes	Impacted	0.00	NA	0.00	0.00	0.00	NA
	Available	0.00	NA	0.00	0.00	0.00	NA
Artificial Lakes	Impacted	0.37	NA	0.37	0.37	0.37	NA
	Available	1.88	NA	1.88	1.88	1.88	NA
Deciduous Wooded Wetlands	Impacted	2.26	2.26	2.26	2.26	NA	NA
	Available	75.92	75.92	75.92	75.92	NA	NA
Coniferous Wooded Wetlands	Impacted	0.62	0.62	0.62	0.62	NA	NA
	Available	4.15	4.15	4.15	4.15	NA	NA
Atlantic White Cedar Wetlands	Impacted	0.00	0.00	NA	0.00	NA	NA
	Available	0.00	0.00	NA	0.00	NA	NA
Deciduous Scrub/Shrub Wetlands	Impacted	0.00	NA	0.00	0.00	NA	NA
	Available	0.64	NA	0.64	0.64	NA	NA
Coniferous Scrub/Shrub Wetlands	Impacted	0.00	NA	0.00	0.00	NA	NA
	Available	0.00	NA	0.00	0.00	NA	NA
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted	0.00	NA	0.00	0.00	NA	NA
	Available	2.75	NA	2.75	2.75	NA	NA
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted	0.00	NA	0.00	0.00	NA	NA
	Available	0.00	NA	0.00	0.00	NA	NA
Herbaceous Wetlands	Impacted	54.96	NA	54.96	54.96	NA	NA
	Available	379.58	NA	379.58	379.58	NA	NA
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted	0.00	0.00	0.00	0.00	NA	NA
	Available	5.56	5.56	5.56	5.56	NA	NA
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted	0.00	0.00	0.00	0.00	NA	NA
	Available	0.23	0.23	0.23	0.23	NA	NA
Disturbed Wetlands (Modified)	Impacted	1.46	NA	1.46	1.46	NA	NA
	Available	13.80	NA	13.80	13.80	NA	NA
Transitional Areas	Impacted	0.84	NA	NA	NA	NA	NA
	Available	3.91	NA	NA	NA	NA	NA
Undifferentiated Barren Lands	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	0.00	NA	NA	NA	NA	0.00
Phragmites Dominant Interior Wetlands	Impacted	0.00	NA	0.00	0.00	NA	NA
	Available	0.00	NA	0.00	0.00	NA	NA
Species Habitat Impacted (ac)			2.87	63.09	63.09	0.37	11.75
Species Habitat Available Overall (ac)			218.70	529.51	529.51	1.88	282.97
Percent Impacted Over Available			1.3138%	11.9149%	11.9149%	19.4651%	4.1533%
Percent Available, Not Impacted			98.6862%	88.0851%	88.0851%	80.5349%	95.8467%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (Ac)	*Podilymbus podiceps*	*Pooecetes gramineus*	*Strix varia*	*Atrytone arogos arogos*	*Bolaria selene myrina*
Cemetery	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.01	NA	NA	NA	NA	NA
Residential, High Density or Multiple Dwelling	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Rural, Single Unit	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Low Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Medium Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Commercial/Services	Impacted	0.00	NA	NA	NA	NA	NA
	Available	1.31	NA	NA	NA	NA	NA
Military Installations	Impacted	178.12	NA	NA	NA	NA	NA
	Available	1,317.90	NA	NA	NA	NA	NA
Transportation/Communication/Utilities	Impacted	0.05	NA	NA	NA	NA	NA
	Available	5.11	NA	NA	NA	NA	NA
Upland Right-of-Way Undeveloped	Impacted	0.00	NA	NA	NA	0.00	NA
	Available	3.10	NA	NA	NA	3.10	NA
Stormwater Basin	Impacted	0.70	NA	NA	NA	NA	NA
	Available	6.95	NA	NA	NA	NA	NA
Other Urban or Built-up Land	Impacted	86.57	NA	NA	NA	NA	NA
	Available	1,194.66	NA	NA	NA	NA	NA
Managed Wetland in Maintained Lawn Greenspace	Impacted	0.00	NA	NA	NA	NA	NA
	Available	4.78	NA	NA	NA	NA	NA
Athletic Fields (Schools)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	11.30	NA	NA	NA	NA	NA
Recreational Land	Impacted	6.03	NA	NA	NA	NA	NA
	Available	249.30	NA	NA	NA	NA	NA
Agricultural Wetlands (Modified)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Cropland and Pastureland	Impacted	0.00	NA	0.00	NA	NA	NA
	Available	0.01	NA	0.01	NA	NA	NA
Deciduous Forest (10-50% Crown Closure)	Impacted	2.67	NA	NA	NA	NA	NA
	Available	23.08	NA	NA	NA	NA	NA
Deciduous Forest (>50% Crown Closure)	Impacted	0.00	NA	NA	0.00	NA	NA
	Available	114.79	NA	NA	114.79	NA	NA
Coniferous Forest (10-50% Crown Closure)	Impacted	0.04	NA	NA	NA	NA	NA
	Available	2.72	NA	NA	NA	NA	NA
Coniferous Forest (>50% Crown Closure)	Impacted	0.00	NA	NA	0.00	NA	NA
	Available	10.32	NA	NA	10.32	NA	NA
Plantation	Impacted	0.00	NA	0.00	NA	NA	NA
	Available	0.00	NA	0.00	NA	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	2.01	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted	0.00	NA	NA	0.00	NA	NA
	Available	5.17	NA	NA	5.17	NA	NA
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	3.45	NA	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted	0.00	NA	NA	0.00	NA	NA
	Available	2.57	NA	NA	2.57	NA	NA
Old Field (< 25% Brush Covered)	Impacted	5.72	NA	5.72	NA	5.72	NA
	Available	30.56	NA	30.56	NA	30.56	NA
Deciduous Brush/Shrubland	Impacted	1.41	NA	NA	NA	NA	NA
	Available	13.30	NA	NA	NA	NA	NA
Coniferous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA

Feature Description	Habitat Status	Area (Ac)	*Podilymbus podiceps*	*Pooecetes gramineus*	*Strix varia*	*Atrytone arogos arogos*	*Bolaria selene myrina*
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	24.11	NA	NA	NA	NA	NA
Streams and Canals	Impacted	3.43	NA	NA	NA	NA	NA
	Available	45.00	NA	NA	NA	NA	NA
Natural Lakes	Impacted	0.00	0.00	NA	NA	NA	NA
	Available	0.00	0.00	NA	NA	NA	NA
Artificial Lakes	Impacted	0.37	0.37	NA	NA	NA	NA
	Available	1.88	1.88	NA	NA	NA	NA
Deciduous Wooded Wetlands	Impacted	2.26	2.26	NA	NA	NA	NA
	Available	75.92	75.92	NA	NA	NA	NA
Coniferous Wooded Wetlands	Impacted	0.62	0.62	NA	NA	NA	NA
	Available	4.15	4.15	NA	NA	NA	NA
Atlantic White Cedar Wetlands	Impacted	0.00	0.00	NA	NA	NA	NA
	Available	0.00	0.00	NA	NA	NA	NA
Deciduous Scrub/Shrub Wetlands	Impacted	0.00	0.00	NA	NA	NA	0.00
	Available	0.64	0.64	NA	NA	NA	0.64
Coniferous Scrub/Shrub Wetlands	Impacted	0.00		NA	NA	NA	0.00
	Available	0.00		NA	NA	NA	0.00
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted	0.00	0.00	NA	NA	NA	0.00
	Available	2.75	2.75	NA	NA	NA	2.75
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted	0.00	0.00	NA	NA	NA	0.00
	Available	0.00	0.00	NA	NA	NA	0.00
Herbaceous Wetlands	Impacted	54.96	54.96	NA	NA	NA	54.96
	Available	379.58	379.58	NA	NA	NA	379.58
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted	0.00	NA	NA	0.00	NA	NA
	Available	5.56	NA	NA	5.56	NA	NA
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted	0.00	NA	NA	0.00	NA	NA
	Available	0.23	NA	NA	0.23	NA	NA
Disturbed Wetlands (Modified)	Impacted	1.46	NA	NA	NA	NA	NA
	Available	13.80	NA	NA	NA	NA	NA
Transitional Areas	Impacted	0.84	NA	NA	NA	NA	NA
	Available	3.91	NA	NA	NA	NA	NA
Undifferentiated Barren Lands	Impacted	0.00	NA	0.00	NA	NA	NA
	Available	0.00	NA	0.00	NA	NA	NA
Phragmites Dominant Interior Wetlands	Impacted	0.00	0.00	NA	NA	NA	NA
	Available	0.00	0.00	NA	NA	NA	NA
Species Habitat Impacted (ac)			58.20	5.72	0.00	5.72	54.96
Species Habitat Available Overall (ac)			464.91	30.57	138.63	33.66	382.96
Percent Impacted Over Available			12.5186%	18.7205%	0.0000%	17.0029%	14.3516%
Percent Available, Not Impacted			87.4814%	81.2795%	100.0000%	82.9971%	85.6484%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (Ac)	*Callophrys irus*	*Lynx rufus*	*Clemmys insculpta*	*Clemmys muhlenbergii*	*Crotalus horridus*
Cemetery	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.01	NA	NA	NA	NA	NA
Residential, High Density or Multiple Dwelling	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Rural, Single Unit	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Low Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Medium Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Commercial/Services	Impacted	0.00	NA	NA	NA	NA	NA
	Available	1.31	NA	NA	NA	NA	NA
Military Installations	Impacted	178.12	NA	NA	NA	NA	NA
	Available	1,317.90	NA	NA	NA	NA	NA
Transportation/Communication/Utilities	Impacted	0.05	NA	NA	NA	NA	NA
	Available	5.11	NA	NA	NA	NA	NA
Upland Right-of-Way Undeveloped	Impacted	0.00	0.00	NA	NA	NA	NA
	Available	3.10	3.10	NA	NA	NA	NA
Stormwater Basin	Impacted	0.70	NA	NA	NA	NA	NA
	Available	6.95	NA	NA	NA	NA	NA
Other Urban or Built-up Land	Impacted	86.57	NA	NA	NA	NA	NA
	Available	1,194.66	NA	NA	NA	NA	NA
Managed Wetland in Maintained Lawn Greenspace	Impacted	0.00	NA	NA	NA	NA	NA
	Available	4.78	NA	NA	NA	NA	NA
Athletic Fields (Schools)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	11.30	NA	NA	NA	NA	NA
Recreational Land	Impacted	6.03	NA	NA	NA	NA	NA
	Available	249.30	NA	NA	NA	NA	NA
Agricultural Wetlands (Modified)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Cropland and Pastureland	Impacted	0.00	NA	0.00	NA	NA	NA
	Available	0.01	NA	0.01	NA	NA	NA
Deciduous Forest (10-50% Crown Closure)	Impacted	2.67	NA	NA	NA	NA	NA
	Available	23.08	NA	NA	NA	NA	NA
Deciduous Forest (>50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	114.79	NA	NA	NA	NA	NA
Coniferous Forest (10-50% Crown Closure)	Impacted	0.04	NA	0.04	NA	NA	0.04
	Available	2.72	NA	2.72	NA	NA	2.72
Coniferous Forest (>50% Crown Closure)	Impacted	0.00	NA	0.00	NA	NA	0.00
	Available	10.32	NA	10.32	NA	NA	10.32
Plantation	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted	0.00	NA	0.00	NA	NA	0.00
	Available	2.01	NA	2.01	NA	NA	2.01
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted	0.00	NA	0.00	NA	NA	0.00
	Available	5.17	NA	5.17	NA	NA	5.17
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted	0.00	NA	0.00	NA	NA	0.00
	Available	3.45	NA	3.45	NA	NA	3.45
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted	0.00	NA	0.00	NA	NA	0.00
	Available	2.57	NA	2.57	NA	NA	2.57
Old Field (< 25% Brush Covered)	Impacted	5.72	5.72	NA	NA	NA	NA
	Available	30.56	30.56	NA	NA	NA	NA
Deciduous Brush/Shrubland	Impacted	1.41	NA	NA	NA	NA	NA
	Available	13.30	NA	NA	NA	NA	NA
Coniferous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA

Feature Description	Habitat Status	Area (Ac)	*Callophrys irus*	*Lynx rufus*	*Clemmys insculpta*	*Clemmys muhlenbergii*	*Crotalus horridus*
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	24.11	NA	NA	NA	NA	NA
Streams and Canals	Impacted	3.43	NA	NA	3.43	NA	NA
	Available	45.00	NA	NA	45.00	NA	NA
Natural Lakes	Impacted	0.00	NA	NA	0.00	NA	NA
	Available	0.00	NA	NA	0.00	NA	NA
Artificial Lakes	Impacted	0.37	NA	NA	NA	NA	NA
	Available	1.88	NA	NA	NA	NA	NA
Deciduous Wooded Wetlands	Impacted	2.26	NA	NA	2.26	NA	NA
	Available	75.92	NA	NA	75.92	NA	NA
Coniferous Wooded Wetlands	Impacted	0.62	NA	NA	0.62	NA	0.62
	Available	4.15	NA	NA	4.15	NA	4.15
Atlantic White Cedar Wetlands	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	0.00	NA	NA	NA	NA	0.00
Deciduous Scrub/Shrub Wetlands	Impacted	0.00	NA	NA	0.00	0.00	NA
	Available	0.64	NA	NA	0.64	0.64	NA
Coniferous Scrub/Shrub Wetlands	Impacted	0.00	NA	NA	0.00	0.00	NA
	Available	0.00	NA	NA	0.00	0.00	NA
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted	0.00	NA	NA	0.00	0.00	NA
	Available	2.75	NA	NA	2.75	2.75	NA
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted	0.00	NA	NA	0.00	0.00	NA
	Available	0.00	NA	NA	0.00	0.00	NA
Herbaceous Wetlands	Impacted	54.96	NA	NA	54.96	54.96	NA
	Available	379.58	NA	NA	379.58	379.58	NA
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted	0.00	NA	NA	0.00	NA	NA
	Available	5.56	NA	NA	5.56	NA	NA
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted	0.00	NA	NA	0.00	NA	0.00
	Available	0.23	NA	NA	0.23	NA	0.23
Disturbed Wetlands (Modified)	Impacted	1.46	NA	NA	NA	NA	NA
	Available	13.80	NA	NA	NA	NA	NA
Transitional Areas	Impacted	0.84	NA	NA	NA	NA	NA
	Available	3.91	NA	NA	NA	NA	NA
Undifferentiated Barren Lands	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Phragmites Dominant Interior Wetlands	Impacted	0.00	NA	NA	0.00	0.00	NA
	Available	0.00	NA	NA	0.00	0.00	NA
Species Habitat Impacted (ac)			5.72	0.04	61.27	54.96	0.66
Species Habitat Available Overall (ac)			33.66	26.25	513.83	382.96	30.62
Percent Impacted Over Available			17.0029%	0.1572%	11.9238%	14.3516%	2.1468%
Percent Available, Not Impacted			82.9971%	99.8428%	88.0762%	85.6484%	97.8532%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (Ac)	*Elaphe guttata*	*Pituophis m melanoleucus*
Cemetery	Impacted	0.00	NA	NA
	Available	0.01	NA	NA
Residential, High Density or Multiple Dwelling	Impacted	0.00	NA	NA
	Available	0.00	NA	NA
Residential, Rural, Single Unit	Impacted	0.00	NA	NA
	Available	0.00	NA	NA
Residential, Single Unit, Low Density	Impacted	0.00	NA	NA
	Available	0.00	NA	NA
Residential, Single Unit, Medium Density	Impacted	0.00	NA	NA
	Available	0.00	NA	NA
Commercial/Services	Impacted	0.00	NA	NA
	Available	1.31	NA	NA
Military Installations	Impacted	178.12	NA	NA
	Available	1,317.90	NA	NA
Transportation/Communication/Utilities	Impacted	0.05	NA	NA
	Available	5.11	NA	NA
Upland Right-of-Way Undeveloped	Impacted	0.00	NA	NA
	Available	3.10	NA	NA
Stormwater Basin	Impacted	0.70	NA	NA
	Available	6.95	NA	NA
Other Urban or Built-up Land	Impacted	86.57	NA	NA
	Available	1,194.66	NA	NA
Managed Wetland in Maintained Lawn Greenspace	Impacted	0.00	NA	NA
	Available	4.78	NA	NA
Athletic Fields (Schools)	Impacted	0.00	NA	NA
	Available	11.30	NA	NA
Recreational Land	Impacted	6.03	NA	NA
	Available	249.30	NA	NA
Agricultural Wetlands (Modified)	Impacted	0.00	NA	NA
	Available	0.00	NA	NA
Cropland and Pastureland	Impacted	0.00	NA	NA
	Available	0.01	NA	NA
Deciduous Forest (10-50% Crown Closure)	Impacted	2.67	NA	2.67
	Available	23.08	NA	23.08
Deciduous Forest (>50% Crown Closure)	Impacted	0.00	NA	NA
	Available	114.79	NA	NA
Coniferous Forest (10-50% Crown Closure)	Impacted	0.04	NA	0.04
	Available	2.72	NA	2.72
Coniferous Forest (>50% Crown Closure)	Impacted	0.00	0.00	NA
	Available	10.32	10.32	NA
Plantation	Impacted	0.00	NA	NA
	Available	0.00	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted	0.00	NA	0.00
	Available	2.01	NA	2.01
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted	0.00	0.00	NA
	Available	5.17	5.17	NA
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted	0.00	NA	0.00
	Available	3.45	NA	3.45
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted	0.00	NA	NA
	Available	2.57	NA	NA
Old Field (< 25% Brush Covered)	Impacted	5.72	NA	5.72
	Available	30.56	NA	30.56
Deciduous Brush/Shrubland	Impacted	1.41	NA	NA
	Available	13.30	NA	NA
Coniferous Brush/Shrubland	Impacted	0.00	NA	NA
	Available	0.00	NA	NA

Feature Description	Habitat Status	Area (Ac)	*Elaphe guttata*	*Pituophis m melanoleucus*
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted	0.00	NA	NA
	Available	24.11	NA	NA
Streams and Canals	Impacted	3.43	NA	NA
	Available	45.00	NA	NA
Natural Lakes	Impacted	0.00	NA	NA
	Available	0.00	NA	NA
Artificial Lakes	Impacted	0.37	NA	NA
	Available	1.88	NA	NA
Deciduous Wooded Wetlands	Impacted	2.26	NA	NA
	Available	75.92	NA	NA
Coniferous Wooded Wetlands	Impacted	0.62	0.62	NA
	Available	4.15	4.15	NA
Atlantic White Cedar Wetlands	Impacted	0.00	0.00	NA
	Available	0.00	0.00	NA
Deciduous Scrub/Shrub Wetlands	Impacted	0.00	NA	NA
	Available	0.64	NA	NA
Coniferous Scrub/Shrub Wetlands	Impacted	0.00	0.00	NA
	Available	0.00	0.00	NA
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted	0.00	NA	NA
	Available	2.75	NA	NA
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted	0.00	0.00	NA
	Available	0.00	0.00	NA
Herbaceous Wetlands	Impacted	54.96	NA	NA
	Available	379.58	NA	NA
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted	0.00	NA	NA
	Available	5.56	NA	NA
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted	0.00	0.00	NA
	Available	0.23	0.23	NA
Disturbed Wetlands (Modified)	Impacted	1.46	NA	NA
	Available	13.80	NA	NA
Transitional Areas	Impacted	0.84	NA	NA
	Available	3.91	NA	NA
Undifferentiated Barren Lands	Impacted	0.00	0.00	0.00
	Available	0.00	0.00	0.00
Phragmites Dominant Interior Wetlands	Impacted	0.00	NA	NA
	Available	0.00	NA	NA
	Species Habitat Impacted (ac)		0.62	8.44
	Species Habitat Available Overall (ac)		19.87	61.83
	Percent Impacted Over Available		3.1002%	13.6478%
	Percent Available, Not Impacted		96.8998%	86.3522%

Notes:
ac = acres
NA = not applicable

Table B-2. Spatial Exposure Potential of Protected Species at Dix of Joint Base McGuire-Dix-Lakehurst

Feature Description	Habitat Status	Area (Ac)	*Clemmy guttata*	*Pseudemys rubriventris* (Juvenile)	*Pseudemys rubriventris* (Adult)	*Hyla andersonii*	*Hyla chrysocelis*
Cemetery	Impacted	0.00	NA	NA	NA	NA	NA
	Available	3.47	NA	NA	NA	NA	NA
Residential, High Density or Multiple Dwelling	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Rural, Single Unit	Impacted	0.00	NA	NA	NA	NA	NA
	Available	9.13	NA	NA	NA	NA	NA
Residential, Single Unit, Low Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.20	NA	NA	NA	NA	NA
Residential, Single Unit, Medium Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	1.05	NA	NA	NA	NA	NA
Commercial/Services	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.42	NA	NA	NA	NA	NA
Military Installations	Impacted	31.35	NA	NA	NA	NA	NA
	Available	3,132.47	NA	NA	NA	NA	NA
Transportation/Communication/Utilities	Impacted	1.36	NA	NA	NA	NA	NA
	Available	220.36	NA	NA	NA	NA	NA
Upland Right-of-Way Undeveloped	Impacted	0.00	NA	NA	NA	NA	NA
	Available	81.09	NA	NA	NA	NA	NA
Stormwater Basin	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	33.27	NA	NA	NA	NA	33.27
Other Urban or Built-up Land	Impacted	16.61	NA	NA	NA	NA	NA
	Available	1,250.32	NA	NA	NA	NA	NA
Managed Wetland in Maintained Lawn Greenspace	Impacted	0.00	NA	0.00	NA	NA	0.00
	Available	4.17	NA	4.17	NA	NA	4.17
Athletic Fields (Schools)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	2.51	NA	NA	NA	NA	NA
Recreational Land	Impacted	114.81	NA	NA	NA	NA	NA
	Available	429.81	NA	NA	NA	NA	NA
Agricultural Wetlands (Modified)	Impacted	92.84	NA	92.84	NA	NA	92.84
	Available	93.97	NA	93.97	NA	NA	93.97
Cropland and Pastureland	Impacted	0.00	NA	0.00	NA	NA	0.00
	Available	14.17	NA	14.17	NA	NA	14.17
Deciduous Forest (10-50% Crown Closure)	Impacted	2.46	NA	NA	NA	NA	NA
	Available	297.32	NA	NA	NA	NA	NA
Deciduous Forest (>50% Crown Closure)	Impacted	39.15	NA	NA	NA	NA	NA
	Available	1,522.35	NA	NA	NA	NA	NA
Coniferous Forest (10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	3,476.78	NA	NA	NA	NA	NA
Coniferous Forest (>50% Crown Closure)	Impacted	7.15	NA	NA	NA	NA	NA
	Available	6,216.02	NA	NA	NA	NA	NA
Plantation	Impacted	10.95	NA	NA	NA	NA	NA
	Available	341.48	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	209.19	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted	34.29	NA	NA	NA	NA	NA
	Available	1,819.31	NA	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	100.33	NA	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted	10.93	NA	NA	NA	NA	NA
	Available	865.23	NA	NA	NA	NA	NA
Old Field (< 25% Brush Covered)	Impacted	1.19	NA	NA	NA	NA	NA
	Available	830.21	NA	NA	NA	NA	NA
Deciduous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	78.60	NA	NA	NA	NA	NA
Coniferous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	679.92	NA	NA	NA	NA	NA
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted	5.77	NA	NA	NA	NA	NA
	Available	734.89	NA	NA	NA	NA	NA

Feature Description	Habitat Status	Area (Ac)	*Clemmy guttata*	*Pseudemys rubriventris* (Juvenile)	*Pseudemys rubriventris* (Adult)	*Hyla andersonii*	*Hyla chrysocelis*
Streams and Canals	Impacted	6.73	6.73	NA	6.73	NA	NA
	Available	452.34	452.34	NA	452.34	NA	NA
Natural Lakes	Impacted	0.00	0.00	0.00	0.00	NA	NA
	Available	4.54	4.54	4.54	4.54	NA	NA
Artificial Lakes	Impacted	7.17	7.17	7.17	7.17	NA	NA
	Available	396.28	396.28	396.28	396.28	NA	NA
Deciduous Wooded Wetlands	Impacted	9.80	9.80	9.80	NA	NA	9.80
	Available	2,334.37	2,334.37	2,334.37	NA	NA	2,334.37
Coniferous Wooded Wetlands	Impacted	0.00	0.00	0.00	NA	0.00	0.00
	Available	1,607.30	1,607.30	1,607.30	NA	1,607.30	1,607.30
Atlantic White Cedar Wetlands	Impacted	0.00	0.00	0.00	NA	0.00	0.00
	Available	298.97	298.97	298.97	NA	298.97	298.97
Deciduous Scrub/Shrub Wetlands	Impacted	0.00	0.00	0.00	NA	0.00	0.00
	Available	371.69	371.69	371.69	NA	371.69	371.69
Coniferous Scrub/Shrub Wetlands	Impacted	0.00	0.00	0.00	NA	0.00	0.00
	Available	292.71	292.71	292.71	NA	292.71	292.71
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted	0.00	0.00	0.00	NA	0.00	0.00
	Available	635.15	635.15	635.15	NA	635.15	635.15
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted	0.00	0.00	0.00	NA	0.00	0.00
	Available	101.91	101.91	101.91	NA	101.91	101.91
Herbaceous Wetlands	Impacted	0.74	0.74	0.74	NA	0.74	0.74
	Available	843.63	843.63	843.63	NA	843.63	843.63
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted	12.13	12.13	12.13	NA	12.13	12.13
	Available	523.83	523.83	523.83	NA	523.83	523.83
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted	0.00	0.00	0.00	NA	0.00	0.00
	Available	635.50	635.50	635.50	NA	635.50	635.50
Disturbed Wetlands (Modified)	Impacted	0.00	NA	0.00	NA	NA	0.00
	Available	47.03	NA	47.03	NA	NA	47.03
Transitional Areas	Impacted	27.51	NA	NA	NA	NA	NA
	Available	166.61	NA	NA	NA	NA	NA
Undifferentiated Barren Lands	Impacted	0.00	NA	NA	NA	NA	NA
	Available	4.34	NA	NA	NA	NA	NA
Phragmites Dominant Interior Wetlands	Impacted	0.00	NA	NA	NA	NA	NA
	Available	2.67	NA	NA	NA	NA	NA
	Species Habitat Impacted (ac)		36.58	122.69	13.90	12.88	115.52
	Species Habitat Available Overall (ac)		8,498.20	8,205.19	853.17	5,310.67	7,837.64
	Percent Impacted Over Available		0.4304%	1.4952%	1.6296%	0.2424%	1.4739%
	Percent Available, Not Impacted		99.5696%	98.5048%	98.3704%	99.7576%	98.5261%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (Ac)	*Pseudotriton montanus*	*Accipiter gentilis*	*Ammodramus henslowii*	*Ammodramus savannarum*	*Asio flammeus*
Cemetery	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	3.47	NA	NA	NA	NA	3.47
Residential, High Density or Multiple Dwelling	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Rural, Single Unit	Impacted	0.00	NA	NA	NA	NA	NA
	Available	9.13	NA	NA	NA	NA	NA
Residential, Single Unit, Low Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.20	NA	NA	NA	NA	NA
Residential, Single Unit, Medium Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	1.05	NA	NA	NA	NA	NA
Commercial/Services	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.42	NA	NA	NA	NA	NA
Military Installations	Impacted	31.35	NA	NA	NA	NA	NA
	Available	3,132.47	NA	NA	NA	NA	NA
Transportation/Communication/Utilities	Impacted	1.36	NA	NA	NA	NA	NA
	Available	220.36	NA	NA	NA	NA	NA
Upland Right-of-Way Undeveloped	Impacted	0.00	NA	NA	0.00	0.00	NA
	Available	81.09	NA	NA	81.09	81.09	NA
Stormwater Basin	Impacted	0.00	NA	NA	NA	NA	NA
	Available	33.27	NA	NA	NA	NA	NA
Other Urban or Built-up Land	Impacted	16.61	NA	NA	NA	NA	16.61
	Available	1,250.32	NA	NA	NA	NA	1,250.32
Managed Wetland in Maintained Lawn Greenspace	Impacted	0.00	NA	NA	NA	NA	NA
	Available	4.17	NA	NA	NA	NA	NA
Athletic Fields (Schools)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	2.51	NA	NA	NA	NA	NA
Recreational Land	Impacted	114.81	NA	NA	NA	NA	NA
	Available	429.81	NA	NA	NA	NA	NA
Agricultural Wetlands (Modified)	Impacted	92.84	NA	NA	NA	NA	NA
	Available	93.97	NA	NA	NA	NA	NA
Cropland and Pastureland	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	14.17	NA	NA	NA	NA	14.17
Deciduous Forest (10-50% Crown Closure)	Impacted	2.46	NA	NA	NA	NA	NA
	Available	297.32	NA	NA	NA	NA	NA
Deciduous Forest (>50% Crown Closure)	Impacted	39.15	NA	39.15	NA	NA	NA
	Available	1,522.35	NA	1,522.35	NA	NA	NA
Coniferous Forest (10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	3,476.78	NA	NA	NA	NA	NA
Coniferous Forest (>50% Crown Closure)	Impacted	7.15	NA	7.15	NA	NA	NA
	Available	6,216.02	NA	6,216.02	NA	NA	NA
Plantation	Impacted	10.95	NA	NA	NA	NA	NA
	Available	341.48	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	209.19	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted	34.29	NA	34.29	NA	NA	NA
	Available	1,819.31	NA	1,819.31	NA	NA	NA
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	100.33	NA	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted	10.93	NA	10.93	NA	NA	NA
	Available	865.23	NA	865.23	NA	NA	NA
Old Field (< 25% Brush Covered)	Impacted	1.19	NA	NA	1.19	1.19	1.19
	Available	830.21	NA	NA	830.21	830.21	830.21
Deciduous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	78.60	NA	NA	NA	NA	NA
Coniferous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	679.92	NA	NA	NA	NA	NA
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted	5.77	NA	NA	NA	NA	NA
	Available	734.89	NA	NA	NA	NA	NA

Feature Description	Habitat Status	Area (Ac)	*Pseudotriton montanus*	*Accipiter gentilis*	*Ammodramus henslowii*	*Ammodramus savannarum*	*Asio flammeus*
Streams and Canals	Impacted	6.73	NA	NA	NA	NA	NA
	Available	452.34	NA	NA	NA	NA	NA
Natural Lakes	Impacted	0.00	0.00	NA	NA	NA	NA
	Available	4.54	4.54	NA	NA	NA	NA
Artificial Lakes	Impacted	7.17	7.17	NA	NA	NA	NA
	Available	396.28	396.28	NA	NA	NA	NA
Deciduous Wooded Wetlands	Impacted	9.80	NA	9.80	NA	NA	NA
	Available	2,334.37	NA	2,334.37	NA	NA	NA
Coniferous Wooded Wetlands	Impacted	0.00	NA	0.00	NA	NA	NA
	Available	1,607.30	NA	1,607.30	NA	NA	NA
Atlantic White Cedar Wetlands	Impacted	0.00	0.00	0.00	NA	NA	NA
	Available	298.97	298.97	298.97	NA	NA	NA
Deciduous Scrub/Shrub Wetlands	Impacted	0.00	NA	NA	NA	NA	NA
	Available	371.69	NA	NA	NA	NA	NA
Coniferous Scrub/Shrub Wetlands	Impacted	0.00	NA	NA	NA	NA	NA
	Available	292.71	NA	NA	NA	NA	NA
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	635.15	NA	NA	NA	NA	NA
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	101.91	NA	NA	NA	NA	NA
Herbaceous Wetlands	Impacted	0.74	0.74	NA	0.74	NA	NA
	Available	843.63	843.63	NA	843.63	NA	NA
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted	12.13	NA	12.13	NA	NA	NA
	Available	523.83	NA	523.83	NA	NA	NA
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted	0.00	NA	0.00	NA	NA	NA
	Available	635.50	NA	635.50	NA	NA	NA
Disturbed Wetlands (Modified)	Impacted	0.00	0.00	NA	NA	NA	NA
	Available	47.03	47.03	NA	NA	NA	NA
Transitional Areas	Impacted	27.51	NA	NA	NA	NA	NA
	Available	166.61	NA	NA	NA	NA	NA
Undifferentiated Barren Lands	Impacted	0.00	NA	NA	0.00	0.00	NA
	Available	4.34	NA	NA	4.34	4.34	NA
Phragmites Dominant Interior Wetlands	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	2.67	NA	NA	NA	NA	2.67
	Species Habitat Impacted (ac)		7.91	113.45	1.93	1.19	17.80
	Species Habitat Available Overall (ac)		1,590.44	15,822.86	1,759.26	915.64	2,100.84
	Percent Impacted Over Available		0.4976%	0.7170%	0.1097%	0.1297%	0.8474%
	Percent Available, Not Impacted		99.5024%	99.2830%	99.8903%	99.8703%	99.1526%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (Ac)	*Asio otus*	*Batramia longicauda*	*Botaurus lentiginosos*	*Buteo lineatus*	*Circus cyaneus*
Cemetery	Impacted	0.00	0.00	0.00	NA	NA	0.00
	Available	3.47	3.47	3.47	NA	NA	3.47
Residential, High Density or Multiple Dwelling	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Rural, Single Unit	Impacted	0.00	NA	NA	NA	NA	NA
	Available	9.13	NA	NA	NA	NA	NA
Residential, Single Unit, Low Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.20	NA	NA	NA	NA	NA
Residential, Single Unit, Medium Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	1.05	NA	NA	NA	NA	NA
Commercial/Services	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.42	NA	NA	NA	NA	NA
Military Installations	Impacted	31.35	NA	NA	NA	NA	NA
	Available	3,132.47	NA	NA	NA	NA	NA
Transportation/Communication/Utilities	Impacted	1.36	NA	NA	NA	NA	NA
	Available	220.36	NA	NA	NA	NA	NA
Upland Right-of-Way Undeveloped	Impacted	0.00	NA	0.00	NA	NA	0.00
	Available	81.09	NA	81.09	NA	NA	81.09
Stormwater Basin	Impacted	0.00	NA	NA	NA	NA	NA
	Available	33.27	NA	NA	NA	NA	NA
Other Urban or Built-up Land	Impacted	16.61	NA	NA	NA	NA	16.61
	Available	1,250.32	NA	NA	NA	NA	1,250.32
Managed Wetland in Maintained Lawn Greenspace	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	4.17	NA	NA	NA	NA	4.17
Athletic Fields (Schools)	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	2.51	NA	NA	NA	NA	2.51
Recreational Land	Impacted	114.81	NA	NA	NA	NA	NA
	Available	429.81	NA	NA	NA	NA	NA
Agricultural Wetlands (Modified)	Impacted	92.84	NA	NA	NA	NA	92.84
	Available	93.97	NA	NA	NA	NA	93.97
Cropland and Pastureland	Impacted	0.00	0.00	0.00	NA	NA	0.00
	Available	14.17	14.17	14.17	NA	NA	14.17
Deciduous Forest (10-50% Crown Closure)	Impacted	2.46	2.46	NA	NA	NA	NA
	Available	297.32	297.32	NA	NA	NA	NA
Deciduous Forest (>50% Crown Closure)	Impacted	39.15	39.15	NA	NA	39.15	NA
	Available	1,522.35	1,522.35	NA	NA	1,522.35	NA
Coniferous Forest (10-50% Crown Closure)	Impacted	0.00	0.00	NA	NA	NA	NA
	Available	3,476.78	3,476.78	NA	NA	NA	NA
Coniferous Forest (>50% Crown Closure)	Impacted	7.15	7.15	NA	NA	7.15	NA
	Available	6,216.02	6,216.02	NA	NA	6,216.02	NA
Plantation	Impacted	10.95	NA	10.95	NA	NA	NA
	Available	341.48	NA	341.48	NA	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted	0.00	0.00	NA	NA	NA	NA
	Available	209.19	209.19	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted	34.29	34.29	NA	NA	34.29	NA
	Available	1,819.31	1,819.31	NA	NA	1,819.31	NA
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted	0.00	0.00	NA	NA	NA	NA
	Available	100.33	100.33	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted	10.93	10.93	NA	NA	10.93	NA
	Available	865.23	865.23	NA	NA	865.23	NA
Old Field (< 25% Brush Covered)	Impacted	1.19	1.19	1.19	NA	NA	1.19
	Available	830.21	830.21	830.21	NA	NA	830.21
Deciduous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	78.60	NA	NA	NA	NA	NA
Coniferous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	679.92	NA	NA	NA	NA	NA
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted	5.77	NA	NA	NA	NA	NA
	Available	734.89	NA	NA	NA	NA	NA

Feature Description	Habitat Status	Area (Ac)	*Asio otus*	*Batramia longicauda*	*Botaurus lentiginosos*	*Buteo lineatus*	*Circus cyaneus*
Streams and Canals	Impacted	6.73	NA	NA	NA	NA	NA
	Available	452.34	NA	NA	NA	NA	NA
Natural Lakes	Impacted	0.00	NA	NA	NA	NA	NA
	Available	4.54	NA	NA	NA	NA	NA
Artificial Lakes	Impacted	7.17	NA	NA	NA	NA	NA
	Available	396.28	NA	NA	NA	NA	NA
Deciduous Wooded Wetlands	Impacted	9.80	NA	NA	NA	9.80	NA
	Available	2,334.37	NA	NA	NA	2,334.37	NA
Coniferous Wooded Wetlands	Impacted	0.00	NA	NA	NA	0.00	NA
	Available	1,607.30	NA	NA	NA	1,607.30	NA
Atlantic White Cedar Wetlands	Impacted	0.00	NA	NA	NA	0.00	NA
	Available	298.97	NA	NA	NA	298.97	NA
Deciduous Scrub/Shrub Wetlands	Impacted	0.00	NA	NA	0.00	NA	0.00
	Available	371.69	NA	NA	371.69	NA	371.69
Coniferous Scrub/Shrub Wetlands	Impacted	0.00	NA	NA	0.00	NA	0.00
	Available	292.71	NA	NA	292.71	NA	292.71
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted	0.00	NA	NA	0.00	NA	0.00
	Available	635.15	NA	NA	635.15	NA	635.15
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted	0.00	NA	NA	0.00	NA	0.00
	Available	101.91	NA	NA	101.91	NA	101.91
Herbaceous Wetlands	Impacted	0.74	NA	NA	0.74	NA	0.74
	Available	843.63	NA	NA	843.63	NA	843.63
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted	12.13	NA	NA	NA	12.13	NA
	Available	523.83	NA	NA	NA	523.83	NA
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted	0.00	NA	NA	NA	0.00	NA
	Available	635.50	NA	NA	NA	635.50	NA
Disturbed Wetlands (Modified)	Impacted	0.00	NA	NA	0.00	NA	NA
	Available	47.03	NA	NA	47.03	NA	NA
Transitional Areas	Impacted	27.51	NA	NA	NA	NA	27.51
	Available	166.61	NA	NA	NA	NA	166.61
Undifferentiated Barren Lands	Impacted	0.00	0.00	0.00	NA	NA	0.00
	Available	4.34	4.34	4.34	NA	NA	4.34
Phragmites Dominant Interior Wetlands	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	2.67	NA	NA	NA	NA	2.67
	Species Habitat Impacted (ac)		95.16	12.14	0.74	113.45	138.90
	Species Habitat Available Overall (ac)		15,358.72	1,274.76	2,292.11	15,822.86	4,698.61
	Percent Impacted Over Available		0.6196%	0.9524%	0.0324%	0.7170%	2.9561%
	Percent Available, Not Impacted		99.3804%	99.0476%	99.9676%	99.2830%	97.0439%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (Ac)	*Cistothorus platensis*	*Dolichonyx oryzivorus*	*Falco sparverius*	*Haliaeetus leucocephalus*	*Lanius ludovicianus*
Cemetery	Impacted	0.00	NA	NA	0.00	NA	0.00
	Available	3.47	NA	NA	3.47	NA	3.47
Residential, High Density or Multiple Dwelling	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Rural, Single Unit	Impacted	0.00	NA	NA	0.00	NA	NA
	Available	9.13	NA	NA	9.13	NA	NA
Residential, Single Unit, Low Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.20	NA	NA	NA	NA	NA
Residential, Single Unit, Medium Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	1.05	NA	NA	NA	NA	NA
Commercial/Services	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.42	NA	NA	NA	NA	NA
Military Installations	Impacted	31.35	NA	NA	NA	NA	NA
	Available	3,132.47	NA	NA	NA	NA	NA
Transportation/Communication/Utilities	Impacted	1.36	NA	NA	NA	NA	NA
	Available	220.36	NA	NA	NA	NA	NA
Upland Right-of-Way Undeveloped	Impacted	0.00	NA	NA	0.00	NA	0.00
	Available	81.09	NA	NA	81.09	NA	81.09
Stormwater Basin	Impacted	0.00	NA	NA	NA	NA	NA
	Available	33.27	NA	NA	NA	NA	NA
Other Urban or Built-up Land	Impacted	16.61	NA	NA	NA	NA	NA
	Available	1,250.32	NA	NA	NA	NA	NA
Managed Wetland in Maintained Lawn Greenspace	Impacted	0.00	NA	NA	0.00	NA	NA
	Available	4.17	NA	NA	4.17	NA	NA
Athletic Fields (Schools)	Impacted	0.00	NA	NA	0.00	NA	NA
	Available	2.51	NA	NA	2.51	NA	NA
Recreational Land	Impacted	114.81	NA	NA	114.81	NA	NA
	Available	429.81	NA	NA	429.81	NA	NA
Agricultural Wetlands (Modified)	Impacted	92.84	NA	92.84	92.84	NA	NA
	Available	93.97	NA	93.97	93.97	NA	NA
Cropland and Pastureland	Impacted	0.00	NA	0.00	0.00	NA	0.00
	Available	14.17	NA	14.17	14.17	NA	14.17
Deciduous Forest (10-50% Crown Closure)	Impacted	2.46	NA	NA	NA	NA	NA
	Available	297.32	NA	NA	NA	NA	NA
Deciduous Forest (>50% Crown Closure)	Impacted	39.15	NA	NA	NA	NA	NA
	Available	1,522.35	NA	NA	NA	NA	NA
Coniferous Forest (10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	3,476.78	NA	NA	NA	NA	NA
Coniferous Forest (>50% Crown Closure)	Impacted	7.15	NA	NA	NA	NA	NA
	Available	6,216.02	NA	NA	NA	NA	NA
Plantation	Impacted	10.95	NA	NA	10.95	NA	NA
	Available	341.48	NA	NA	341.48	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	209.19	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted	34.29	NA	NA	NA	NA	NA
	Available	1,819.31	NA	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	100.33	NA	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted	10.93	NA	NA	NA	NA	NA
	Available	865.23	NA	NA	NA	NA	NA
Old Field (< 25% Brush Covered)	Impacted	1.19	NA	1.19	1.19	NA	1.19
	Available	830.21	NA	830.21	830.21	NA	830.21
Deciduous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	78.60	NA	NA	NA	NA	78.60
Coniferous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	679.92	NA	NA	NA	NA	679.92
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted	5.77	NA	NA	NA	NA	5.77
	Available	734.89	NA	NA	NA	NA	734.89

Feature Description	Habitat Status	Area (Ac)	*Cistothorus platensis*	*Dolichonyx oryzivorus*	*Falco sparverius*	*Haliaeetus leucocephalus*	*Lanius ludovicianus*
Streams and Canals	Impacted	6.73	NA	NA	NA	6.73	NA
	Available	452.34	NA	NA	NA	452.34	NA
Natural Lakes	Impacted	0.00	NA	NA	NA	0.00	NA
	Available	4.54	NA	NA	NA	4.54	NA
Artificial Lakes	Impacted	7.17	NA	NA	NA	7.17	NA
	Available	396.28	NA	NA	NA	396.28	NA
Deciduous Wooded Wetlands	Impacted	9.80	NA	NA	NA	9.80	NA
	Available	2,334.37	NA	NA	NA	2,334.37	NA
Coniferous Wooded Wetlands	Impacted	0.00	NA	NA	NA	0.00	NA
	Available	1,607.30	NA	NA	NA	1,607.30	NA
Atlantic White Cedar Wetlands	Impacted	0.00	NA	NA	NA	0.00	NA
	Available	298.97	NA	NA	NA	298.97	NA
Deciduous Scrub/Shrub Wetlands	Impacted	0.00	0.00	NA	NA	0.00	0.00
	Available	371.69	371.69	NA	NA	371.69	371.69
Coniferous Scrub/Shrub Wetlands	Impacted	0.00	0.00	NA	NA	0.00	0.00
	Available	292.71	292.71	NA	NA	292.71	292.71
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted	0.00	NA	NA	NA	0.00	0.00
	Available	635.15	NA	NA	NA	635.15	635.15
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted	0.00	NA	NA	NA	0.00	0.00
	Available	101.91	NA	NA	NA	101.91	101.91
Herbaceous Wetlands	Impacted	0.74	0.74	NA	NA	0.74	NA
	Available	843.63	843.63	NA	NA	843.63	NA
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted	12.13	NA	NA	NA	12.13	NA
	Available	523.83	NA	NA	NA	523.83	NA
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted	0.00	NA	NA	NA	0.00	NA
	Available	635.50	NA	NA	NA	635.50	NA
Disturbed Wetlands (Modified)	Impacted	0.00	0.00	NA	NA	0.00	0.00
	Available	47.03	47.03	NA	NA	47.03	47.03
Transitional Areas	Impacted	27.51	NA	NA	27.51	NA	NA
	Available	166.61	NA	NA	166.61	NA	NA
Undifferentiated Barren Lands	Impacted	0.00	NA	0.00	0.00	NA	NA
	Available	4.34	NA	4.34	4.34	NA	NA
Phragmites Dominant Interior Wetlands	Impacted	0.00	NA	NA	NA	0.00	NA
	Available	2.67	NA	NA	NA	2.67	NA
	Species Habitat Impacted (ac)		0.74	94.03	247.31	36.58	6.97
	Species Habitat Available Overall (ac)		1,555.05	942.69	1,980.96	8,547.90	3,870.82
	Percent Impacted Over Available		0.0478%	9.9744%	12.4842%	0.4280%	0.1800%
	Percent Available, Not Impacted		99.9522%	90.0256%	87.5158%	99.5720%	99.8200%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (Ac)	*Melanerpes erythrocephalus*	*Nyctanassa violaceus*	*Nycticorax nycticorax*	*Pandion haliaetus*	*Passerculus sandwichensis*
Cemetery	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	3.47	NA	NA	NA	NA	3.47
Residential, High Density or Multiple Dwelling	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Rural, Single Unit	Impacted	0.00	NA	NA	NA	NA	NA
	Available	9.13	NA	NA	NA	NA	NA
Residential, Single Unit, Low Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.20	NA	NA	NA	NA	NA
Residential, Single Unit, Medium Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	1.05	NA	NA	NA	NA	NA
Commercial/Services	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.42	NA	NA	NA	NA	NA
Military Installations	Impacted	31.35	NA	NA	NA	NA	NA
	Available	3,132.47	NA	NA	NA	NA	NA
Transportation/Communication/Utilities	Impacted	1.36	NA	NA	NA	NA	NA
	Available	220.36	NA	NA	NA	NA	NA
Upland Right-of-Way Undeveloped	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	81.09	NA	NA	NA	NA	81.09
Stormwater Basin	Impacted	0.00	NA	NA	NA	NA	NA
	Available	33.27	NA	NA	NA	NA	NA
Other Urban or Built-up Land	Impacted	16.61	NA	NA	NA	NA	NA
	Available	1,250.32	NA	NA	NA	NA	NA
Managed Wetland in Maintained Lawn Greenspace	Impacted	0.00	NA	NA	NA	NA	NA
	Available	4.17	NA	NA	NA	NA	NA
Athletic Fields (Schools)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	2.51	NA	NA	NA	NA	NA
Recreational Land	Impacted	114.81	NA	NA	NA	NA	114.81
	Available	429.81	NA	NA	NA	NA	429.81
Agricultural Wetlands (Modified)	Impacted	92.84	NA	NA	NA	NA	NA
	Available	93.97	NA	NA	NA	NA	NA
Cropland and Pastureland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	14.17	NA	NA	NA	NA	NA
Deciduous Forest (10-50% Crown Closure)	Impacted	2.46	NA	NA	NA	NA	NA
	Available	297.32	NA	NA	NA	NA	NA
Deciduous Forest (>50% Crown Closure)	Impacted	39.15	39.15	NA	NA	NA	NA
	Available	1,522.35	1,522.35	NA	NA	NA	NA
Coniferous Forest (10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	3,476.78	NA	NA	NA	NA	NA
Coniferous Forest (>50% Crown Closure)	Impacted	7.15	7.15	NA	NA	NA	NA
	Available	6,216.02	6,216.02	NA	NA	NA	NA
Plantation	Impacted	10.95	NA	NA	NA	NA	NA
	Available	341.48	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	209.19	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted	34.29	34.29	NA	NA	NA	NA
	Available	1,819.31	1,819.31	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	100.33	NA	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted	10.93	10.93	NA	NA	NA	NA
	Available	865.23	865.23	NA	NA	NA	NA
Old Field (< 25% Brush Covered)	Impacted	1.19	NA	NA	NA	NA	1.19
	Available	830.21	NA	NA	NA	NA	830.21
Deciduous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	78.60	NA	NA	NA	NA	NA
Coniferous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	679.92	NA	NA	NA	NA	NA
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted	5.77	NA	NA	NA	NA	NA
	Available	734.89	NA	NA	NA	NA	NA

Feature Description	Habitat Status	Area (Ac)	*Melanerpes erythrocephalus*	*Nyctanassa violaceus*	*Nycticorax nycticorax*	*Pandion haliaetus*	*Passerculus sandwichensis*
Streams and Canals	Impacted	6.73	NA	6.73	6.73	NA	NA
	Available	452.34	NA	452.34	452.34	NA	NA
Natural Lakes	Impacted	0.00	NA	0.00	0.00	0.00	NA
	Available	4.54	NA	4.54	4.54	4.54	NA
Artificial Lakes	Impacted	7.17	NA	7.17	7.17	7.17	NA
	Available	396.28	NA	396.28	396.28	396.28	NA
Deciduous Wooded Wetlands	Impacted	9.80	9.80	9.80	9.80	NA	NA
	Available	2,334.37	2,334.37	2,334.37	2,334.37	NA	NA
Coniferous Wooded Wetlands	Impacted	0.00	0.00	0.00	0.00	NA	NA
	Available	1,607.30	1,607.30	1,607.30	1,607.30	NA	NA
Atlantic White Cedar Wetlands	Impacted	0.00	0.00	NA	0.00	NA	NA
	Available	298.97	298.97	NA	298.97	NA	NA
Deciduous Scrub/Shrub Wetlands	Impacted	0.00	NA	0.00	0.00	NA	NA
	Available	371.69	NA	371.69	371.69	NA	NA
Coniferous Scrub/Shrub Wetlands	Impacted	0.00	NA	0.00	0.00	NA	NA
	Available	292.71	NA	292.71	292.71	NA	NA
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted	0.00	NA	0.00	0.00	NA	NA
	Available	635.15	NA	635.15	635.15	NA	NA
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted	0.00	NA	0.00	0.00	NA	NA
	Available	101.91	NA	101.91	101.91	NA	NA
Herbaceous Wetlands	Impacted	0.74	NA	0.74	0.74	NA	NA
	Available	843.63	NA	843.63	843.63	NA	NA
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted	12.13	12.13	12.13	12.13	NA	NA
	Available	523.83	523.83	523.83	523.83	NA	NA
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted	0.00	0.00	0.00	0.00	NA	NA
	Available	635.50	635.50	635.50	635.50	NA	NA
Disturbed Wetlands (Modified)	Impacted	0.00	NA	0.00	0.00	NA	NA
	Available	47.03	NA	47.03	47.03	NA	NA
Transitional Areas	Impacted	27.51	NA	NA	NA	NA	NA
	Available	166.61	NA	NA	NA	NA	NA
Undifferentiated Barren Lands	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	4.34	NA	NA	NA	NA	4.34
Phragmites Dominant Interior Wetlands	Impacted	0.00	NA	0.00	0.00	NA	NA
	Available	2.67	NA	2.67	2.67	NA	NA
Species Habitat Impacted (ac)			113.45	36.58	36.58	7.17	116.00
Species Habitat Available Overall (ac)			15,822.86	8,248.93	8,547.90	400.82	1,348.92
Percent Impacted Over Available			0.7170%	0.4435%	0.4280%	1.7888%	8.5994%
Percent Available, Not Impacted			99.2830%	99.5565%	99.5720%	98.2112%	91.4006%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (Ac)	*Podilymbus podiceps*	*Pooecetes gramineus*	*Strix varia*	*Atrytone arogos arogos*	*Bolaria selene myrina*
Cemetery	Impacted	0.00	NA	NA	NA	NA	NA
	Available	3.47	NA	NA	NA	NA	NA
Residential, High Density or Multiple Dwelling	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Rural, Single Unit	Impacted	0.00	NA	NA	NA	NA	NA
	Available	9.13	NA	NA	NA	NA	NA
Residential, Single Unit, Low Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.20	NA	NA	NA	NA	NA
Residential, Single Unit, Medium Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	1.05	NA	NA	NA	NA	NA
Commercial/Services	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.42	NA	NA	NA	NA	NA
Military Installations	Impacted	31.35	NA	NA	NA	NA	NA
	Available	3,132.47	NA	NA	NA	NA	NA
Transportation/Communication/Utilities	Impacted	1.36	NA	NA	NA	NA	NA
	Available	220.36	NA	NA	NA	NA	NA
Upland Right-of-Way Undeveloped	Impacted	0.00	NA	NA	NA	0.00	NA
	Available	81.09	NA	NA	NA	81.09	NA
Stormwater Basin	Impacted	0.00	NA	NA	NA	NA	NA
	Available	33.27	NA	NA	NA	NA	NA
Other Urban or Built-up Land	Impacted	16.61	NA	NA	NA	NA	NA
	Available	1,250.32	NA	NA	NA	NA	NA
Managed Wetland in Maintained Lawn Greenspace	Impacted	0.00	NA	NA	NA	NA	NA
	Available	4.17	NA	NA	NA	NA	NA
Athletic Fields (Schools)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	2.51	NA	NA	NA	NA	NA
Recreational Land	Impacted	114.81	NA	NA	NA	NA	NA
	Available	429.81	NA	NA	NA	NA	NA
Agricultural Wetlands (Modified)	Impacted	92.84	NA	NA	NA	NA	NA
	Available	93.97	NA	NA	NA	NA	NA
Cropland and Pastureland	Impacted	0.00	NA	0.00	NA	NA	NA
	Available	14.17	NA	14.17	NA	NA	NA
Deciduous Forest (10-50% Crown Closure)	Impacted	2.46	NA	NA	NA	NA	NA
	Available	297.32	NA	NA	NA	NA	NA
Deciduous Forest (>50% Crown Closure)	Impacted	39.15	NA	NA	39.15	NA	NA
	Available	1,522.35	NA	NA	1,522.35	NA	NA
Coniferous Forest (10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	3,476.78	NA	NA	NA	NA	NA
Coniferous Forest (>50% Crown Closure)	Impacted	7.15	NA	NA	7.15	NA	NA
	Available	6,216.02	NA	NA	6,216.02	NA	NA
Plantation	Impacted	10.95	NA	10.95	NA	NA	NA
	Available	341.48	NA	341.48	NA	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	209.19	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted	34.29	NA	NA	34.29	NA	NA
	Available	1,819.31	NA	NA	1,819.31	NA	NA
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	100.33	NA	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted	10.93	NA	NA	10.93	NA	NA
	Available	865.23	NA	NA	865.23	NA	NA
Old Field (< 25% Brush Covered)	Impacted	1.19	NA	1.19	NA	1.19	NA
	Available	830.21	NA	830.21	NA	830.21	NA
Deciduous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	78.60	NA	NA	NA	NA	NA
Coniferous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	679.92	NA	NA	NA	NA	NA
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted	5.77	NA	NA	NA	NA	NA
	Available	734.89	NA	NA	NA	NA	NA

Feature Description	Habitat Status	Area (Ac)	*Podilymbus podiceps*	*Pooecetes gramineus*	*Strix varia*	*Atrytone arogos arogos*	*Bolaria selene myrina*
Streams and Canals	Impacted	6.73	NA	NA	NA	NA	NA
	Available	452.34	NA	NA	NA	NA	NA
Natural Lakes	Impacted	0.00	0.00	NA	NA	NA	NA
	Available	4.54	4.54	NA	NA	NA	NA
Artificial Lakes	Impacted	7.17	7.17	NA	NA	NA	NA
	Available	396.28	396.28	NA	NA	NA	NA
Deciduous Wooded Wetlands	Impacted	9.80	9.80	NA	NA	NA	NA
	Available	2,334.37	2,334.37	NA	NA	NA	NA
Coniferous Wooded Wetlands	Impacted	0.00	0.00	NA	NA	NA	NA
	Available	1,607.30	1,607.30	NA	NA	NA	NA
Atlantic White Cedar Wetlands	Impacted	0.00	0.00	NA	NA	NA	NA
	Available	298.97	298.97	NA	NA	NA	NA
Deciduous Scrub/Shrub Wetlands	Impacted	0.00	0.00	NA	NA	NA	0.00
	Available	371.69	371.69	NA	NA	NA	371.69
Coniferous Scrub/Shrub Wetlands	Impacted	0.00		NA	NA	NA	0.00
	Available	292.71		NA	NA	NA	292.71
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted	0.00	0.00	NA	NA	NA	0.00
	Available	635.15	635.15	NA	NA	NA	635.15
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted	0.00	0.00	NA	NA	NA	0.00
	Available	101.91	101.91	NA	NA	NA	101.91
Herbaceous Wetlands	Impacted	0.74	0.74	NA	NA	NA	0.74
	Available	843.63	843.63	NA	NA	NA	843.63
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted	12.13	NA	NA	12.13	NA	NA
	Available	523.83	NA	NA	523.83	NA	NA
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted	0.00	NA	NA	0.00	NA	NA
	Available	635.50	NA	NA	635.50	NA	NA
Disturbed Wetlands (Modified)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	47.03	NA	NA	NA	NA	NA
Transitional Areas	Impacted	27.51	NA	NA	NA	NA	NA
	Available	166.61	NA	NA	NA	NA	NA
Undifferentiated Barren Lands	Impacted	0.00	NA	0.00	NA	NA	NA
	Available	4.34	NA	4.34	NA	NA	NA
Phragmites Dominant Interior Wetlands	Impacted	0.00	0.00	NA	NA	NA	NA
	Available	2.67	2.67	NA	NA	NA	NA
	Species Habitat Impacted (ac)		17.71	12.14	103.65	1.19	0.74
	Species Habitat Available Overall (ac)		6,596.50	1,190.20	11,582.23	911.30	2,245.08
	Percent Impacted Over Available		0.2685%	1.0201%	0.8949%	0.1303%	0.0331%
	Percent Available, Not Impacted		99.7315%	98.9799%	99.1051%	99.8697%	99.9669%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (Ac)	*Callophrys irus*	*Lynx rufus*	*Clemmys insculpta*	*Clemmys muhlenbergii*	*Crotalus horridus*
Cemetery	Impacted	0.00	NA	NA	NA	NA	NA
	Available	3.47	NA	NA	NA	NA	NA
Residential, High Density or Multiple Dwelling	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Rural, Single Unit	Impacted	0.00	NA	NA	NA	NA	NA
	Available	9.13	NA	NA	NA	NA	NA
Residential, Single Unit, Low Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.20	NA	NA	NA	NA	NA
Residential, Single Unit, Medium Density	Impacted	0.00	NA	NA	NA	NA	NA
	Available	1.05	NA	NA	NA	NA	NA
Commercial/Services	Impacted	0.00	NA	NA	NA	NA	NA
	Available	0.42	NA	NA	NA	NA	NA
Military Installations	Impacted	31.35	NA	NA	NA	NA	NA
	Available	3,132.47	NA	NA	NA	NA	NA
Transportation/Communication/Utilities	Impacted	1.36	NA	NA	NA	NA	NA
	Available	220.36	NA	NA	NA	NA	NA
Upland Right-of-Way Undeveloped	Impacted	0.00	0.00	NA	NA	NA	NA
	Available	81.09	81.09	NA	NA	NA	NA
Stormwater Basin	Impacted	0.00	NA	NA	NA	NA	NA
	Available	33.27	NA	NA	NA	NA	NA
Other Urban or Built-up Land	Impacted	16.61	NA	NA	NA	NA	NA
	Available	1,250.32	NA	NA	NA	NA	NA
Managed Wetland in Maintained Lawn Greenspace	Impacted	0.00	NA	NA	NA	NA	NA
	Available	4.17	NA	NA	NA	NA	NA
Athletic Fields (Schools)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	2.51	NA	NA	NA	NA	NA
Recreational Land	Impacted	114.81	NA	NA	NA	NA	NA
	Available	429.81	NA	NA	NA	NA	NA
Agricultural Wetlands (Modified)	Impacted	92.84	NA	NA	NA	NA	NA
	Available	93.97	NA	NA	NA	NA	NA
Cropland and Pastureland	Impacted	0.00	NA	0.00	NA	NA	NA
	Available	14.17	NA	14.17	NA	NA	NA
Deciduous Forest (10-50% Crown Closure)	Impacted	2.46	NA	NA	NA	NA	NA
	Available	297.32	NA	NA	NA	NA	NA
Deciduous Forest (>50% Crown Closure)	Impacted	39.15	NA	NA	NA	NA	NA
	Available	1,522.35	NA	NA	NA	NA	NA
Coniferous Forest (10-50% Crown Closure)	Impacted	0.00	NA	0.00	NA	NA	0.00
	Available	3,476.78	NA	3,476.78	NA	NA	3,476.78
Coniferous Forest (>50% Crown Closure)	Impacted	7.15	NA	7.15	NA	NA	7.15
	Available	6,216.02	NA	6,216.02	NA	NA	6,216.02
Plantation	Impacted	10.95	NA	NA	NA	NA	NA
	Available	341.48	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted	0.00	NA	0.00	NA	NA	0.00
	Available	209.19	NA	209.19	NA	NA	209.19
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted	34.29	NA	34.29	NA	NA	34.29
	Available	1,819.31	NA	1,819.31	NA	NA	1,819.31
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted	0.00	NA	0.00	NA	NA	0.00
	Available	100.33	NA	100.33	NA	NA	100.33
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted	10.93	NA	10.93	NA	NA	10.93
	Available	865.23	NA	865.23	NA	NA	865.23
Old Field (< 25% Brush Covered)	Impacted	1.19	1.19	NA	NA	NA	NA
	Available	830.21	830.21	NA	NA	NA	NA
Deciduous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	78.60	NA	NA	NA	NA	NA
Coniferous Brush/Shrubland	Impacted	0.00	NA	NA	NA	NA	NA
	Available	679.92	NA	NA	NA	NA	NA
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted	5.77	NA	NA	NA	NA	NA
	Available	734.89	NA	NA	NA	NA	NA

Feature Description	Habitat Status	Area (Ac)	*Callophrys irus*	*Lynx rufus*	*Clemmys insculpta*	*Clemmys muhlenbergii*	*Crotalus horridus*
Streams and Canals	Impacted	6.73	NA	NA	6.73	NA	NA
	Available	452.34	NA	NA	452.34	NA	NA
Natural Lakes	Impacted	0.00	NA	NA	0.00	NA	NA
	Available	4.54	NA	NA	4.54	NA	NA
Artificial Lakes	Impacted	7.17	NA	NA	NA	NA	NA
	Available	396.28	NA	NA	NA	NA	NA
Deciduous Wooded Wetlands	Impacted	9.80	NA	NA	9.80	NA	NA
	Available	2,334.37	NA	NA	2,334.37	NA	NA
Coniferous Wooded Wetlands	Impacted	0.00	NA	NA	0.00	NA	0.00
	Available	1,607.30	NA	NA	1,607.30	NA	1,607.30
Atlantic White Cedar Wetlands	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	298.97	NA	NA	NA	NA	298.97
Deciduous Scrub/Shrub Wetlands	Impacted	0.00	NA	NA	0.00	0.00	NA
	Available	371.69	NA	NA	371.69	371.69	NA
Coniferous Scrub/Shrub Wetlands	Impacted	0.00	NA	NA	0.00	0.00	NA
	Available	292.71	NA	NA	292.71	292.71	NA
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted	0.00	NA	NA	0.00	0.00	NA
	Available	635.15	NA	NA	635.15	635.15	NA
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted	0.00	NA	NA	0.00	0.00	NA
	Available	101.91	NA	NA	101.91	101.91	NA
Herbaceous Wetlands	Impacted	0.74	NA	NA	0.74	0.74	NA
	Available	843.63	NA	NA	843.63	843.63	NA
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted	12.13	NA	NA	12.13	NA	NA
	Available	523.83	NA	NA	523.83	NA	NA
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted	0.00	NA	NA	0.00	NA	0.00
	Available	635.50	NA	NA	635.50	NA	635.50
Disturbed Wetlands (Modified)	Impacted	0.00	NA	NA	NA	NA	NA
	Available	47.03	NA	NA	NA	NA	NA
Transitional Areas	Impacted	27.51	NA	NA	NA	NA	NA
	Available	166.61	NA	NA	NA	NA	NA
Undifferentiated Barren Lands	Impacted	0.00	NA	NA	NA	NA	NA
	Available	4.34	NA	NA	NA	NA	NA
Phragmites Dominant Interior Wetlands	Impacted	0.00	NA	NA	0.00	0.00	NA
	Available	2.67	NA	NA	2.67	2.67	NA
	Species Habitat Impacted (ac)		1.19	52.36	29.41	0.74	52.36
	Species Habitat Available Overall (ac)		911.30	12,701.03	7,805.62	2,247.75	15,228.62
	Percent Impacted Over Available		0.1303%	0.4123%	0.3768%	0.0330%	0.3438%
	Percent Available, Not Impacted		99.8697%	99.5877%	99.6232%	99.9670%	99.6562%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (Ac)	*Elaphe guttata*	*Pituophis m melanoleucus*
Cemetery	Impacted	0.00	NA	NA
	Available	3.47	NA	NA
Residential, High Density or Multiple Dwelling	Impacted	0.00	NA	NA
	Available	0.00	NA	NA
Residential, Rural, Single Unit	Impacted	0.00	NA	NA
	Available	9.13	NA	NA
Residential, Single Unit, Low Density	Impacted	0.00	NA	NA
	Available	0.20	NA	NA
Residential, Single Unit, Medium Density	Impacted	0.00	NA	NA
	Available	1.05	NA	NA
Commercial/Services	Impacted	0.00	NA	NA
	Available	0.42	NA	NA
Military Installations	Impacted	31.35	NA	NA
	Available	3,132.47	NA	NA
Transportation/Communication/Utilities	Impacted	1.36	NA	NA
	Available	220.36	NA	NA
Upland Right-of-Way Undeveloped	Impacted	0.00	NA	NA
	Available	81.09	NA	NA
Stormwater Basin	Impacted	0.00	NA	NA
	Available	33.27	NA	NA
Other Urban or Built-up Land	Impacted	16.61	NA	NA
	Available	1,250.32	NA	NA
Managed Wetland in Maintained Lawn Greenspace	Impacted	0.00	NA	NA
	Available	4.17	NA	NA
Athletic Fields (Schools)	Impacted	0.00	NA	NA
	Available	2.51	NA	NA
Recreational Land	Impacted	114.81	NA	NA
	Available	429.81	NA	NA
Agricultural Wetlands (Modified)	Impacted	92.84	NA	NA
	Available	93.97	NA	NA
Cropland and Pastureland	Impacted	0.00	NA	NA
	Available	14.17	NA	NA
Deciduous Forest (10-50% Crown Closure)	Impacted	2.46	NA	2.46
	Available	297.32	NA	297.32
Deciduous Forest (>50% Crown Closure)	Impacted	39.15	NA	NA
	Available	1,522.35	NA	NA
Coniferous Forest (10-50% Crown Closure)	Impacted	0.00	NA	0.00
	Available	3,476.78	NA	3,476.78
Coniferous Forest (>50% Crown Closure)	Impacted	7.15	7.15	NA
	Available	6,216.02	6,216.02	NA
Plantation	Impacted	10.95	NA	NA
	Available	341.48	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted	0.00	NA	0.00
	Available	209.19	NA	209.19
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted	34.29	34.29	NA
	Available	1,819.31	1,819.31	NA
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted	0.00	NA	0.00
	Available	100.33	NA	100.33
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted	10.93	NA	NA
	Available	865.23	NA	NA
Old Field (< 25% Brush Covered)	Impacted	1.19	NA	1.19
	Available	830.21	NA	830.21
Deciduous Brush/Shrubland	Impacted	0.00	NA	NA
	Available	78.60	NA	NA
Coniferous Brush/Shrubland	Impacted	0.00	NA	NA
	Available	679.92	NA	NA
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted	5.77	NA	NA
	Available	734.89	NA	NA

Feature Description	Habitat Status	Area (Ac)	*Elaphe guttata*	*Pituophis m melanoleucus*
Streams and Canals	Impacted	6.73	NA	NA
	Available	452.34	NA	NA
Natural Lakes	Impacted	0.00	NA	NA
	Available	4.54	NA	NA
Artificial Lakes	Impacted	7.17	NA	NA
	Available	396.28	NA	NA
Deciduous Wooded Wetlands	Impacted	9.80	NA	NA
	Available	2,334.37	NA	NA
Coniferous Wooded Wetlands	Impacted	0.00	0.00	NA
	Available	1,607.30	1,607.30	NA
Atlantic White Cedar Wetlands	Impacted	0.00	0.00	NA
	Available	298.97	298.97	NA
Deciduous Scrub/Shrub Wetlands	Impacted	0.00	NA	NA
	Available	371.69	NA	NA
Coniferous Scrub/Shrub Wetlands	Impacted	0.00	0.00	NA
	Available	292.71	292.71	NA
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted	0.00	NA	NA
	Available	635.15	NA	NA
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted	0.00	0.00	NA
	Available	101.91	101.91	NA
Herbaceous Wetlands	Impacted	0.74	NA	NA
	Available	843.63	NA	NA
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted	12.13	NA	NA
	Available	523.83	NA	NA
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted	0.00	0.00	NA
	Available	635.50	635.50	NA
Disturbed Wetlands (Modified)	Impacted	0.00	NA	NA
	Available	47.03	NA	NA
Transitional Areas	Impacted	27.51	NA	NA
	Available	166.61	NA	NA
Undifferentiated Barren Lands	Impacted	0.00	0.00	0.00
	Available	4.34	4.34	4.34
Phragmites Dominant Interior Wetlands	Impacted	0.00	NA	NA
	Available	2.67	NA	NA
	Species Habitat Impacted (ac)		41.44	3.65
	Species Habitat Available Overall (ac)		10,976.05	4,918.17
	Percent Impacted Over Available		0.3775%	0.0742%
	Percent Available, Not Impacted		99.6225%	99.9258%

Notes:
ac = acres
NA = not applicable

Table B-3. Spatial Exposure Potential of Protected Species at Lakehurst of Joint Base McGuire-Dix-Lakehurst

Feature Description	Habitat Status	Area (Ac)	*Clemmy guttata*	*Pseudemys rubriventris* (Juvenile)	*Pseudemys rubriventris* (Adult)	*Hyla andersonii*	*Hyla chrysocelis*
Cemetery	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, High Density or Multiple Dwelling	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	20.73	NA	NA	NA	NA	NA
Residential, Rural, Single Unit	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Low Density	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Medium Density	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Commercial/Services	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	2.62	NA	NA	NA	NA	NA
Military Installations	Impacted (AFFF Drainage)	72.52	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	22.07	NA	NA	NA	NA	NA
	Available	903.70	NA	NA	NA	NA	NA
Transportation/Communication/Utilities	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	2.43	NA	NA	NA	NA	NA
Upland Right-of-Way Undeveloped	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	3.42	NA	NA	NA	NA	NA
Stormwater Basin	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	0.00
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	0.00
	Available	23.49	NA	NA	NA	NA	23.49
Other Urban or Built-up Land	Impacted (AFFF Drainage)	67.20	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	8.22	NA	NA	NA	NA	NA
	Available	1,729.81	NA	NA	NA	NA	NA
Managed Wetland in Maintained Lawn Greenspace	Impacted (AFFF Drainage)	0.04	NA	0.04	NA	NA	0.04
	Impacted (AFFF Area)	0.00	NA	0.00	NA	NA	0.00
	Available	10.38	NA	10.38	NA	NA	10.38
Athletic Fields (Schools)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Recreational Land	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	82.29	NA	NA	NA	NA	NA
Agricultural Wetlands (Modified)	Impacted (AFFF Drainage)	0.00	NA	0.00	NA	NA	0.00
	Impacted (AFFF Area)	0.00	NA	0.00	NA	NA	0.00
	Available	0.00	NA	0.00	NA	NA	0.00
Cropland and Pastureland	Impacted (AFFF Drainage)	0.00	NA	0.00	NA	NA	0.00
	Impacted (AFFF Area)	0.00	NA	0.00	NA	NA	0.00
	Available	0.00	NA	0.00	NA	NA	0.00
Deciduous Forest (10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.73	NA	NA	NA	NA	NA
Deciduous Forest (>50% Crown Closure)	Impacted (AFFF Drainage)	0.01	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.01	NA	NA	NA	NA	NA
	Available	146.32	NA	NA	NA	NA	NA
Coniferous Forest (10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	184.15	NA	NA	NA	NA	NA

Feature Description	Habitat Status	Area (Ac)	*Clemmy guttata*	*Pseudemys rubriventris* (Juvenile)	*Pseudemys rubriventris* (Adult)	*Hyla andersonii*	*Hyla chrysocelis*
Coniferous Forest (>50% Crown Closure)	Impacted (AFFF Drainage)	45.67	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.01	NA	NA	NA	NA	NA
	Available	1,381.20	NA	NA	NA	NA	NA
Plantation	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	104.26	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	10.91	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted (AFFF Drainage)	15.12	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.01	NA	NA	NA	NA	NA
	Available	904.40	NA	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	14.62	NA	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted (AFFF Drainage)	1.32	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.06	NA	NA	NA	NA	NA
	Available	375.12	NA	NA	NA	NA	NA
Old Field (< 25% Brush Covered)	Impacted (AFFF Drainage)	0.30	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.06	NA	NA	NA	NA	NA
	Available	124.81	NA	NA	NA	NA	NA
Deciduous Brush/Shrubland	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	1.15	NA	NA	NA	NA	NA
Coniferous Brush/Shrubland	Impacted (AFFF Drainage)	5.44	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	200.94	NA	NA	NA	NA	NA
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted (AFFF Drainage)	3.82	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.10	NA	NA	NA	NA	NA
	Available	80.91	NA	NA	NA	NA	NA
Streams and Canals	Impacted (AFFF Drainage)	4.45	4.45	NA	4.45	NA	NA
	Impacted (AFFF Area)	0.00	0.00	NA	0.00	NA	NA
	Available	67.79	67.79	NA	67.79	NA	NA
Natural Lakes	Impacted (AFFF Drainage)	0.00	0.00	0.00	0.00	NA	NA
	Impacted (AFFF Area)	0.00	0.00	0.00	0.00	NA	NA
	Available	0.95	0.95	0.95	0.95	NA	NA
Artificial Lakes	Impacted (AFFF Drainage)	0.07	0.07	0.07	0.07	NA	NA
	Impacted (AFFF Area)	0.00	0.00	0.00	0.00	NA	NA
	Available	91.55	91.55	91.55	91.55	NA	NA
Deciduous Wooded Wetlands	Impacted (AFFF Drainage)	2.58	2.58	2.58	NA	NA	2.58
	Impacted (AFFF Area)	0.00	0.00	0.00	NA	NA	0.00
	Available	63.59	63.59	63.59	NA	NA	63.59
Coniferous Wooded Wetlands	Impacted (AFFF Drainage)	2.06	2.06	2.06	NA	2.06	2.06
	Impacted (AFFF Area)	0.00	0.00	0.00	NA	0.00	0.00
	Available	289.14	289.14	289.14	NA	289.14	289.14
Atlantic White Cedar Wetlands	Impacted (AFFF Drainage)	0.00	0.00	0.00	NA	0.00	0.00
	Impacted (AFFF Area)	0.00	0.00	0.00	NA	0.00	0.00
	Available	109.14	109.14	109.14	NA	109.14	109.14
Deciduous Scrub/Shrub Wetlands	Impacted (AFFF Drainage)	3.34	3.34	3.34	NA	3.34	3.34
	Impacted (AFFF Area)	0.00	0.00	0.00	NA	0.00	0.00
	Available	83.03	83.03	83.03	NA	83.03	83.03
Coniferous Scrub/Shrub Wetlands	Impacted (AFFF Drainage)	0.00	0.00	0.00	NA	0.00	0.00
	Impacted (AFFF Area)	0.00	0.00	0.00	NA	0.00	0.00
	Available	51.98	51.98	51.98	NA	51.98	51.98
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted (AFFF Drainage)	0.65	0.65	0.65	NA	0.65	0.65
	Impacted (AFFF Area)	0.00	0.00	0.00	NA	0.00	0.00
	Available	60.14	60.14	60.14	NA	60.14	60.14

Feature Description	Habitat Status	Area (Ac)	*Clemmy guttata*	*Pseudemys rubriventris* (Juvenile)	*Pseudemys rubriventris* (Adult)	*Hyla andersonii*	*Hyla chrysocelis*
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted (AFFF Drainage)	0.00	0.00	0.00	NA	0.00	0.00
	Impacted (AFFF Area)	0.00	0.00	0.00	NA	0.00	0.00
	Available	63.10	63.10	63.10	NA	63.10	63.10
Herbaceous Wetlands	Impacted (AFFF Drainage)	0.00	0.00	0.00	NA	0.00	0.00
	Impacted (AFFF Area)	0.00	0.00	0.00	NA	0.00	0.00
	Available	21.06	21.06	21.06	NA	21.06	21.06
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted (AFFF Drainage)	1.44	1.44	1.44	NA	1.44	1.44
	Impacted (AFFF Area)	0.00	0.00	0.00	NA	0.00	0.00
	Available	47.03	47.03	47.03	NA	47.03	47.03
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted (AFFF Drainage)	0.00	0.00	0.00	NA	0.00	0.00
	Impacted (AFFF Area)	0.00	0.00	0.00	NA	0.00	0.00
	Available	78.97	78.97	78.97	NA	78.97	78.97
Disturbed Wetlands (Modified)	Impacted (AFFF Drainage)	0.51	NA	0.51	NA	NA	0.51
	Impacted (AFFF Area)	0.28	NA	0.28	NA	NA	0.28
	Available	32.13	NA	32.13	NA	NA	32.13
Transitional Areas	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	14.34	NA	NA	NA	NA	NA
Undifferentiated Barren Lands	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	34.78	NA	NA	NA	NA	NA
Phragmites Dominant Interior Wetlands	Impacted (AFFF Drainage)	0.38	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	7.23	NA	NA	NA	NA	NA
Species Habitat Impacted, AFFF Drainage (ac)			14.58	10.68	4.52	7.49	10.61
Species Habitat Impacted, AFFF Area (ac)			0.00	0.28	0.00	0.00	0.28
Species Habitat Available Overall (ac)			1,027.47	1,002.20	160.29	803.60	933.19
Percent Impacted Over Available, AFFF Drainage			1.4190%	1.0660%	2.8169%	0.9317%	1.1374%
Percent Impacted Over Available, AFFF Area			0.0000%	0.0279%	0.0000%	0.0000%	0.0300%
Percent Available, Not Impacted			98.5810%	98.9061%	97.1831%	99.0683%	98.8326%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (Ac)	*Pseudotriton montanus*	*Accipiter gentilis*	*Ammodramus henslowii*	*Ammodramus savannarum*	*Asio flammeus*
Cemetery	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	0.00
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	0.00
	Available	0.00	NA	NA	NA	NA	0.00
Residential, High Density or Multiple Dwelling	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	20.73	NA	NA	NA	NA	NA
Residential, Rural, Single Unit	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Low Density	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Medium Density	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Commercial/Services	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	2.62	NA	NA	NA	NA	NA
Military Installations	Impacted (AFFF Drainage)	72.52	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	22.07	NA	NA	NA	NA	NA
	Available	903.70	NA	NA	NA	NA	NA
Transportation/Communication/Utilities	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	2.43	NA	NA	NA	NA	NA
Upland Right-of-Way Undeveloped	Impacted (AFFF Drainage)	0.00	NA	NA	0.00	0.00	NA
	Impacted (AFFF Area)	0.00	NA	NA	0.00	0.00	NA
	Available	3.42	NA	NA	3.42	3.42	NA
Stormwater Basin	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	23.49	NA	NA	NA	NA	NA
Other Urban or Built-up Land	Impacted (AFFF Drainage)	67.20	NA	NA	NA	NA	67.20
	Impacted (AFFF Area)	8.22	NA	NA	NA	NA	8.22
	Available	1,729.81	NA	NA	NA	NA	1,729.81
Managed Wetland in Maintained Lawn Greenspace	Impacted (AFFF Drainage)	0.04	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	10.38	NA	NA	NA	NA	NA
Athletic Fields (Schools)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Recreational Land	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	82.29	NA	NA	NA	NA	NA
Agricultural Wetlands (Modified)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Cropland and Pastureland	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	0.00
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	0.00
	Available	0.00	NA	NA	NA	NA	0.00
Deciduous Forest (10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.73	NA	NA	NA	NA	NA
Deciduous Forest (>50% Crown Closure)	Impacted (AFFF Drainage)	0.01	NA	0.01	NA	NA	NA
	Impacted (AFFF Area)	0.01	NA	0.01	NA	NA	NA
	Available	146.32	NA	146.32	NA	NA	NA
Coniferous Forest (10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	184.15	NA	NA	NA	NA	NA

Feature Description	Habitat Status	Area (Ac)	*Pseudotriton montanus*	*Accipiter gentilis*	*Ammodramus henslowii*	*Ammodramus savannarum*	*Asio flammeus*
Coniferous Forest (>50% Crown Closure)	Impacted (AFFF Drainage)	45.67	NA	45.67	NA	NA	NA
	Impacted (AFFF Area)	0.01	NA	0.01	NA	NA	NA
	Available	1,381.20	NA	1,381.20	NA	NA	NA
Plantation	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	104.26	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	10.91	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted (AFFF Drainage)	15.12	NA	15.12	NA	NA	NA
	Impacted (AFFF Area)	0.01	NA	0.01	NA	NA	NA
	Available	904.40	NA	904.40	NA	NA	NA
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	14.62	NA	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted (AFFF Drainage)	1.32	NA	1.32	NA	NA	NA
	Impacted (AFFF Area)	0.06	NA	0.06	NA	NA	NA
	Available	375.12	NA	375.12	NA	NA	NA
Old Field (< 25% Brush Covered)	Impacted (AFFF Drainage)	0.30	NA	NA	0.30	0.30	0.30
	Impacted (AFFF Area)	0.06	NA	NA	0.06	0.06	0.06
	Available	124.81	NA	NA	124.81	124.81	124.81
Deciduous Brush/Shrubland	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	1.15	NA	NA	NA	NA	NA
Coniferous Brush/Shrubland	Impacted (AFFF Drainage)	5.44	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	200.94	NA	NA	NA	NA	NA
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted (AFFF Drainage)	3.82	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.10	NA	NA	NA	NA	NA
	Available	80.91	NA	NA	NA	NA	NA
Streams and Canals	Impacted (AFFF Drainage)	4.45	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	67.79	NA	NA	NA	NA	NA
Natural Lakes	Impacted (AFFF Drainage)	0.00	0.00	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	0.00	NA	NA	NA	NA
	Available	0.95	0.95	NA	NA	NA	NA
Artificial Lakes	Impacted (AFFF Drainage)	0.07	0.07	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	0.00	NA	NA	NA	NA
	Available	91.55	91.55	NA	NA	NA	NA
Deciduous Wooded Wetlands	Impacted (AFFF Drainage)	2.58	NA	2.58	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	0.00	NA	NA	NA
	Available	63.59	NA	63.59	NA	NA	NA
Coniferous Wooded Wetlands	Impacted (AFFF Drainage)	2.06	NA	2.06	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	0.00	NA	NA	NA
	Available	289.14	NA	289.14	NA	NA	NA
Atlantic White Cedar Wetlands	Impacted (AFFF Drainage)	0.00	0.00	0.00	NA	NA	NA
	Impacted (AFFF Area)	0.00	0.00	0.00	NA	NA	NA
	Available	109.14	109.14	109.14	NA	NA	NA
Deciduous Scrub/Shrub Wetlands	Impacted (AFFF Drainage)	3.34	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	83.03	NA	NA	NA	NA	NA
Coniferous Scrub/Shrub Wetlands	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	51.98	NA	NA	NA	NA	NA
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted (AFFF Drainage)	0.65	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	60.14	NA	NA	NA	NA	NA

Feature Description	Habitat Status	Area (Ac)	*Pseudotriton montanus*	*Accipiter gentilis*	*Ammodramus henslowii*	*Ammodramus savannarum*	*Asio flammeus*
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	63.10	NA	NA	NA	NA	NA
Herbaceous Wetlands	Impacted (AFFF Drainage)	0.00	0.00	NA	0.00	NA	NA
	Impacted (AFFF Area)	0.00	0.00	NA	0.00	NA	NA
	Available	21.06	21.06	NA	21.06	NA	NA
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted (AFFF Drainage)	1.44	NA	1.44	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	0.00	NA	NA	NA
	Available	47.03	NA	47.03	NA	NA	NA
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted (AFFF Drainage)	0.00	NA	0.00	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	0.00	NA	NA	NA
	Available	78.97	NA	78.97	NA	NA	NA
Disturbed Wetlands (Modified)	Impacted (AFFF Drainage)	0.51	0.51	NA	NA	NA	NA
	Impacted (AFFF Area)	0.28	0.28	NA	NA	NA	NA
	Available	32.13	32.13	NA	NA	NA	NA
Transitional Areas	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	14.34	NA	NA	NA	NA	NA
Undifferentiated Barren Lands	Impacted (AFFF Drainage)	0.00	NA	NA	0.00	0.00	NA
	Impacted (AFFF Area)	0.00	NA	NA	0.00	0.00	NA
	Available	34.78	NA	NA	34.78	34.78	NA
Phragmites Dominant Interior Wetlands	Impacted (AFFF Drainage)	0.38	NA	NA	NA	NA	0.38
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	0.00
	Available	7.23	NA	NA	NA	NA	7.23
Species Habitat Impacted, AFFF Drainage (ac)			0.57	68.21	0.30	0.30	67.88
Species Habitat Impacted, AFFF Area (ac)			0.28	0.09	0.06	0.06	8.28
Species Habitat Available Overall (ac)			254.83	3,394.91	184.07	163.01	1,861.84
Percent Impacted Over Available, AFFF Drainage			0.2253%	2.0091%	0.1646%	0.1859%	3.6459%
Percent Impacted Over Available, AFFF Area			0.1099%	0.0027%	0.0327%	0.0369%	0.4446%
Percent Available, Not Impacted			99.6648%	97.9882%	99.8027%	99.7772%	95.9094%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (Ac)	*Asio otus*	*Batramia longicauda*	*Botaurus lentiginosos*	*Buteo lineatus*	*Circus cyaneus*
Cemetery	Impacted (AFFF Drainage)	0.00	0.00	0.00	NA	NA	0.00
	Impacted (AFFF Area)	0.00	0.00	0.00	NA	NA	0.00
	Available	0.00	0.00	0.00	NA	NA	0.00
Residential, High Density or Multiple Dwelling	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	20.73	NA	NA	NA	NA	NA
Residential, Rural, Single Unit	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Low Density	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Medium Density	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Commercial/Services	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	2.62	NA	NA	NA	NA	NA
Military Installations	Impacted (AFFF Drainage)	72.52	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	22.07	NA	NA	NA	NA	NA
	Available	903.70	NA	NA	NA	NA	NA
Transportation/Communication/Utilities	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	2.43	NA	NA	NA	NA	NA
Upland Right-of-Way Undeveloped	Impacted (AFFF Drainage)	0.00	NA	0.00	NA	NA	0.00
	Impacted (AFFF Area)	0.00	NA	0.00	NA	NA	0.00
	Available	3.42	NA	3.42	NA	NA	3.42
Stormwater Basin	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	23.49	NA	NA	NA	NA	NA
Other Urban or Built-up Land	Impacted (AFFF Drainage)	67.20	NA	NA	NA	NA	67.20
	Impacted (AFFF Area)	8.22	NA	NA	NA	NA	8.22
	Available	1,729.81	NA	NA	NA	NA	1,729.81
Managed Wetland in Maintained Lawn Greenspace	Impacted (AFFF Drainage)	0.04	NA	NA	NA	NA	0.04
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	0.00
	Available	10.38	NA	NA	NA	NA	10.38
Athletic Fields (Schools)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	0.00
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	0.00
	Available	0.00	NA	NA	NA	NA	0.00
Recreational Land	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	82.29	NA	NA	NA	NA	NA
Agricultural Wetlands (Modified)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	0.00
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	0.00
	Available	0.00	NA	NA	NA	NA	0.00
Cropland and Pastureland	Impacted (AFFF Drainage)	0.00	0.00	0.00	NA	NA	0.00
	Impacted (AFFF Area)	0.00	0.00	0.00	NA	NA	0.00
	Available	0.00	0.00	0.00	NA	NA	0.00
Deciduous Forest (10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	0.00	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	0.00	NA	NA	NA	NA
	Available	0.73	0.73	NA	NA	NA	NA
Deciduous Forest (>50% Crown Closure)	Impacted (AFFF Drainage)	0.01	0.01	NA	NA	0.01	NA
	Impacted (AFFF Area)	0.01	0.01	NA	NA	0.01	NA
	Available	146.32	146.32	NA	NA	146.32	NA
Coniferous Forest (10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	0.00	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	0.00	NA	NA	NA	NA
	Available	184.15	184.15	NA	NA	NA	NA

Feature Description	Habitat Status	Area (Ac)	*Asio otus*	*Batramia longicauda*	*Botaurus lentiginosos*	*Buteo lineatus*	*Circus cyaneus*
Coniferous Forest (>50% Crown Closure)	Impacted (AFFF Drainage)	45.67	45.67	NA	NA	45.67	NA
	Impacted (AFFF Area)	0.01	0.01	NA	NA	0.01	NA
	Available	1,381.20	1,381.20	NA	NA	1,381.20	NA
Plantation	Impacted (AFFF Drainage)	0.00	NA	0.00	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	0.00	NA	NA	NA
	Available	104.26	NA	104.26	NA	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	0.00	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	0.00	NA	NA	NA	NA
	Available	10.91	10.91	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted (AFFF Drainage)	15.12	15.12	NA	NA	15.12	NA
	Impacted (AFFF Area)	0.01	0.01	NA	NA	0.01	NA
	Available	904.40	904.40	NA	NA	904.40	NA
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	0.00	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	0.00	NA	NA	NA	NA
	Available	14.62	14.62	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted (AFFF Drainage)	1.32	1.32	NA	NA	1.32	NA
	Impacted (AFFF Area)	0.06	0.06	NA	NA	0.06	NA
	Available	375.12	375.12	NA	NA	375.12	NA
Old Field (< 25% Brush Covered)	Impacted (AFFF Drainage)	0.30	0.30	0.30	NA	NA	0.30
	Impacted (AFFF Area)	0.06	0.06	0.06	NA	NA	0.06
	Available	124.81	124.81	124.81	NA	NA	124.81
Deciduous Brush/Shrubland	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	1.15	NA	NA	NA	NA	NA
Coniferous Brush/Shrubland	Impacted (AFFF Drainage)	5.44	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	200.94	NA	NA	NA	NA	NA
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted (AFFF Drainage)	3.82	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.10	NA	NA	NA	NA	NA
	Available	80.91	NA	NA	NA	NA	NA
Streams and Canals	Impacted (AFFF Drainage)	4.45	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	67.79	NA	NA	NA	NA	NA
Natural Lakes	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.95	NA	NA	NA	NA	NA
Artificial Lakes	Impacted (AFFF Drainage)	0.07	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	91.55	NA	NA	NA	NA	NA
Deciduous Wooded Wetlands	Impacted (AFFF Drainage)	2.58	NA	NA	NA	2.58	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	0.00	NA
	Available	63.59	NA	NA	NA	63.59	NA
Coniferous Wooded Wetlands	Impacted (AFFF Drainage)	2.06	NA	NA	NA	2.06	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	0.00	NA
	Available	289.14	NA	NA	NA	289.14	NA
Atlantic White Cedar Wetlands	Impacted (AFFF Drainage)	0.00	NA	NA	NA	0.00	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	0.00	NA
	Available	109.14	NA	NA	NA	109.14	NA
Deciduous Scrub/Shrub Wetlands	Impacted (AFFF Drainage)	3.34	NA	NA	3.34	NA	3.34
	Impacted (AFFF Area)	0.00	NA	NA	0.00	NA	0.00
	Available	83.03	NA	NA	83.03	NA	83.03
Coniferous Scrub/Shrub Wetlands	Impacted (AFFF Drainage)	0.00	NA	NA	0.00	NA	0.00
	Impacted (AFFF Area)	0.00	NA	NA	0.00	NA	0.00
	Available	51.98	NA	NA	51.98	NA	51.98
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted (AFFF Drainage)	0.65	NA	NA	0.65	NA	0.65
	Impacted (AFFF Area)	0.00	NA	NA	0.00	NA	0.00
	Available	60.14	NA	NA	60.14	NA	60.14

Feature Description	Habitat Status	Area (Ac)	*Asio otus*	*Batramia longicauda*	*Botaurus lentiginosos*	*Buteo lineatus*	*Circus cyaneus*
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted (AFFF Drainage)	0.00	NA	NA	0.00	NA	0.00
	Impacted (AFFF Area)	0.00	NA	NA	0.00	NA	0.00
	Available	63.10	NA	NA	63.10	NA	63.10
Herbaceous Wetlands	Impacted (AFFF Drainage)	0.00	NA	NA	0.00	NA	0.00
	Impacted (AFFF Area)	0.00	NA	NA	0.00	NA	0.00
	Available	21.06	NA	NA	21.06	NA	21.06
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted (AFFF Drainage)	1.44	NA	NA	NA	1.44	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	0.00	NA
	Available	47.03	NA	NA	NA	47.03	NA
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	0.00	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	0.00	NA
	Available	78.97	NA	NA	NA	78.97	NA
Disturbed Wetlands (Modified)	Impacted (AFFF Drainage)	0.51	NA	NA	0.51	NA	NA
	Impacted (AFFF Area)	0.28	NA	NA	0.28	NA	NA
	Available	32.13	NA	NA	32.13	NA	NA
Transitional Areas	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	0.00
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	0.00
	Available	14.34	NA	NA	NA	NA	14.34
Undifferentiated Barren Lands	Impacted (AFFF Drainage)	0.00	0.00	0.00	NA	NA	0.00
	Impacted (AFFF Area)	0.00	0.00	0.00	NA	NA	0.00
	Available	34.78	34.78	34.78	NA	NA	34.78
Phragmites Dominant Interior Wetlands	Impacted (AFFF Drainage)	0.38	NA	NA	NA	NA	0.38
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	0.00
	Available	7.23	NA	NA	NA	NA	7.23
Species Habitat Impacted, AFFF Drainage (ac)			62.43	0.30	4.49	68.21	71.91
Species Habitat Impacted, AFFF Area (ac)			0.15	0.06	0.28	0.09	8.28
Species Habitat Available Overall (ac)			3,177.04	267.27	311.44	3,394.91	2,204.07
Percent Impacted Over Available, AFFF Drainage			1.9652%	0.1134%	1.4426%	2.0091%	3.2628%
Percent Impacted Over Available, AFFF Area			0.0048%	0.0225%	0.0899%	0.0027%	0.3756%
Percent Available, Not Impacted			98.0301%	99.8641%	98.4675%	97.9882%	96.3616%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (Ac)	*Cistothorus platensis*	*Dolichonyx oryzivorus*	*Falco sparverius*	*Haliaeetus leucocephalus*	*Lanius ludovicianus*
Cemetery	Impacted (AFFF Drainage)	0.00	NA	NA	0.00	NA	0.00
	Impacted (AFFF Area)	0.00	NA	NA	0.00	NA	0.00
	Available	0.00	NA	NA	0.00	NA	0.00
Residential, High Density or Multiple Dwelling	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	20.73	NA	NA	NA	NA	NA
Residential, Rural, Single Unit	Impacted (AFFF Drainage)	0.00	NA	NA	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	0.00	NA	NA
	Available	0.00	NA	NA	0.00	NA	NA
Residential, Single Unit, Low Density	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Medium Density	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Commercial/Services	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	2.62	NA	NA	NA	NA	NA
Military Installations	Impacted (AFFF Drainage)	72.52	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	22.07	NA	NA	NA	NA	NA
	Available	903.70	NA	NA	NA	NA	NA
Transportation/Communication/Utilities	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	2.43	NA	NA	NA	NA	NA
Upland Right-of-Way Undeveloped	Impacted (AFFF Drainage)	0.00	NA	NA	0.00	NA	0.00
	Impacted (AFFF Area)	0.00	NA	NA	0.00	NA	0.00
	Available	3.42	NA	NA	3.42	NA	3.42
Stormwater Basin	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	23.49	NA	NA	NA	NA	NA
Other Urban or Built-up Land	Impacted (AFFF Drainage)	67.20	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	8.22	NA	NA	NA	NA	NA
	Available	1,729.81	NA	NA	NA	NA	NA
Managed Wetland in Maintained Lawn Greenspace	Impacted (AFFF Drainage)	0.04	NA	NA	0.04	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	0.00	NA	NA
	Available	10.38	NA	NA	10.38	NA	NA
Athletic Fields (Schools)	Impacted (AFFF Drainage)	0.00	NA	NA	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	0.00	NA	NA
	Available	0.00	NA	NA	0.00	NA	NA
Recreational Land	Impacted (AFFF Drainage)	0.00	NA	NA	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	0.00	NA	NA
	Available	82.29	NA	NA	82.29	NA	NA
Agricultural Wetlands (Modified)	Impacted (AFFF Drainage)	0.00	NA	0.00	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	0.00	0.00	NA	NA
	Available	0.00	NA	0.00	0.00	NA	NA
Cropland and Pastureland	Impacted (AFFF Drainage)	0.00	NA	0.00	0.00	NA	0.00
	Impacted (AFFF Area)	0.00	NA	0.00	0.00	NA	0.00
	Available	0.00	NA	0.00	0.00	NA	0.00
Deciduous Forest (10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.73	NA	NA	NA	NA	NA
Deciduous Forest (>50% Crown Closure)	Impacted (AFFF Drainage)	0.01	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.01	NA	NA	NA	NA	NA
	Available	146.32	NA	NA	NA	NA	NA
Coniferous Forest (10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	184.15	NA	NA	NA	NA	NA

Feature Description	Habitat Status	Area (Ac)	*Cistothorus platensis*	*Dolichonyx oryzivorus*	*Falco sparverius*	*Haliaeetus leucocephalus*	*Lanius ludovicianus*
Coniferous Forest (>50% Crown Closure)	Impacted (AFFF Drainage)	45.67	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.01	NA	NA	NA	NA	NA
	Available	1,381.20	NA	NA	NA	NA	NA
Plantation	Impacted (AFFF Drainage)	0.00	NA	NA	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	0.00	NA	NA
	Available	104.26	NA	NA	104.26	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	10.91	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted (AFFF Drainage)	15.12	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.01	NA	NA	NA	NA	NA
	Available	904.40	NA	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	14.62	NA	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted (AFFF Drainage)	1.32	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.06	NA	NA	NA	NA	NA
	Available	375.12	NA	NA	NA	NA	NA
Old Field (< 25% Brush Covered)	Impacted (AFFF Drainage)	0.30	NA	0.30	0.30	NA	0.30
	Impacted (AFFF Area)	0.06	NA	0.06	0.06	NA	0.06
	Available	124.81	NA	124.81	124.81	NA	124.81
Deciduous Brush/Shrubland	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	0.00
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	0.00
	Available	1.15	NA	NA	NA	NA	1.15
Coniferous Brush/Shrubland	Impacted (AFFF Drainage)	5.44	NA	NA	NA	NA	5.44
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	0.00
	Available	200.94	NA	NA	NA	NA	200.94
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted (AFFF Drainage)	3.82	NA	NA	NA	NA	3.82
	Impacted (AFFF Area)	0.10	NA	NA	NA	NA	0.10
	Available	80.91	NA	NA	NA	NA	80.91
Streams and Canals	Impacted (AFFF Drainage)	4.45	NA	NA	NA	4.45	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	0.00	NA
	Available	67.79	NA	NA	NA	67.79	NA
Natural Lakes	Impacted (AFFF Drainage)	0.00	NA	NA	NA	0.00	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	0.00	NA
	Available	0.95	NA	NA	NA	0.95	NA
Artificial Lakes	Impacted (AFFF Drainage)	0.07	NA	NA	NA	0.07	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	0.00	NA
	Available	91.55	NA	NA	NA	91.55	NA
Deciduous Wooded Wetlands	Impacted (AFFF Drainage)	2.58	NA	NA	NA	2.58	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	0.00	NA
	Available	63.59	NA	NA	NA	63.59	NA
Coniferous Wooded Wetlands	Impacted (AFFF Drainage)	2.06	NA	NA	NA	2.06	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	0.00	NA
	Available	289.14	NA	NA	NA	289.14	NA
Atlantic White Cedar Wetlands	Impacted (AFFF Drainage)	0.00	NA	NA	NA	0.00	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	0.00	NA
	Available	109.14	NA	NA	NA	109.14	NA
Deciduous Scrub/Shrub Wetlands	Impacted (AFFF Drainage)	3.34	3.34	NA	NA	3.34	3.34
	Impacted (AFFF Area)	0.00	0.00	NA	NA	0.00	0.00
	Available	83.03	83.03	NA	NA	83.03	83.03
Coniferous Scrub/Shrub Wetlands	Impacted (AFFF Drainage)	0.00	0.00	NA	NA	0.00	0.00
	Impacted (AFFF Area)	0.00	0.00	NA	NA	0.00	0.00
	Available	51.98	51.98	NA	NA	51.98	51.98
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted (AFFF Drainage)	0.65	NA	NA	NA	0.65	0.65
	Impacted (AFFF Area)	0.00	NA	NA	NA	0.00	0.00
	Available	60.14	NA	NA	NA	60.14	60.14

Feature Description	Habitat Status	Area (Ac)	*Cistothorus platensis*	*Dolichonyx oryzivorus*	*Falco sparverius*	*Haliaeetus leucocephalus*	*Lanius ludovicianus*
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	0.00	0.00
	Impacted (AFFF Area)	0.00	NA	NA	NA	0.00	0.00
	Available	63.10	NA	NA	NA	63.10	63.10
Herbaceous Wetlands	Impacted (AFFF Drainage)	0.00	0.00	NA	NA	0.00	NA
	Impacted (AFFF Area)	0.00	0.00	NA	NA	0.00	NA
	Available	21.06	21.06	NA	NA	21.06	NA
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted (AFFF Drainage)	1.44	NA	NA	NA	1.44	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	0.00	NA
	Available	47.03	NA	NA	NA	47.03	NA
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	0.00	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	0.00	NA
	Available	78.97	NA	NA	NA	78.97	NA
Disturbed Wetlands (Modified)	Impacted (AFFF Drainage)	0.51	0.51	NA	NA	0.51	0.51
	Impacted (AFFF Area)	0.28	0.28	NA	NA	0.28	0.28
	Available	32.13	32.13	NA	NA	32.13	32.13
Transitional Areas	Impacted (AFFF Drainage)	0.00	NA	NA	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	0.00	NA	NA
	Available	14.34	NA	NA	14.34	NA	NA
Undifferentiated Barren Lands	Impacted (AFFF Drainage)	0.00	NA	0.00	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	0.00	0.00	NA	NA
	Available	34.78	NA	34.78	34.78	NA	NA
Phragmites Dominant Interior Wetlands	Impacted (AFFF Drainage)	0.38	NA	NA	NA	0.38	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	0.00	NA
	Available	7.23	NA	NA	NA	7.23	NA
Species Habitat Impacted, AFFF Drainage (ac)			3.84	0.30	0.35	15.47	14.06
Species Habitat Impacted, AFFF Area (ac)			0.28	0.06	0.06	0.28	0.44
Species Habitat Available Overall (ac)			188.20	159.59	374.27	1,066.83	701.59
Percent Impacted Over Available, AFFF Drainage			2.0414%	0.1899%	0.0928%	1.4497%	2.0038%
Percent Impacted Over Available, AFFF Area			0.1488%	0.0377%	0.0161%	0.0263%	0.0627%
Percent Available, Not Impacted			97.8098%	99.7724%	99.8912%	98.5240%	97.9335%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (Ac)	*Melanerpes erythrocephalus*	*Nyctanassa violaceus*	*Nycticorax nycticorax*	*Pandion haliaetus*	*Passerculus sandwichensis*
Cemetery	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	0.00
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	0.00
	Available	0.00	NA	NA	NA	NA	0.00
Residential, High Density or Multiple Dwelling	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	20.73	NA	NA	NA	NA	NA
Residential, Rural, Single Unit	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Low Density	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Medium Density	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Commercial/Services	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	2.62	NA	NA	NA	NA	NA
Military Installations	Impacted (AFFF Drainage)	72.52	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	22.07	NA	NA	NA	NA	NA
	Available	903.70	NA	NA	NA	NA	NA
Transportation/Communication/Utilities	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	2.43	NA	NA	NA	NA	NA
Upland Right-of-Way Undeveloped	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	0.00
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	0.00
	Available	3.42	NA	NA	NA	NA	3.42
Stormwater Basin	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	23.49	NA	NA	NA	NA	NA
Other Urban or Built-up Land	Impacted (AFFF Drainage)	67.20	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	8.22	NA	NA	NA	NA	NA
	Available	1,729.81	NA	NA	NA	NA	NA
Managed Wetland in Maintained Lawn Greenspace	Impacted (AFFF Drainage)	0.04	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	10.38	NA	NA	NA	NA	NA
Athletic Fields (Schools)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Recreational Land	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	0.00
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	0.00
	Available	82.29	NA	NA	NA	NA	82.29
Agricultural Wetlands (Modified)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Cropland and Pastureland	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Deciduous Forest (10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.73	NA	NA	NA	NA	NA
Deciduous Forest (>50% Crown Closure)	Impacted (AFFF Drainage)	0.01	0.01	NA	NA	NA	NA
	Impacted (AFFF Area)	0.01	0.01	NA	NA	NA	NA
	Available	146.32	146.32	NA	NA	NA	NA
Coniferous Forest (10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	184.15	NA	NA	NA	NA	NA

Feature Description	Habitat Status	Area (Ac)	*Melanerpes erythrocephalus*	*Nyctanassa violaceus*	*Nycticorax nycticorax*	*Pandion haliaetus*	*Passerculus sandwichensis*
Coniferous Forest (>50% Crown Closure)	Impacted (AFFF Drainage)	45.67	45.67	NA	NA	NA	NA
	Impacted (AFFF Area)	0.01	0.01	NA	NA	NA	NA
	Available	1,381.20	1,381.20	NA	NA	NA	NA
Plantation	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	104.26	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	10.91	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted (AFFF Drainage)	15.12	15.12	NA	NA	NA	NA
	Impacted (AFFF Area)	0.01	0.01	NA	NA	NA	NA
	Available	904.40	904.40	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	14.62	NA	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted (AFFF Drainage)	1.32	1.32	NA	NA	NA	NA
	Impacted (AFFF Area)	0.06	0.06	NA	NA	NA	NA
	Available	375.12	375.12	NA	NA	NA	NA
Old Field (< 25% Brush Covered)	Impacted (AFFF Drainage)	0.30	NA	NA	NA	NA	0.30
	Impacted (AFFF Area)	0.06	NA	NA	NA	NA	0.06
	Available	124.81	NA	NA	NA	NA	124.81
Deciduous Brush/Shrubland	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	1.15	NA	NA	NA	NA	NA
Coniferous Brush/Shrubland	Impacted (AFFF Drainage)	5.44	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	200.94	NA	NA	NA	NA	NA
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted (AFFF Drainage)	3.82	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.10	NA	NA	NA	NA	NA
	Available	80.91	NA	NA	NA	NA	NA
Streams and Canals	Impacted (AFFF Drainage)	4.45	NA	4.45	4.45	NA	NA
	Impacted (AFFF Area)	0.00	NA	0.00	0.00	NA	NA
	Available	67.79	NA	67.79	67.79	NA	NA
Natural Lakes	Impacted (AFFF Drainage)	0.00	NA	0.00	0.00	0.00	NA
	Impacted (AFFF Area)	0.00	NA	0.00	0.00	0.00	NA
	Available	0.95	NA	0.95	0.95	0.95	NA
Artificial Lakes	Impacted (AFFF Drainage)	0.07	NA	0.07	0.07	0.07	NA
	Impacted (AFFF Area)	0.00	NA	0.00	0.00	0.00	NA
	Available	91.55	NA	91.55	91.55	91.55	NA
Deciduous Wooded Wetlands	Impacted (AFFF Drainage)	2.58	2.58	2.58	2.58	NA	NA
	Impacted (AFFF Area)	0.00	0.00	0.00	0.00	NA	NA
	Available	63.59	63.59	63.59	63.59	NA	NA
Coniferous Wooded Wetlands	Impacted (AFFF Drainage)	2.06	2.06	2.06	2.06	NA	NA
	Impacted (AFFF Area)	0.00	0.00	0.00	0.00	NA	NA
	Available	289.14	289.14	289.14	289.14	NA	NA
Atlantic White Cedar Wetlands	Impacted (AFFF Drainage)	0.00	0.00	NA	0.00	NA	NA
	Impacted (AFFF Area)	0.00	0.00	NA	0.00	NA	NA
	Available	109.14	109.14	NA	109.14	NA	NA
Deciduous Scrub/Shrub Wetlands	Impacted (AFFF Drainage)	3.34	NA	3.34	3.34	NA	NA
	Impacted (AFFF Area)	0.00	NA	0.00	0.00	NA	NA
	Available	83.03	NA	83.03	83.03	NA	NA
Coniferous Scrub/Shrub Wetlands	Impacted (AFFF Drainage)	0.00	NA	0.00	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	0.00	0.00	NA	NA
	Available	51.98	NA	51.98	51.98	NA	NA
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted (AFFF Drainage)	0.65	NA	0.65	0.65	NA	NA
	Impacted (AFFF Area)	0.00	NA	0.00	0.00	NA	NA
	Available	60.14	NA	60.14	60.14	NA	NA

Feature Description	Habitat Status	Area (Ac)	*Melanerpes erythrocephalus*	*Nyctanassa violaceus*	*Nycticorax nycticorax*	*Pandion haliaetus*	*Passerculus sandwichensis*
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted (AFFF Drainage)	0.00	NA	0.00	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	0.00	0.00	NA	NA
	Available	63.10	NA	63.10	63.10	NA	NA
Herbaceous Wetlands	Impacted (AFFF Drainage)	0.00	NA	0.00	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	0.00	0.00	NA	NA
	Available	21.06	NA	21.06	21.06	NA	NA
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted (AFFF Drainage)	1.44	1.44	1.44	1.44	NA	NA
	Impacted (AFFF Area)	0.00	0.00	0.00	0.00	NA	NA
	Available	47.03	47.03	47.03	47.03	NA	NA
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted (AFFF Drainage)	0.00	0.00	0.00	0.00	NA	NA
	Impacted (AFFF Area)	0.00	0.00	0.00	0.00	NA	NA
	Available	78.97	78.97	78.97	78.97	NA	NA
Disturbed Wetlands (Modified)	Impacted (AFFF Drainage)	0.51	NA	0.51	0.51	NA	NA
	Impacted (AFFF Area)	0.28	NA	0.28	0.28	NA	NA
	Available	32.13	NA	32.13	32.13	NA	NA
Transitional Areas	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	14.34	NA	NA	NA	NA	NA
Undifferentiated Barren Lands	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	0.00
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	0.00
	Available	34.78	NA	NA	NA	NA	34.78
Phragmites Dominant Interior Wetlands	Impacted (AFFF Drainage)	0.38	NA	0.38	0.38	NA	NA
	Impacted (AFFF Area)	0.00	NA	0.00	0.00	NA	NA
	Available	7.23	NA	7.23	7.23	NA	NA
Species Habitat Impacted, AFFF Drainage (ac)			68.21	15.47	15.47	0.07	0.30
Species Habitat Impacted, AFFF Area (ac)			0.09	0.28	0.28	0.00	0.06
Species Habitat Available Overall (ac)			3,394.91	957.69	1,066.83	92.50	245.30
Percent Impacted Over Available, AFFF Drainage			2.0091%	1.6150%	1.4497%	0.0744%	0.1235%
Percent Impacted Over Available, AFFF Area			0.0027%	0.0292%	0.0263%	0.0000%	0.0245%
Percent Available, Not Impacted			97.9882%	98.3558%	98.5240%	99.9256%	99.8519%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (Ac)	*Podilymbus podiceps*	*Pooecetes gramineus*	*Strix varia*	*Atrytone arogos arogos*	*Bolaria selene myrina*
Cemetery	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, High Density or Multiple Dwelling	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	20.73	NA	NA	NA	NA	NA
Residential, Rural, Single Unit	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Low Density	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Medium Density	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Commercial/Services	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	2.62	NA	NA	NA	NA	NA
Military Installations	Impacted (AFFF Drainage)	72.52	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	22.07	NA	NA	NA	NA	NA
	Available	903.70	NA	NA	NA	NA	NA
Transportation/Communication/Utilities	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	2.43	NA	NA	NA	NA	NA
Upland Right-of-Way Undeveloped	Impacted (AFFF Drainage)	0.00	NA	NA	NA	0.00	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	0.00	NA
	Available	3.42	NA	NA	NA	3.42	NA
Stormwater Basin	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	23.49	NA	NA	NA	NA	NA
Other Urban or Built-up Land	Impacted (AFFF Drainage)	67.20	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	8.22	NA	NA	NA	NA	NA
	Available	1,729.81	NA	NA	NA	NA	NA
Managed Wetland in Maintained Lawn Greenspace	Impacted (AFFF Drainage)	0.04	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	10.38	NA	NA	NA	NA	NA
Athletic Fields (Schools)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Recreational Land	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	82.29	NA	NA	NA	NA	NA
Agricultural Wetlands (Modified)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Cropland and Pastureland	Impacted (AFFF Drainage)	0.00	NA	0.00	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	0.00	NA	NA	NA
	Available	0.00	NA	0.00	NA	NA	NA
Deciduous Forest (10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.73	NA	NA	NA	NA	NA
Deciduous Forest (>50% Crown Closure)	Impacted (AFFF Drainage)	0.01	NA	NA	0.01	NA	NA
	Impacted (AFFF Area)	0.01	NA	NA	0.01	NA	NA
	Available	146.32	NA	NA	146.32	NA	NA
Coniferous Forest (10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	184.15	NA	NA	NA	NA	NA

Feature Description	Habitat Status	Area (Ac)	*Podilymbus podiceps*	*Pooecetes gramineus*	*Strix varia*	*Atrytone arogos arogos*	*Bolaria selene myrina*
Coniferous Forest (>50% Crown Closure)	Impacted (AFFF Drainage)	45.67	NA	NA	45.67	NA	NA
	Impacted (AFFF Area)	0.01	NA	NA	0.01	NA	NA
	Available	1,381.20	NA	NA	1,381.20	NA	NA
Plantation	Impacted (AFFF Drainage)	0.00	NA	0.00	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	0.00	NA	NA	NA
	Available	104.26	NA	104.26	NA	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	10.91	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted (AFFF Drainage)	15.12	NA	NA	15.12	NA	NA
	Impacted (AFFF Area)	0.01	NA	NA	0.01	NA	NA
	Available	904.40	NA	NA	904.40	NA	NA
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	14.62	NA	NA	NA	NA	NA
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted (AFFF Drainage)	1.32	NA	NA	1.32	NA	NA
	Impacted (AFFF Area)	0.06	NA	NA	0.06	NA	NA
	Available	375.12	NA	NA	375.12	NA	NA
Old Field (< 25% Brush Covered)	Impacted (AFFF Drainage)	0.30	NA	0.30	NA	0.30	NA
	Impacted (AFFF Area)	0.06	NA	0.06	NA	0.06	NA
	Available	124.81	NA	124.81	NA	124.81	NA
Deciduous Brush/Shrubland	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	1.15	NA	NA	NA	NA	NA
Coniferous Brush/Shrubland	Impacted (AFFF Drainage)	5.44	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	200.94	NA	NA	NA	NA	NA
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted (AFFF Drainage)	3.82	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.10	NA	NA	NA	NA	NA
	Available	80.91	NA	NA	NA	NA	NA
Streams and Canals	Impacted (AFFF Drainage)	4.45	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	67.79	NA	NA	NA	NA	NA
Natural Lakes	Impacted (AFFF Drainage)	0.00	0.00	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	0.00	NA	NA	NA	NA
	Available	0.95	0.95	NA	NA	NA	NA
Artificial Lakes	Impacted (AFFF Drainage)	0.07	0.07	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	0.00	NA	NA	NA	NA
	Available	91.55	91.55	NA	NA	NA	NA
Deciduous Wooded Wetlands	Impacted (AFFF Drainage)	2.58	2.58	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	0.00	NA	NA	NA	NA
	Available	63.59	63.59	NA	NA	NA	NA
Coniferous Wooded Wetlands	Impacted (AFFF Drainage)	2.06	2.06	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	0.00	NA	NA	NA	NA
	Available	289.14	289.14	NA	NA	NA	NA
Atlantic White Cedar Wetlands	Impacted (AFFF Drainage)	0.00	0.00	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	0.00	NA	NA	NA	NA
	Available	109.14	109.14	NA	NA	NA	NA
Deciduous Scrub/Shrub Wetlands	Impacted (AFFF Drainage)	3.34	3.34	NA	NA	NA	3.34
	Impacted (AFFF Area)	0.00	0.00	NA	NA	NA	0.00
	Available	83.03	83.03	NA	NA	NA	83.03
Coniferous Scrub/Shrub Wetlands	Impacted (AFFF Drainage)	0.00		NA	NA	NA	0.00
	Impacted (AFFF Area)	0.00		NA	NA	NA	0.00
	Available	51.98		NA	NA	NA	51.98
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted (AFFF Drainage)	0.65	0.65	NA	NA	NA	0.65
	Impacted (AFFF Area)	0.00	0.00	NA	NA	NA	0.00
	Available	60.14	60.14	NA	NA	NA	60.14

Feature Description	Habitat Status	Area (Ac)	*Podilymbus podiceps*	*Pooecetes gramineus*	*Strix varia*	*Atrytone arogos arogos*	*Bolaria selene myrina*
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted (AFFF Drainage)	0.00	0.00	NA	NA	NA	0.00
	Impacted (AFFF Area)	0.00	0.00	NA	NA	NA	0.00
	Available	63.10	63.10	NA	NA	NA	63.10
Herbaceous Wetlands	Impacted (AFFF Drainage)	0.00	0.00	NA	NA	NA	0.00
	Impacted (AFFF Area)	0.00	0.00	NA	NA	NA	0.00
	Available	21.06	21.06	NA	NA	NA	21.06
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted (AFFF Drainage)	1.44	NA	NA	1.44	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	0.00	NA	NA
	Available	47.03	NA	NA	47.03	NA	NA
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted (AFFF Drainage)	0.00	NA	NA	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	0.00	NA	NA
	Available	78.97	NA	NA	78.97	NA	NA
Disturbed Wetlands (Modified)	Impacted (AFFF Drainage)	0.51	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.28	NA	NA	NA	NA	NA
	Available	32.13	NA	NA	NA	NA	NA
Transitional Areas	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	14.34	NA	NA	NA	NA	NA
Undifferentiated Barren Lands	Impacted (AFFF Drainage)	0.00	NA	0.00	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	0.00	NA	NA	NA
	Available	34.78	NA	34.78	NA	NA	NA
Phragmites Dominant Interior Wetlands	Impacted (AFFF Drainage)	0.38	0.38	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	0.00	NA	NA	NA	NA
	Available	7.23	7.23	NA	NA	NA	NA
Species Habitat Impacted, AFFF Drainage (ac)			9.07	0.30	63.57	0.30	3.99
Species Habitat Impacted, AFFF Area (ac)			0.00	0.06	0.09	0.06	0.00
Species Habitat Available Overall (ac)			788.93	263.85	2,933.03	128.23	279.31
Percent Impacted Over Available, AFFF Drainage			1.1501%	0.1148%	2.1674%	0.2363%	1.4276%
Percent Impacted Over Available, AFFF Area			0.0000%	0.0228%	0.0031%	0.0469%	0.0000%
Percent Available, Not Impacted			98.8499%	99.8624%	97.8294%	99.7168%	98.5724%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (Ac)	*Callophrys irus*	*Lynx rufus*	*Clemmys insculpta*	*Clemmys muhlenbergii*	*Crotalus horridus*
Cemetery	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, High Density or Multiple Dwelling	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	20.73	NA	NA	NA	NA	NA
Residential, Rural, Single Unit	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Low Density	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Residential, Single Unit, Medium Density	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Commercial/Services	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	2.62	NA	NA	NA	NA	NA
Military Installations	Impacted (AFFF Drainage)	72.52	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	22.07	NA	NA	NA	NA	NA
	Available	903.70	NA	NA	NA	NA	NA
Transportation/Communication/Utilities	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	2.43	NA	NA	NA	NA	NA
Upland Right-of-Way Undeveloped	Impacted (AFFF Drainage)	0.00	0.00	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	0.00	NA	NA	NA	NA
	Available	3.42	3.42	NA	NA	NA	NA
Stormwater Basin	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	23.49	NA	NA	NA	NA	NA
Other Urban or Built-up Land	Impacted (AFFF Drainage)	67.20	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	8.22	NA	NA	NA	NA	NA
	Available	1,729.81	NA	NA	NA	NA	NA
Managed Wetland in Maintained Lawn Greenspace	Impacted (AFFF Drainage)	0.04	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	10.38	NA	NA	NA	NA	NA
Athletic Fields (Schools)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Recreational Land	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	82.29	NA	NA	NA	NA	NA
Agricultural Wetlands (Modified)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.00	NA	NA	NA	NA	NA
Cropland and Pastureland	Impacted (AFFF Drainage)	0.00	NA	0.00	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	0.00	NA	NA	NA
	Available	0.00	NA	0.00	NA	NA	NA
Deciduous Forest (10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	0.73	NA	NA	NA	NA	NA
Deciduous Forest (>50% Crown Closure)	Impacted (AFFF Drainage)	0.01	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.01	NA	NA	NA	NA	NA
	Available	146.32	NA	NA	NA	NA	NA
Coniferous Forest (10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	0.00	NA	NA	0.00
	Impacted (AFFF Area)	0.00	NA	0.00	NA	NA	0.00
	Available	184.15	NA	184.15	NA	NA	184.15

Feature Description	Habitat Status	Area (Ac)	*Callophrys irus*	*Lynx rufus*	*Clemmys insculpta*	*Clemmys muhlenbergii*	*Crotalus horridus*
Coniferous Forest (>50% Crown Closure)	Impacted (AFFF Drainage)	45.67	NA	45.67	NA	NA	45.67
	Impacted (AFFF Area)	0.01	NA	0.01	NA	NA	0.01
	Available	1,381.20	NA	1,381.20	NA	NA	1,381.20
Plantation	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	104.26	NA	NA	NA	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	0.00	NA	NA	0.00
	Impacted (AFFF Area)	0.00	NA	0.00	NA	NA	0.00
	Available	10.91	NA	10.91	NA	NA	10.91
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted (AFFF Drainage)	15.12	NA	15.12	NA	NA	15.12
	Impacted (AFFF Area)	0.01	NA	0.01	NA	NA	0.01
	Available	904.40	NA	904.40	NA	NA	904.40
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	0.00	NA	NA	0.00
	Impacted (AFFF Area)	0.00	NA	0.00	NA	NA	0.00
	Available	14.62	NA	14.62	NA	NA	14.62
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted (AFFF Drainage)	1.32	NA	1.32	NA	NA	1.32
	Impacted (AFFF Area)	0.06	NA	0.06	NA	NA	0.06
	Available	375.12	NA	375.12	NA	NA	375.12
Old Field (< 25% Brush Covered)	Impacted (AFFF Drainage)	0.30	0.30	NA	NA	NA	NA
	Impacted (AFFF Area)	0.06	0.06	NA	NA	NA	NA
	Available	124.81	124.81	NA	NA	NA	NA
Deciduous Brush/Shrubland	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	1.15	NA	NA	NA	NA	NA
Coniferous Brush/Shrubland	Impacted (AFFF Drainage)	5.44	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	200.94	NA	NA	NA	NA	NA
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted (AFFF Drainage)	3.82	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.10	NA	NA	NA	NA	NA
	Available	80.91	NA	NA	NA	NA	NA
Streams and Canals	Impacted (AFFF Drainage)	4.45	NA	NA	4.45	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	0.00	NA	NA
	Available	67.79	NA	NA	67.79	NA	NA
Natural Lakes	Impacted (AFFF Drainage)	0.00	NA	NA	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	0.00	NA	NA
	Available	0.95	NA	NA	0.95	NA	NA
Artificial Lakes	Impacted (AFFF Drainage)	0.07	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	91.55	NA	NA	NA	NA	NA
Deciduous Wooded Wetlands	Impacted (AFFF Drainage)	2.58	NA	NA	2.58	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	0.00	NA	NA
	Available	63.59	NA	NA	63.59	NA	NA
Coniferous Wooded Wetlands	Impacted (AFFF Drainage)	2.06	NA	NA	2.06	NA	2.06
	Impacted (AFFF Area)	0.00	NA	NA	0.00	NA	0.00
	Available	289.14	NA	NA	289.14	NA	289.14
Atlantic White Cedar Wetlands	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	0.00
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	0.00
	Available	109.14	NA	NA	NA	NA	109.14
Deciduous Scrub/Shrub Wetlands	Impacted (AFFF Drainage)	3.34	NA	NA	3.34	3.34	NA
	Impacted (AFFF Area)	0.00	NA	NA	0.00	0.00	NA
	Available	83.03	NA	NA	83.03	83.03	NA
Coniferous Scrub/Shrub Wetlands	Impacted (AFFF Drainage)	0.00	NA	NA	0.00	0.00	NA
	Impacted (AFFF Area)	0.00	NA	NA	0.00	0.00	NA
	Available	51.98	NA	NA	51.98	51.98	NA
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted (AFFF Drainage)	0.65	NA	NA	0.65	0.65	NA
	Impacted (AFFF Area)	0.00	NA	NA	0.00	0.00	NA
	Available	60.14	NA	NA	60.14	60.14	NA

Feature Description	Habitat Status	Area (Ac)	*Callophrys irus*	*Lynx rufus*	*Clemmys insculpta*	*Clemmys muhlenbergii*	*Crotalus horridus*
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted (AFFF Drainage)	0.00	NA	NA	0.00	0.00	NA
	Impacted (AFFF Area)	0.00	NA	NA	0.00	0.00	NA
	Available	63.10	NA	NA	63.10	63.10	NA
Herbaceous Wetlands	Impacted (AFFF Drainage)	0.00	NA	NA	0.00	0.00	NA
	Impacted (AFFF Area)	0.00	NA	NA	0.00	0.00	NA
	Available	21.06	NA	NA	21.06	21.06	NA
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted (AFFF Drainage)	1.44	NA	NA	1.44	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	0.00	NA	NA
	Available	47.03	NA	NA	47.03	NA	NA
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted (AFFF Drainage)	0.00	NA	NA	0.00	NA	0.00
	Impacted (AFFF Area)	0.00	NA	NA	0.00	NA	0.00
	Available	78.97	NA	NA	78.97	NA	78.97
Disturbed Wetlands (Modified)	Impacted (AFFF Drainage)	0.51	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.28	NA	NA	NA	NA	NA
	Available	32.13	NA	NA	NA	NA	NA
Transitional Areas	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	14.34	NA	NA	NA	NA	NA
Undifferentiated Barren Lands	Impacted (AFFF Drainage)	0.00	NA	NA	NA	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA	NA	NA	NA
	Available	34.78	NA	NA	NA	NA	NA
Phragmites Dominant Interior Wetlands	Impacted (AFFF Drainage)	0.38	NA	NA	0.38	0.38	NA
	Impacted (AFFF Area)	0.00	NA	NA	0.00	0.00	NA
	Available	7.23	NA	NA	7.23	7.23	NA
Species Habitat Impacted, AFFF Drainage (ac)			0.30	62.12	14.89	4.37	64.18
Species Habitat Impacted, AFFF Area (ac)			0.06	0.08	0.00	0.00	0.08
Species Habitat Available Overall (ac)			128.23	2,870.40	834.01	286.54	3,347.65
Percent Impacted Over Available, AFFF Drainage			0.2363%	2.1641%	1.7856%	1.5246%	1.9171%
Percent Impacted Over Available, AFFF Area			0.0469%	0.0027%	0.0000%	0.0000%	0.0023%
Percent Available, Not Impacted			99.7168%	97.8332%	98.2144%	98.4754%	98.0806%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (Ac)	*Elaphe guttata*	*Pituophis m melanoleucus*
Cemetery	Impacted (AFFF Drainage)	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	0.00	NA	NA
Residential, High Density or Multiple Dwelling	Impacted (AFFF Drainage)	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	20.73	NA	NA
Residential, Rural, Single Unit	Impacted (AFFF Drainage)	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	0.00	NA	NA
Residential, Single Unit, Low Density	Impacted (AFFF Drainage)	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	0.00	NA	NA
Residential, Single Unit, Medium Density	Impacted (AFFF Drainage)	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	0.00	NA	NA
Commercial/Services	Impacted (AFFF Drainage)	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	2.62	NA	NA
Military Installations	Impacted (AFFF Drainage)	72.52	NA	NA
	Impacted (AFFF Area)	22.07	NA	NA
	Available	903.70	NA	NA
Transportation/Communication/Utilities	Impacted (AFFF Drainage)	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	2.43	NA	NA
Upland Right-of-Way Undeveloped	Impacted (AFFF Drainage)	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	3.42	NA	NA
Stormwater Basin	Impacted (AFFF Drainage)	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	23.49	NA	NA
Other Urban or Built-up Land	Impacted (AFFF Drainage)	67.20	NA	NA
	Impacted (AFFF Area)	8.22	NA	NA
	Available	1,729.81	NA	NA
Managed Wetland in Maintained Lawn Greenspace	Impacted (AFFF Drainage)	0.04	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	10.38	NA	NA
Athletic Fields (Schools)	Impacted (AFFF Drainage)	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	0.00	NA	NA
Recreational Land	Impacted (AFFF Drainage)	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	82.29	NA	NA
Agricultural Wetlands (Modified)	Impacted (AFFF Drainage)	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	0.00	NA	NA
Cropland and Pastureland	Impacted (AFFF Drainage)	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	0.00	NA	NA
Deciduous Forest (10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	0.00
	Impacted (AFFF Area)	0.00	NA	0.00
	Available	0.73	NA	0.73
Deciduous Forest (>50% Crown Closure)	Impacted (AFFF Drainage)	0.01	NA	NA
	Impacted (AFFF Area)	0.01	NA	NA
	Available	146.32	NA	NA
Coniferous Forest (10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	0.00
	Impacted (AFFF Area)	0.00	NA	0.00
	Available	184.15	NA	184.15

Feature Description	Habitat Status	Area (Ac)	*Elaphe guttata*	*Pituophis m melanoleucus*
Coniferous Forest (>50% Crown Closure)	Impacted (AFFF Drainage)	45.67	45.67	NA
	Impacted (AFFF Area)	0.01	0.01	NA
	Available	1,381.20	1,381.20	NA
Plantation	Impacted (AFFF Drainage)	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	104.26	NA	NA
Mixed Forest (> 50% Coniferous with 10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	0.00
	Impacted (AFFF Area)	0.00	NA	0.00
	Available	10.91	NA	10.91
Mixed Forest (> 50% Coniferous with >50% Crown Closure)	Impacted (AFFF Drainage)	15.12	15.12	NA
	Impacted (AFFF Area)	0.01	0.01	NA
	Available	904.40	904.40	NA
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	Impacted (AFFF Drainage)	0.00	NA	0.00
	Impacted (AFFF Area)	0.00	NA	0.00
	Available	14.62	NA	14.62
Mixed Forest (>50% Deciduous with >50% Crown Closure)	Impacted (AFFF Drainage)	1.32	NA	NA
	Impacted (AFFF Area)	0.06	NA	NA
	Available	375.12	NA	NA
Old Field (< 25% Brush Covered)	Impacted (AFFF Drainage)	0.30	NA	0.30
	Impacted (AFFF Area)	0.06	NA	0.06
	Available	124.81	NA	124.81
Deciduous Brush/Shrubland	Impacted (AFFF Drainage)	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	1.15	NA	NA
Coniferous Brush/Shrubland	Impacted (AFFF Drainage)	5.44	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	200.94	NA	NA
Mixed Deciduous/Coniferous Brush/Shrubland	Impacted (AFFF Drainage)	3.82	NA	NA
	Impacted (AFFF Area)	0.10	NA	NA
	Available	80.91	NA	NA
Streams and Canals	Impacted (AFFF Drainage)	4.45	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	67.79	NA	NA
Natural Lakes	Impacted (AFFF Drainage)	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	0.95	NA	NA
Artificial Lakes	Impacted (AFFF Drainage)	0.07	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	91.55	NA	NA
Deciduous Wooded Wetlands	Impacted (AFFF Drainage)	2.58	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	63.59	NA	NA
Coniferous Wooded Wetlands	Impacted (AFFF Drainage)	2.06	2.06	NA
	Impacted (AFFF Area)	0.00	0.00	NA
	Available	289.14	289.14	NA
Atlantic White Cedar Wetlands	Impacted (AFFF Drainage)	0.00	0.00	NA
	Impacted (AFFF Area)	0.00	0.00	NA
	Available	109.14	109.14	NA
Deciduous Scrub/Shrub Wetlands	Impacted (AFFF Drainage)	3.34	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	83.03	NA	NA
Coniferous Scrub/Shrub Wetlands	Impacted (AFFF Drainage)	0.00	0.00	NA
	Impacted (AFFF Area)	0.00	0.00	NA
	Available	51.98	51.98	NA
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	Impacted (AFFF Drainage)	0.65	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	60.14	NA	NA

Feature Description	Habitat Status	Area (Ac)	*Elaphe guttata*	*Pituophis m melanoleucus*
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	Impacted (AFFF Drainage)	0.00	0.00	NA
	Impacted (AFFF Area)	0.00	0.00	NA
	Available	63.10	63.10	NA
Herbaceous Wetlands	Impacted (AFFF Drainage)	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	21.06	NA	NA
Mixed Wooded Wetlands (Deciduous Dom.)	Impacted (AFFF Drainage)	1.44	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	47.03	NA	NA
Mixed Wooded Wetlands (Coniferous Dom.)	Impacted (AFFF Drainage)	0.00	0.00	NA
	Impacted (AFFF Area)	0.00	0.00	NA
	Available	78.97	78.97	NA
Disturbed Wetlands (Modified)	Impacted (AFFF Drainage)	0.51	NA	NA
	Impacted (AFFF Area)	0.28	NA	NA
	Available	32.13	NA	NA
Transitional Areas	Impacted (AFFF Drainage)	0.00	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	14.34	NA	NA
Undifferentiated Barren Lands	Impacted (AFFF Drainage)	0.00	0.00	0.00
	Impacted (AFFF Area)	0.00	0.00	0.00
	Available	34.78	34.78	34.78
Phragmites Dominant Interior Wetlands	Impacted (AFFF Drainage)	0.38	NA	NA
	Impacted (AFFF Area)	0.00	NA	NA
	Available	7.23	NA	NA
Species Habitat Impacted, AFFF Drainage (ac)			62.86	0.30
Species Habitat Impacted, AFFF Area (ac)			0.02	0.06
Species Habitat Available Overall (ac)			2,912.71	370.00
Percent Impacted Over Available, AFFF Drainage			2.1581%	0.0819%
Percent Impacted Over Available, AFFF Area			0.0005%	0.0163%
Percent Available, Not Impacted			97.8414%	99.9018%

Notes:
ac = acres
NA = not applicable

Table B-4. Spatial Exposure Potential of Protected Species at Naval Air Station Patuxent River

Feature Description	Habitat Status	Area (ac)	*Gastrophryne carolinensis*	*Accipiter gentilis*	*Ammodramus henslowii*	*Asio flammeus*	*Bartramia longicauda*	*Charadrius melodus*	*Cistothorus platensis*
Residential	Impacted	0.00	NA	NA	NA	NA	NA	NA	NA
	Available	19.80	NA	NA	NA	NA	NA	NA	NA
Institutional	Impacted	21.68	NA	NA	NA	NA	NA	NA	NA
	Available	723.50	NA	NA	NA	NA	NA	NA	NA
Transportation	Impacted	10.13	NA	NA	NA	NA	NA	NA	NA
	Available	503.97	NA	NA	NA	NA	NA	NA	NA
Open Urban Land	Impacted	37.57	NA	NA	37.57	37.57	37.57	NA	NA
	Available	1,917.60	NA	NA	1,917.60	1,917.60	1,917.60	NA	NA
Agriculture	Impacted	0.00	0.00	0.00	NA	0.00	0.00	NA	NA
	Available	149.09	149.09	149.09	NA	149.09	149.09	NA	NA
Deciduous Forest	Impacted	0.02	0.02	0.02	NA	NA	NA	NA	NA
	Available	633.81	633.81	633.81	NA	NA	NA	NA	NA
Evergreen Forest	Impacted	8.90	8.90	8.90	NA	NA	NA	NA	NA
	Available	99.75	99.75	99.75	NA	NA	NA	NA	NA
Mixed Forest	Impacted	24.78	24.78	24.78	NA	NA	NA	NA	NA
	Available	1,323.13	1,323.13	1,323.13	NA	NA	NA	NA	NA
Old Field	Impacted	5.26	5.26	5.26	5.26	5.26	5.26	NA	NA
	Available	221.84	221.84	221.84	221.84	221.84	221.84	NA	NA
Brush	Impacted	5.26	NA	NA	5.26	5.26	5.26	NA	5.26
	Available	127.32	NA	NA	127.32	127.32	127.32	NA	127.32
Nontidal Water	Impacted	0.98	0.98	NA	NA	NA	NA	0.98	0.98
	Available	42.79	42.79	NA	NA	NA	NA	42.79	42.79
Tidal Water	Impacted	0.00	NA	NA	NA	NA	NA	0.00	NA
	Available	47.41	NA	NA	NA	NA	NA	47.41	NA
Emergent Wetland	Impacted	0.00	0.00	0.00	0.00	0.00	NA	0.00	0.00
	Available	109.79	109.79	109.79	109.79	109.79	NA	109.79	109.79
Forested Wetland	Impacted	5.53	5.53	5.53	NA	NA	NA	NA	NA
	Available	270.12	270.12	270.12	NA	NA	NA	NA	NA
Sandy Shoreline	Impacted	0.00	NA	NA	NA	0.00	NA	0.00	NA
	Available	18.28	NA	NA	NA	18.28	NA	18.28	NA
Species Habitat Impacted (ac)			45.46	44.48	48.09	48.09	48.09	0.98	6.24
Species Habitat Available Overall (ac)			2,850.32	2,807.53	2,376.55	2,543.92	2,415.85	218.26	279.89
Percent Impacted Over Available			1.59%	1.58%	2.02%	1.89%	1.99%	0.45%	2.23%
Percent Available, Not Impacted			98.41%	98.42%	97.98%	98.11%	98.01%	99.55%	97.77%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (ac)	*Contopus cooperi*	*Gelochelidon nilotica*	*Geothlypis philadelphia*	*Lanius ludovicianus*	*Rynchops niger*	*Setophaga fusca*	*Sternula antillarum*
Residential	Impacted	0.00	NA	NA	NA	NA	NA	NA	NA
	Available	19.80	NA	NA	NA	NA	NA	NA	NA
Institutional	Impacted	21.68	NA	NA	NA	NA	NA	NA	NA
	Available	723.50	NA	NA	NA	NA	NA	NA	NA
Transportation	Impacted	10.13	NA	NA	NA	NA	NA	NA	NA
	Available	503.97	NA	NA	NA	NA	NA	NA	NA
Open Urban Land	Impacted	37.57	NA	NA	NA	37.57	NA	NA	NA
	Available	1,917.60	NA	NA	NA	1,917.60	NA	NA	NA
Agriculture	Impacted	0.00	NA	0.00	NA	NA	NA	NA	NA
	Available	149.09	NA	149.09	NA	NA	NA	NA	NA
Deciduous Forest	Impacted	0.02	NA	NA	0.02	0.02	NA	0.02	NA
	Available	633.81	NA	NA	633.81	633.81	NA	633.81	NA
Evergreen Forest	Impacted	8.90	8.90	NA	8.90	8.90	NA	8.90	NA
	Available	99.75	99.75	NA	99.75	99.75	NA	99.75	NA
Mixed Forest	Impacted	24.78	24.78	NA	24.78	NA	NA	24.78	NA
	Available	1,323.13	1,323.13	NA	1,323.13	NA	NA	1,323.13	NA
Old Field	Impacted	5.26	NA	NA	5.26	5.26	NA	NA	NA
	Available	221.84	NA	NA	221.84	221.84	NA	NA	NA
Brush	Impacted	5.26	5.26	NA	5.26	5.26	NA	NA	NA
	Available	127.32	127.32	NA	127.32	127.32	NA	NA	NA
Nontidal Water	Impacted	0.98	NA	NA	NA	NA	NA	NA	0.98
	Available	42.79	NA	NA	NA	NA	NA	NA	42.79
Tidal Water	Impacted	0.00	NA	0.00	NA	NA	0.00	NA	0.00
	Available	47.41	NA	47.41	NA	NA	47.41	NA	47.41
Emergent Wetland	Impacted	0.00	NA	NA	NA	NA	NA	NA	NA
	Available	109.79	NA	NA	NA	NA	NA	NA	NA
Forested Wetland	Impacted	5.53	5.53	NA	NA	NA	NA	5.53	NA
	Available	270.12	270.12	NA	NA	NA	NA	270.12	NA
Sandy Shoreline	Impacted	0.00	NA	0.00	NA	NA	0.00	NA	0.00
	Available	18.28	NA	18.28	NA	NA	18.28	NA	18.28
Species Habitat Impacted (ac)			44.46	0.00	44.21	57.01	0.00	39.22	0.98
Species Habitat Available Overall (ac)			1,820.32	214.78	2,405.85	3,000.32	65.69	2,326.81	108.47
Percent Impacted Over Available			2.44%	0.00%	1.84%	1.90%	0.00%	1.69%	0.90%
Percent Available, Not Impacted			97.56%	100.00%	98.16%	98.10%	100.00%	98.31%	99.10%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (ac)	*Thalasseus maximus*	*Acipenser oxyrhynchus*	*Centrarchus macropterus*	*Notropis chalybaeus*	*Callophrys irus*	*Cicindela d dorsalis*	*Eubalaeana glacialis*
Residential	Impacted	0.00	NA	NA	NA	NA	NA	NA	NA
	Available	19.80	NA	NA	NA	NA	NA	NA	NA
Institutional	Impacted	21.68	NA	NA	NA	NA	NA	NA	NA
	Available	723.50	NA	NA	NA	NA	NA	NA	NA
Transportation	Impacted	10.13	NA	NA	NA	NA	NA	NA	NA
	Available	503.97	NA	NA	NA	NA	NA	NA	NA
Open Urban Land	Impacted	37.57	NA	NA	NA	NA	37.57	NA	NA
	Available	1,917.60	NA	NA	NA	NA	1,917.60	NA	NA
Agriculture	Impacted	0.00	NA	NA	NA	NA	NA	NA	NA
	Available	149.09	NA	NA	NA	NA	NA	NA	NA
Deciduous Forest	Impacted	0.02	NA	NA	NA	NA	NA	NA	NAA
	Available	633.81	NA	NA	NA	NA	NA	NA	NA
Evergreen Forest	Impacted	8.90	NA	NA	NA	NA	NA	NA	NA
	Available	99.75	NA	NA	NA	NA	NA	NA	NA
Mixed Forest	Impacted	24.78	NA	NA	NA	NA	NA	NA	NA
	Available	1,323.13	NA	NA	NA	NA	NA	NA	NA
Old Field	Impacted	5.26	NA	NA	NA	NA	5.26	5.26	NA
	Available	221.84	NA	NA	NA	NA	221.84	221.84	NA
Brush	Impacted	5.26	NA	NA	NA	NA	5.26	NA	NA
	Available	127.32	NA	NA	NA	NA	127.32	NA	NA
Nontidal Water	Impacted	0.98	NA	NA	0.98	0.98	NA	NA	NA
	Available	42.79	NA	NA	42.79	42.79	NA	NA	NA
Tidal Water	Impacted	0.00	0.00	0.00	NA	NA	NA	NA	0.00
	Available	47.41	47.41	47.41	NA	NA	NA	NA	47.41
Emergent Wetland	Impacted	0.00	NA	NA	NA	NA	NA	NA	NA
	Available	109.79	NA	NA	NA	NA	NA	NA	NA
Forested Wetland	Impacted	5.53	NA	NA	NA	NA	NA	NA	NA
	Available	270.12	NA	NA	NA	NA	NA	NA	NA
Sandy Shoreline	Impacted	0.00	0.00	NA	NA	NA	NA	0.00	NA
	Available	18.28	18.28	NA	NA	NA	NA	18.28	NA
	Species Habitat Impacted (ac)		0.00	0.00	0.98	0.98	48.09	5.26	0.00
	Species Habitat Available Overall (ac)		65.69	47.41	42.79	42.79	2,266.76	240.12	47.41
	Percent Impacted Over Available		0.00%	0.00%	2.29%	2.29%	2.12%	2.19%	0.00%
	Percent Available, Not Impacted		100.00%	100.00%	97.71%	97.71%	97.88%	97.81%	100.00%

Notes:
ac = acres
NA = not applicable

Feature Description	Habitat Status	Area (ac)	*Megaptera novaeangliae*	*Dermochelys coriacea*	*Caretta caretta*	*Lepidochelys kempii*	*Haliaeetus leucocephalus*
Residential	Impacted	0.00	NA	NA	NA	NA	NA
	Available	19.80	NA	NA	NA	NA	NA
Institutional	Impacted	21.68	NA	NA	NA	NA	NA
	Available	723.50	NA	NA	NA	NA	NA
Transportation	Impacted	10.13	NA	NA	NA	NA	NA
	Available	503.97	NA	NA	NA	NA	NA
Open Urban Land	Impacted	37.57	NA	NA	NA	NA	NA
	Available	1,917.60	NA	NA	NA	NA	NA
Agriculture	Impacted	0.00	NA	NA	NA	NA	NA
	Available	149.09	NA	NA	NA	NA	NA
Deciduous Forest	Impacted	0.02	NA	NA	NA	NA	0.02
	Available	633.81	NA	NA	NA	NA	633.81
Evergreen Forest	Impacted	8.90	NA	NA	NA	NA	8.90
	Available	99.75	NA	NA	NA	NA	99.75
Mixed Forest	Impacted	24.78	NA	NA	NA	NA	24.78
	Available	1,323.13	NA	NA	NA	NA	1,323.13
Old Field	Impacted	5.26	NA	NA	NA	NA	5.26
	Available	221.84	NA	NA	NA	NA	221.84
Brush	Impacted	5.26	NA	NA	NA	NA	NA
	Available	127.32	NA	NA	NA	NA	NA
Nontidal Water	Impacted	0.98	NA	NA	NA	NA	0.98
	Available	42.79	NA	NA	NA	NA	42.79
Tidal Water	Impacted	0.00	0.00	0.00	0.00	0.00	0.00
	Available	47.41	47.41	47.41	47.41	47.41	47.41
Emergent Wetland	Impacted	0.00	NA	NA	NA	NA	0.00
	Available	109.79	NA	NA	NA	NA	109.79
Forested Wetland	Impacted	5.53	NA	NA	NA	NA	NA
	Available	270.12	NA	NA	NA	NA	NA
Sandy Shoreline	Impacted	0.00	NA	0.00	0.00	0.00	NA
	Available	18.28	NA	18.28	18.28	18.28	NA
Species Habitat Impacted (ac)			0.00	0.00	0.00	0.00	39.93
Species Habitat Available Overall (ac)			47.41	65.69	65.69	65.69	2,478.52
Percent Impacted Over Available			0.00%	0.00%	0.00%	0.00%	1.61%
Percent Available, Not Impacted			100.00%	100.00%	100.00%	100.00%	98.39%

Notes:
ac = acres
NA = not applicable

Appendix C

Habitat Type

- ARTIFICIAL LAKES
- ATLANTIC WHITE CEDAR WETLANDS
- COMMERCIAL/SERVICES
- CONIFEROUS BRUSH/SHRUBLAND
- CONIFEROUS FOREST (10-50% CROWN CLOSURE)
- CONIFEROUS FOREST (>50% CROWN CLOSURE)
- CONIFEROUS SCRUB/SHRUB WETLANDS
- CONIFEROUS WOODED WETLANDS
- DECIDUOUS BRUSH/SHRUBLAND
- DECIDUOUS FOREST (10-50% CROWN CLOSURE)
- DECIDUOUS FOREST (>50% CROWN CLOSURE)
- DECIDUOUS SCRUB/SHRUB WETLANDS
- DECIDUOUS WOODED WETLANDS
- DISTURBED WETLANDS (MODIFIED)
- HERBACEOUS WETLANDS
- MANAGED WETLAND IN MAINTAINED LAWN GREENSPACE
- MILITARY INSTALLATIONS
- MIXED DECIDUOUS/CONIFEROUS BRUSH/SHRUBLAND
- MIXED FOREST (>50% CONIFEROUS WITH 10-50% CROWN CLOSURE)
- MIXED FOREST (>50% CONIFEROUS WITH >50% CROWN CLOSURE)
- MIXED FOREST (>50% DECIDUOUS WITH 10-50% CROWN CLOSURE)
- MIXED FOREST (>50% DECIDUOUS WITH >50% CROWN CLOSURE)
- MIXED SCRUB/SHRUB WETLANDS (CONIFEROUS DOM.)
- MIXED SCRUB/SHRUB WETLANDS (DECIDUOUS DOM.)
- MIXED WOODED WETLANDS (CONIFEROUS DOM.)
- MIXED WOODED WETLANDS (DECIDUOUS DOM.)
- NATURAL LAKES
- OLD FIELD (< 25% BRUSH COVERED)
- OTHER URBAN OR BUILT-UP LAND
- PHRAGMITES DOMINANT INTERIOR WETLANDS
- PLANTATION
- RECREATIONAL LAND
- RESIDENTIAL, HIGH DENSITY OR MULTIPLE DWELLING
- STORMWATER BASIN
- STREAMS AND CANALS
- TRANSITIONAL AREAS
- TRANSPORTATION/COMMUNICATION/UTILITIES
- UNDIFFERENTIATED BARREN LANDS
- UPLAND RIGHTS-OF-WAY UNDEVELOPED

Demonstration of the robust landscape layers of JBMDL – Lakehurst

VICINITY MAP

Legend

- Installation Boundary
- Range Boundary
- Potential AFFF Release Area

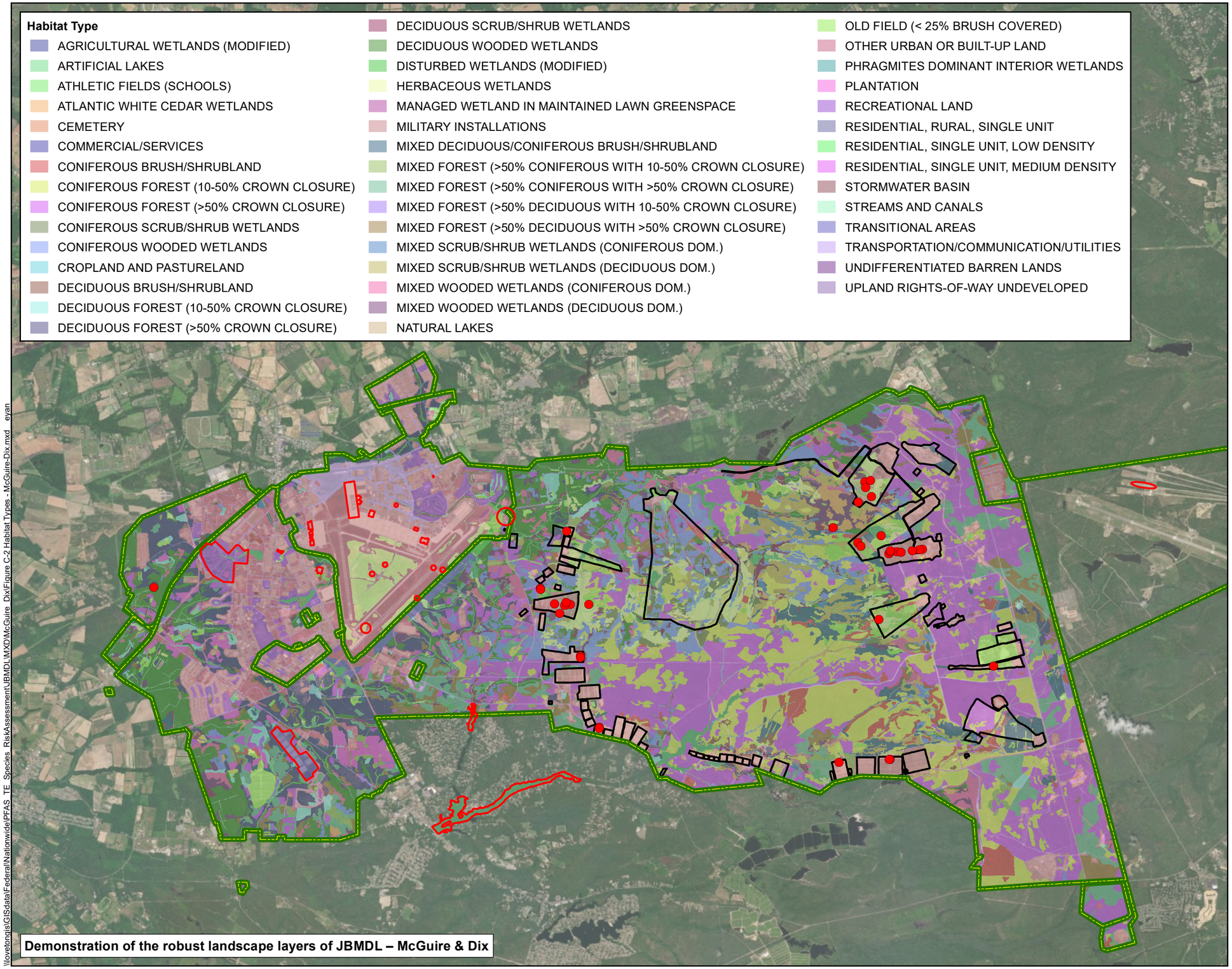
Map Date: 12/30/2019
Source: ESRI 2017, JBMDL 2018, NJDEP 2012
Projection: WGS 1984 UTM 18N Meter

N

0 0.5 1
Miles

Figure C-1
Habitat Types - Lakehurst
PFAS T&E Species Risk Assessment
Joint Base McGuire-Dix-Lakehurst

\\lovetongis\GIS\data\Federal\Nationwide\PFAS_TE_Species_RiskAssessment\JBMDL\MXD\Lakehurst\Figure C-1 Habitat Types - Lakehurst.mxd evan



Legend

- Installation Boundary
- Range Boundary
- Potential AFFF Release Location
- Potential AFFF Release Area

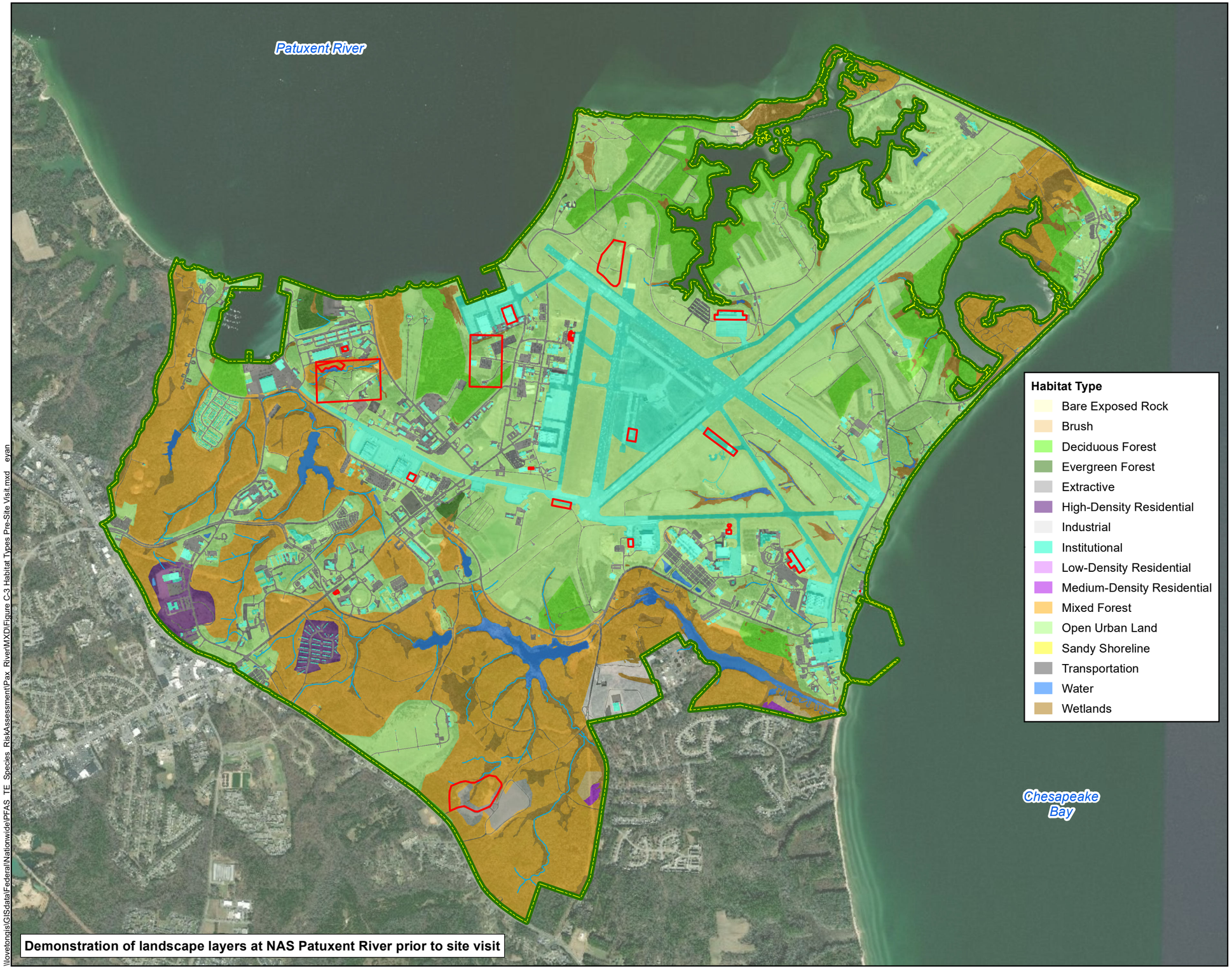
Map Date: 12/30/2019
Source: ESRI 2017, JBMDL 2018
Projection: WGS 1984 UTM 18N Meter

N

0 1 2
Miles

Figure C-2
Habitat Types - McGuire-Dix
PFAS T&E Species Risk Assessment
Joint Base McGuire-Dix-Lakehurst

\\lovetongis\GIS\data\Federal\Nationwide\PFAS_TE_Species_RiskAssessment\JBMDL\MXD\McGuire_Dix\Figure C-2 Habitat Types - McGuire-Dix.mxd evan



VICINITY MAP

Legend

- Installation Boundary
- Potential AFFF Release Area
- Stream

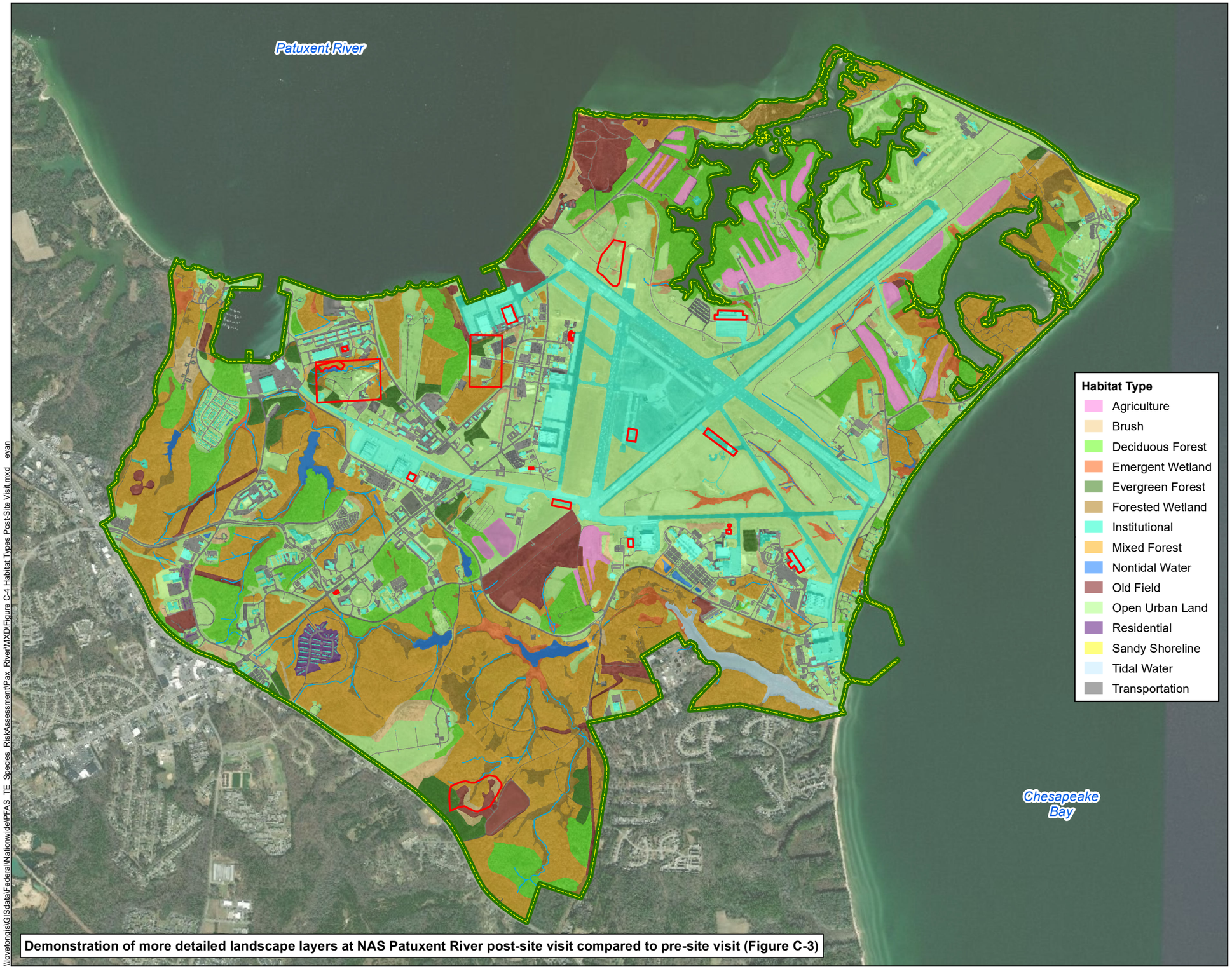
Map Date: 12/30/2019
Source: ESRI 2017, NAS Pax River 2018, MDP 2010
Projection: WGS 1984 UTM 18N Meter

N

0 0.5 1
Miles

Figure C-3
Habitat Types Pre-Site Visit
PFAS T&E Species Risk Assessment
Naval Air Station Patuxent River

\\ovetongis\GISdata\FederalNationwide\PFAS_TE_Species_RiskAssessment\Pax_River\MXD\Figure C-3 Habitat Types Pre-Site Visit.mxd eyan



Demonstration of more detailed landscape layers at NAS Patuxent River post-site visit compared to pre-site visit (Figure C-3)

VICINITY MAP

Legend

- Installation Boundary
- Potential AFFF Release Area
- Stream

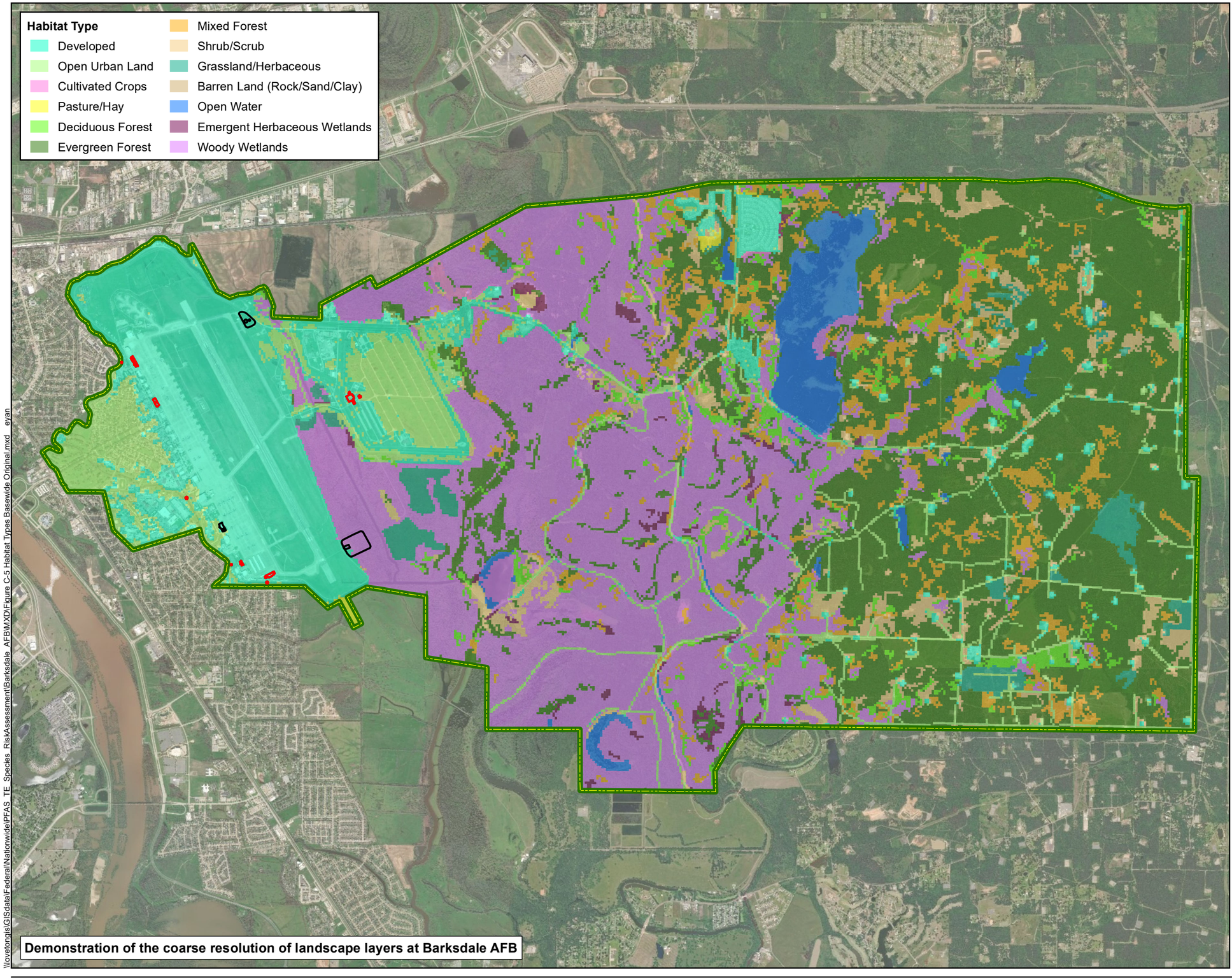
Map Date: 12/30/2019
Source: ESRI 2017, NAS Pax River 2018, MDP 2010
Projection: WGS 1984 UTM 18N Meter

N

0 0.5 1
Miles

Figure C-4
Habitat Types Post-Site Visit
PFAS T&E Species Risk Assessment
Naval Air Station Patuxent River

\\ovetongis\GISdata\FederalNationwide\PFAS_TE_Species_RiskAssessment\Pax_RiverMXD\Figure C-4 Habitat Types Post-Site Visit.mxd evan



VICINITY MAP

Legend

- Installation Boundary
- AFFF Release Area Identified in Preliminary Assessment (2015)
- AFFF Release Area Studied in Site Investigation (2019)

Map Date: 12/30/2019
Source: ESRI 2016, Barksdale AFB 2019
Projection: WGS 1984 UTM 15N Meter

N

0 0.5 1
Miles

Figure C-5
Habitat Types (Original)
PFAS T&E Species Risk Assessment
Barksdale Air Force Base

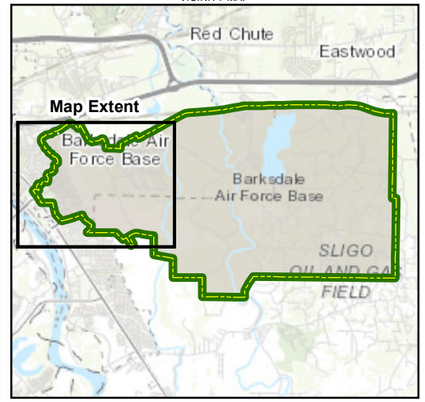
\\lovetongis\GISdata\Federal\Nationwide\PFAS_TE_Species_RiskAssessment\Barksdale_AFB\MXD\Figure C-5 Habitat Types Basewide Original.mxd eyan

FT002 Fire Protection Area No. 2
Holding Pond
Unlined Pit
Building 6214
Building 6215
Macks Bayou Outfall 6214
Building 6238
Building 7710 and AFFF Retention Pond
AFFF Retention Pond
Macks Bayou Outfall 009
Building 6626
DP028 AFFF Retention Pond
Macks Bayou Outfall 6824
Building 6824
Building 6850
Building 6850 AFFF Retention Pond
Macks Bayou Outfall 6850
FT001 Fire Protection Area No. 1
Unlined Shallow Pits Area

Habitat Type
- Developed
- Open Urban Land
- Cultivated Crops
- Pasture/Hay
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Grassland/Herbaceous
- Barren Land (Rock/Sand/Clay)
- Open Water
- Emergent Herbaceous Wetlands
- Woody Wetlands

Demonstration of the coarse resolution of landscape layers at Barksdale AFB at locations of identified AFFF release

VICINITY MAP



Legend
- Installation Boundary
- AFFF Release Area Identified in Preliminary Assessment (2015)
- AFFF Release Area Studied in Site Investigation (2019)

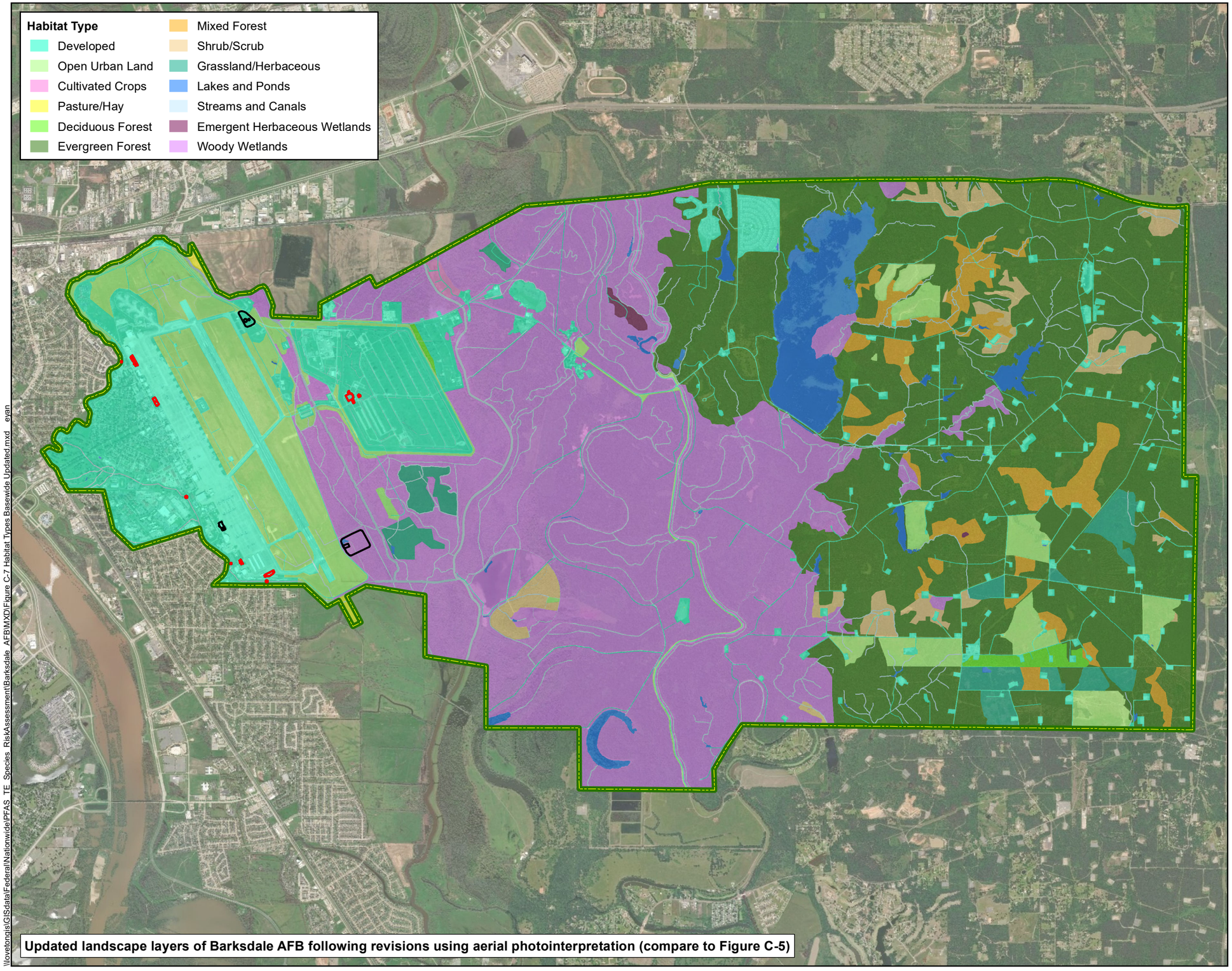
Map Date: 12/30/2019
Source: ESRI 2016, Barksdale AFB 2019
Projection: WGS 1984 UTM 15N Meter

N

0 1,000 2,000
Feet

Figure C-6
Habitat Types (Original)
PFAS T&E Species Risk Assessment
Barksdale Air Force Base

\\lovetongis\GISdata\Federal\Nationwide\PFAS_TE_Species_RiskAssessment\Barksdale_AFB\MXD\Figure C-6 Habitat Types Original.mxd evan



VICINITY MAP

Legend

- Installation Boundary
- AFFF Release Area Identified in Preliminary Assessment (2015)
- AFFF Release Area Studied in Site Investigation (2019)

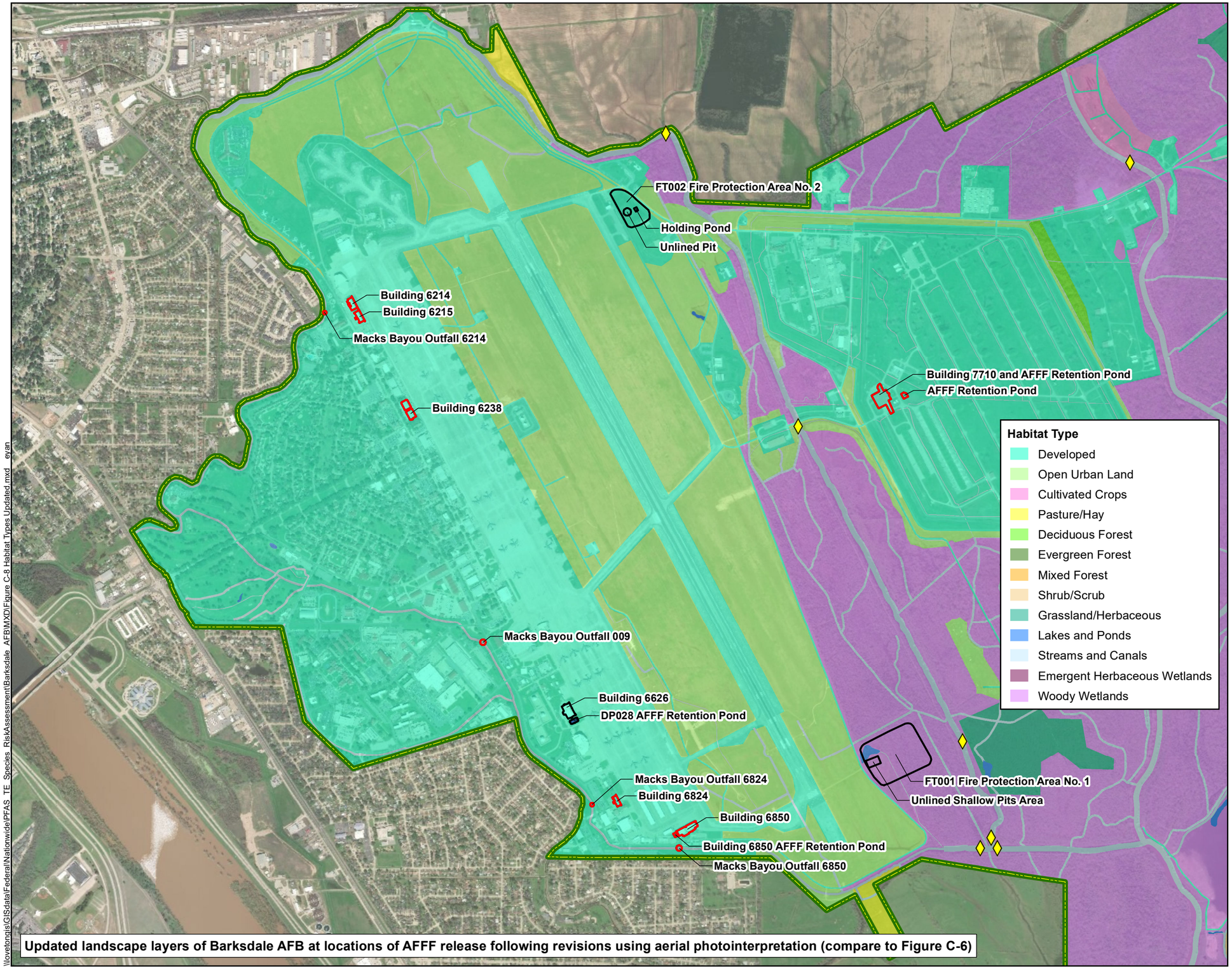
Map Date: 12/30/2019
Source: ESRI 2016, Barksdale AFB 2019
Projection: WGS 1984 UTM 15N Meter

N

0 0.5 1
Miles

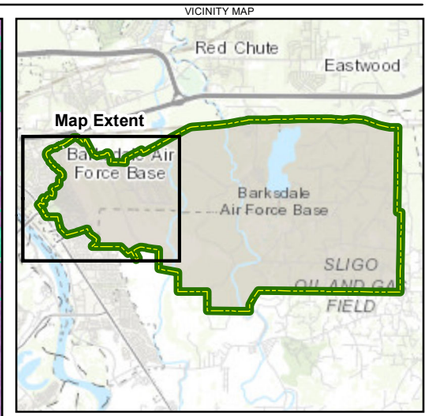
Figure C-7
Habitat Types (Updated)
PFAS T&E Species Risk Assessment
Barksdale Air Force Base

\\lovetongis\GISdata\Federal\Nationwide\PFAS_TE_Species_RiskAssessment\Barksdale_AFB\MXD\Figure C-7 Habitat Types Basewide Updated.mxd eyan



Updated landscape layers of Barksdale AFB at locations of AFFF release following revisions using aerial photointerpretation (compare to Figure C-6)

VICINITY MAP



Legend

- Installation Boundary
- AFFF Release Area Identified in Preliminary Assessment (2015)
- AFFF Release Area Studied in Site Investigation (2019)

Sample Locations

- Lanza et al. (2017)

Map Date: 12/30/2019
Source: ESRI 2016, Barksdale AFB 2019
Projection: WGS 1984 UTM 15N Meter

N

0 1,000 2,000
Feet

Figure C-8
Habitat Types (Updated)
PFAS T&E Species Risk Assessment
Barksdale Air Force Base

\\lovetongis\GIS\data\Federal\Nationwide\PFAS_TE_Species_RiskAssessment\Barksdale_AFB\MXD\Figure C-8 Habitat Types Updated.mxd eyan

Old Fire Station Building 2502
Petroleum, Oil and Lubricants Yard (Former Building 2121)
Hangars 2251 (C-17 Hangar)
Hangars 3210 and 3211
Romeo Row
WWTP Sludge Disposol Area - WP-021
Disposal Area (WP-021)
Hangar 3370
Hangar 3336
Old Fire Station (Former Building 1708)
Hangar 3335
Hangar 3333
Hangar 1897 (3-Bay Hangar)
and Hangars 1837 and 2251
Active Fire Training Area - Building 1613
Former Fire Training Area FT013
Former Fire Training Area No. 2 FT011
1983 Plane Crash Site
Suspected Fire Training Area No. 5
1980 Plane Crash Site

Spatial model of PFAS exposure potential to the Northern Pine Snake at McGuire of JBMDL

VICINITY MAP

Legend

- Installation Boundary
- Pituophis melanoleucus Habitat
- Pituophis melanoleucus Range
- Potential AFFF Release Area
- Potential AFFF Drainage Area

Map Date: 12/30/2019
Source: ESRI 2017, JBMDL 2018
Projection: WGS 1984 UTM 18N Meter

N

0 0.5 1
Miles

Figure C-9
Habitats Impacted for Pituophis melanoleucus - - McGuire
PFAS T&E Species Risk Assessment
Joint Base McGuire-Dix-Lakehurst

\\lovetongis\GISdata\FederalNationwide\PFAS_TE_Species_RiskAssessment\JBMDL\MXD\McGuire_DixFigure C-9 Habitats Impacted for Pituophis melanoleucus - McGuire.mxd eyan

Old Fire Station Building 2502
Petroleum, Oil and Lubricants Yard (Former Building 2121)
Hangars 2251 (C-17 Hangar)
Hangars 3210 and 3211
Romeo Row
WWTP Sludge Disposol Area - WP-021
Disposal Area (WP-021)
Hangar 3370
Hangar 3336
Old Fire Station (Former Building 1708)
Hangar 3335
Hangar 3333
Hangar 1897 (3-Bay Hangar)
and Hangars 1837 and 2251
Active Fire Training Area - Building 1613
Former Fire Training Area FT013
Former Fire Training Area No. 2 FT011
1983 Plane Crash Site
Suspected Fire Training Area No. 5
1980 Plane Crash Site

Spatial model of PFAS exposure potential to the Bald Eagle at McGuire of JBMDL

VICINITY MAP

Legend

- Installation Boundary
- Haliaeetus leucocephalus Habitat
- Haliaeetus leucocephalus Range
- Potential AFFF Release Area
- Potential AFFF Drainage Area

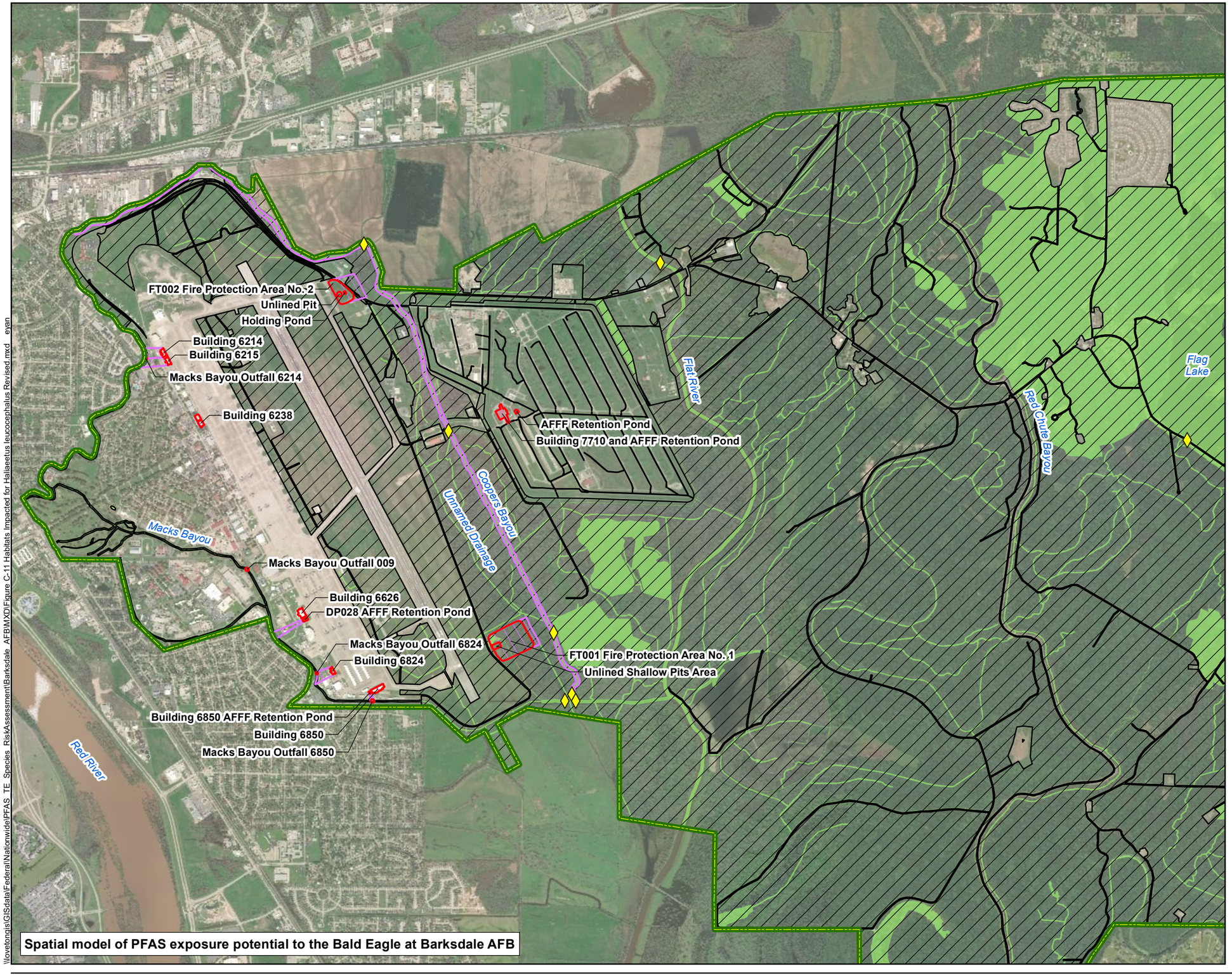
Map Date: 12/30/2019
Source: ESRI 2017, JBMDL 2018
Projection: WGS 1984 UTM 18N Meter

N

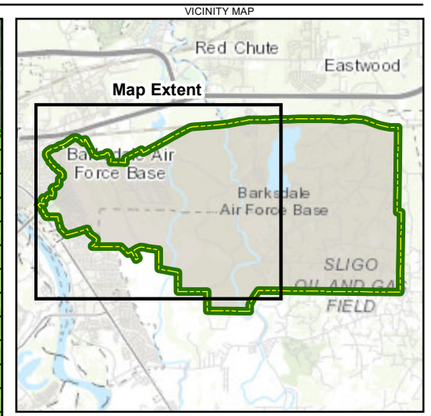
0 0.5 1
Miles

Figure C-10
Habitats Impacted for Haliaeetus leucocephalus - - McGuire
PFAS T&E Species Risk Assessment
Joint Base McGuire-Dix-Lakehurst

\\loyetongis\GISdata\Federal\Nationwide\PFAS_TE_Species_RiskAssessment\JBMDL\MXD\McGuire_DixFigure C-10 Habitats Impacted for Haliaeetus leucocephalus - McGuire.mxd eyan



VICINITY MAP



Legend

- Installation Boundary
- Haliaeetus leucocephalus Habitat
- Haliaeetus leucocephalus Range
- AFFF Release Area
- Potential AFFF Drainage Area

Sample Locations

- Lanza et al. (2017)

Map Date: 12/30/2019
Source: ESRI 2016, Barksdale AFB 2019
Projection: WGS 1984 UTM 15N Meter

N

0 2,000 4,000
Feet

Figure C-11
Habitats Impacted for
Haliaeetus leucocephalus - Revised Layer
PFAS T&E Species Risk Assessment
Barksdale Air Force Base

\\lovetongis\GIS\data\Federal\Nationwide\PFAS_TE_Species_RiskAssessment\Barksdale_AFB\MXD\Figure C-11 Habitats Impacted for Haliaeetus leucocephalus Revised.mxd eyan