Integrated Natural Resources Management Plan (INRMP) Volk Field Combat Readiness Training Center and Hardwood Weapons Range

2019

Prepared for:

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Cooperative Agreement:
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SIGNATURE PAGE

The Volk Field Combat Readiness Training Center (CRTC) and Hardwood Weapons Range (herein referred to as Hardwood Range) Integrated Natural Resources Management Plan (INRMP) has been prepared to manage significant natural resources in support of the military mission. Significant natural resources include the presence of federal and state-listed species, and the presence of Waters of the United States including wetlands. The Volk Field CRTC and Hardwood Range INRMP meets the intent of the Sikes Act (16 US Code [USC] § 670a–670l, 74 Stat. 1052).

To the extent that resources permit, the US Fish and Wildlife Service (USFWS), Wisconsin Department of Natural Resources (WDNR), and the Wisconsin Air National Guard (WIANG) by signature of their agency representative, do hereby enter into a cooperative agreement for the conservation, protection, and management of natural resources present on Volk Field CRTC and Hardwood Range. The agreement may be modified and amended by mutual agreement of the authorized representatives of the 3 agencies. This agreement will become effective upon the date of the last signatory and shall continue in full force for a period of 5 years or until terminated by written notice to the other parties, in whole or in part, by any of the parties signing the agreement.

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

Approving Officials:

MAY.DAVID.W.1099458620 Digitally signed by MAY.DAVID.W.1099458620 Date: 2019.10.22 17:02:59 -05'00'

Col. David May Date
Wisconsin Air National Guard
Commander, Volk Field CRTC and Hardwood Range

for Annette Trowbridge 11/08/19

Charles Wooley Date
US Fish and Wildlife Service
Acting Regional Director, Region 3

for Brett Bier 12/9/19

Preston Cole Date
Wisconsin Department of Natural Resources
Secretary

ANNUAL REVIEW DOCUMENTS

This page is used to certify the annual review and coordination of the Volk Field CRTC and Hardwood Range INRMP.

With the signature below, this document acknowledges that the annual review and coordination of the INRMP has occurred for the specified year.

Year: 2020

[ ]	Date
Volk Field CRTC and Hardwood Range	
[ ]	Date
US Fish and Wildlife Service	
[ ]	Date
Wisconsin Department of Natural Resources	

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Year: 2021

[ ]	Date
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Year: 2024

[ ]	Date
Volk Field CRTC and Hardwood Range	
[ ]	Date
US Fish and Wildlife Service	
[ ]	Date
Wisconsin Department of Natural Resources	

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Record of Review – In accordance with the Sikes Act, Department of Defense Instruction (DoDI) 4715.03, *Natural Resources Conservation Program*, Department of Defense Manual (DoDM) 4715.03, *INRMP Implementation Manual*, and Air Force Instruction (AFI) 32-7064, *Natural Resources Management*, an INRMP is required to be reviewed annually to ensure plans and projects remain current, and every 5 years for operation and effect. Annual reviews and updates are accomplished through annual meetings led by the base Environmental Management Office and attended by the USFWS, the WDNR, and, if required, the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA NMFS). During the annual meetings, actions taken over the previous year are discussed and actions to be taken over the coming year are discussed and agreed to. The meeting is followed up in writing for concurrence by the Environmental Manager (EM) and the representatives from the USFWS and the WDNR. As part of the annual and 5-year reviews, the EM shall hold meetings with internal stakeholders to ensure all personnel and tenants are informed of INRMP requirements.

ACRONYMS

°F	Degrees Fahrenheit
ACTS	Air Combat Training System
AFI	Air Force Instruction
AM	Airfield Management
ANG	Air National Guard
ANGRC	ANG Readiness Center
ATV	All-Terrain Vehicle
BA	Biological Assessment
BASH	Bird/Wildlife Aircraft Strike Hazard
BCI	Bat Conservation International
BGEPA	Bald and Golden Eagle Protection Act
BHWG	Bird Hazard Working Group
BMP	Best Management Practice
CE	Civil Engineer
CEQ	Council on Environmental Quality
CECOS	Civil Engineer Corps Officers School
CFR	Code of Federal Regulations
CIP	Common Installation Picture
CRTC	Combat Readiness Training Center
CWA	Clean Water Act
DEPARC	Defense Environmental Programs Annual Report to Congress
DoD	Department of Defense
DoDI	Department of Defense Instruction
DoDM	Department of Defense Manual
DOE	Department of Energy
DUSD	Deputy Under Secretary of Defense
DZ	Drop Zone
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EM	Environmental Manager
EO	Executive Order
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FFMC	Fine Fuel Moisture Code
FIRM	Flood Insurance Rate Map
FY	Fiscal Year
GIS	Geographic Information Systems
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
INRMP	Integrated Natural Resources Management Plan
IPAW	Invasive Plant Association of Wisconsin
IPM	Integrated Pest Management
IPMC	Installation Pest Management Coordinator
ISI	Initial Spread Index

JCEDC	Juneau County Economic Development Corporation
KBB	Karner Blue Butterfly
MBTA	Migratory Bird Treaty Act
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MSL	Mean Sea Level
NEPA	National Environmental Policy Act
NGB	National Guard Bureau
NM	nautical miles
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NWR	National Wildlife Refuge
OPR	Office of Primary Responsibility
PIF	Partners in Flight
RM	Range Management
ROD	Record of Decision
RPA	Remotely Piloted Aircraft
SWMP	Stormwater Management Plan
SWPPP	Stormwater Pollution Prevention Plan
US EPA	US Environmental Protection Agency
USACE	US Army Corps of Engineers
USAF	US Air Force
USC	US Code
USDA	US Department of Agriculture
USDA-WS	US Department of Agriculture Wildlife Services
USFS	US Department of Agriculture Forest Service
USFWS	US Fish and Wildlife Service
WDNR	Wisconsin Department of Natural Resources
WHA	Wildlife Hazard Assessment
WHMP	Wildlife Hazard Management Plan
WIANG	Wisconsin Air National Guard
WPDES	Wisconsin Pollution Discharge Elimination System
WSS	Web Soil Service
WWAP	Wisconsin Wildlife Action Plan

1.0 EXECUTIVE SUMMARY

The Sikes Act Improvement Act of 1997, 16 USC § 670a et seq., as amended, (herein referred to as the Sikes Act) requires federal military installations with significant natural resources to develop a long-range INRMP and implement cooperative agreements with other agencies. The Sikes Act is implemented through Department of Defense (DoD) and US Air Force (USAF) Instructions and Manuals. The conservation measures discussed in the INRMP help manage water resources, reduce bird/wildlife aircraft strike hazard (BASH) risk, manage federal and state-listed species, and sustain natural resources. The Volk Field CRTC and Hardwood Range INRMP is intended to be in support of and consistent with the intent of the Sikes Act.

The Volk Field CRTC and Hardwood Range INRMP is the primary guidance document and tool for managing natural resources. Volk Field CRTC is composed of approximately 2,231 acres in Juneau County. Volk Field CRTC also manages Hardwood Range as an operational location which occupies approximately 7,263 acres also in Juneau County. All facilities are ultimately under the command of the WIANG with the primary purpose to provide support, facilities, instruction, and airspace for military and civilian training in support of the military mission and civilian authorities. The natural resources management on Volk Field CRTC and Hardwood Range must be conducted in a way that provides for sustainable land use, complies with applicable environmental laws and regulations, real estate leases and licenses, and provides for no net loss in the capability to support the military mission. This INRMP provides a structure and plan to manage natural resources more effectively and ensure that Volk Field CRTC and Hardwood Range remain available to support the WIANG military mission into the future.

Specific goals in the Volk Field CRTC and Hardwood Range INRMP are supported by its objectives and work plans, as well as management strategies and specific actions. Goals and objectives are listed in **Section 8**, and projects are summarized in **Section 9**. The Volk Field CRTC and Hardwood Range INRMP provides a description of the installation, the military mission, the environment on the installation, and specific plans and strategies for natural resource management designed for sustainable military operations. The implementation of the Volk Field CRTC and Hardwood Range INRMP will ensure the successful accomplishment of the military mission while promoting adaptive management that sustains ecosystem and biological integrity, and provides for multiple uses of natural resources.

2.0 GENERAL INFORMATION

2.1 Purpose and Scope

This INRMP is the primary guidance document and tool for natural resource management at Volk Field CRTC and Hardwood Range that provides for sustainable, healthy ecosystems, complies with applicable environmental laws and regulations, real estate leases and licenses, and provides for “no net loss” in the capability of installation lands to support the military mission. The Installation Commander can use this INRMP to manage natural resources more effectively to ensure that installation lands remain available and in good condition to support the installation’s military mission over the long term.

The Volk Field CRTC and Hardwood Range INRMP is consistent with the Sikes Act as required by the DoD, USAF, and the National Guard Bureau (NGB). It was developed as a result of the presence of federal and state-listed species, and the presence of Waters of the United States including wetlands. A multiple-use approach is implemented to allow for the presence of mission-oriented activities, as well as protecting environmental quality through the efficient management of natural resources.

2.2 Management Philosophy

2.2.1 Ecosystem Management

Natural resources at Volk Field CRTC and Hardwood Range are managed with an ecosystem management approach as directed by AFI 32-7064 and DoDI 4715.03. Ecosystem management is defined as management to conserve major ecological services and restore natural resources while meeting the socioeconomic, political, and cultural needs of current and future generations. The goal of ecosystem management on military lands is to ensure that military lands support present and future test and training requirements while conserving, improving, and enhancing ecosystem integrity. The ecosystem management program for Volk Field CRTC and Hardwood Range incorporates these elements as described in **Table 1**.

Biodiversity is the degree of variation of life within a given ecosystem, region, or even the entire planet. The DoD's challenge is to manage for biodiversity in a way that supports the military mission. Specific management practices identified in the Volk Field CRTC and Hardwood Range INRMP have been developed to enhance and maintain biological diversity within the installations' ecosystems. Ecosystem management includes biodiversity conservation and invasive species control as integral parts of ecosystem management. Air National Guard (ANG) installations maintain or re-establish viable populations of all native species when practical and consistent with the military mission. ANG installations also identify the presence of exotic and invasive species, and implement programs to control and/or eradicate those species. Finally, when feasible, ANG installations develop joint control strategies with other federal, state, and local cooperating agencies and adjacent landowners to increase the effectiveness of control measures and for the benefits illustrated in **Figure 1**.

Table 1. Elements and Principles of Ecosystem Management	
DoDI 4715.03 Elements	
1	Avoid single-species management and implement an ecosystem-based multiple species management approach, insofar as that is consistent with the requirements of the Endangered Species Act (ESA)
2	Use an adaptive management approach to manage natural resources such as climate change
3	Evaluate and engage in the formation of local or regional partnerships that benefit the goals and objectives of the INRMP
4	Use the best available scientific information in decision-making and adaptive management techniques in natural resource management
5	Foster long-term sustainability of ecosystem services
AFI 32-7064 Principles	
1	Maintain or restore native ecosystem types across their natural range
2	Maintain or restore ecological processes such as wildland fire and other disturbance regimes where practical and consistent with the military mission
3	Maintain or restore the hydrological processes in streams, floodplains, and wetlands when feasible
4	Use regional approaches to implement ecosystem management on an installation by collaboration with other DoD components as well as other federal, state and local agencies, and adjoining property owners
5	Provide for outdoor recreation, agricultural production, harvesting of forest products, and other practical utilization of the land and its resources, provided that such use does not inflict long-term ecosystem damage or negatively impact the ANG mission

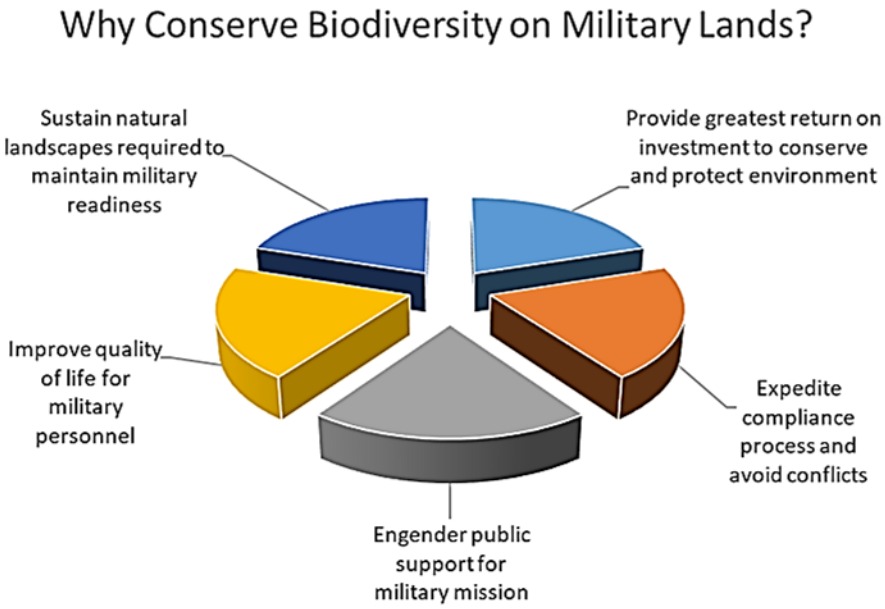

Figure 1. Why conserve biodiversity on Military Lands
**Adapted from Keystone Center, 1996.*

2.3 Authority

2.3.1 Natural Resources Law, Regulations & Policy

The ANG, USFWS, and WDNR determined an INRMP was required for Volk Field CRTC and Hardwood Range due to the presence of significant natural resources thereby necessitating conservation and management.

DoDI 4715.03, *Natural Resources Conservation Program*, identifies the DoD policies and procedures concerning natural resources management and INRMP reviews, public comment, and endangered species consultation. INRMPs are required to be jointly reviewed by the USFWS, state fish and wildlife agency, and ANG installation for operation and effect on a regular basis, but not less often than every 5 years. Minor updates and continued implementation of an existing INRMP do not require need for public comment. Major revisions to an INRMP require an opportunity for public review. The degree of endangered species consultation when updating or revising an INRMP depends upon specific projects identified in the INRMP and the amount of past consultation. Most updates and revisions will not require formal consultation. ESA Section 7 consultation is required for INRMPs that contain projects that may affect federally-listed species or designated critical habitat. The need for such consultation should become apparent during the review for operation and effect, and implemented if necessary, as part of an INRMP revision.

2.3.2 National Environmental Policy Act Compliance

The Environmental Impact Analysis Process (EIAP) is the process by which federal agencies facilitate compliance with environmental regulations. The primary legislation affecting these agencies' decision-making process is the National Environmental Policy Act of 1969 (NEPA; 42 USC § 4321 *et seq*.). NEPA requires that any organization using federal monies, proposing work on federal lands, or requiring a federal permit consider potential environmental consequences of proposed actions. The law's intent is to protect, restore, or enhance the environment through well-informed decisions.

The Council on Environmental Quality (CEQ) was established under NEPA for the purpose of implementing and overseeing federal policies as they relate to this process. The adoption of an INRMP can be considered a major federal action as defined by Section 1508.18 of the CEQ regulations. This requires an analysis of potential environmental impacts for the implementation of an INRMP, although a complete Environmental Assessment (EA) is not necessarily required as individual actions and projects undergo their own NEPA analysis.

CEQ regulations require intergovernmental notifications prior to making any detailed statement of environmental impacts. Through the Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) process, Volk Field CRTC and Hardwood Range notifies relevant federal, state, and local agencies and allows them sufficient time to make known their environmental concerns specific to a Proposed Action. Comments and concerns submitted by these agencies during the IICEP process are subsequently incorporated into the analysis of potential environmental impacts. This coordination fulfills requirements under Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, and AFI 32-7061, *Environmental Impact Analysis Process*. Furthermore, public participation in decision making on new proposals is required. Consideration of the views and information of all interested persons promotes open communication and enables better decision-making. Agencies, organizations, and members of the

public with a potential interest in the Proposed Action, including minority, low-income, disadvantaged, and Native American groups, are urged to participate.

The EIAP for the implementation of the Volk Field CRTC and Hardwood Range INRMP (September 2014; WIANG 2014a) fell under the 2008 INRMP EIAP. It was conducted in accordance with NEPA, CEQ *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 Code of Federal Regulations [CFR] § 1500-1508), and 32 CFR Part 989. The EIAP and decision-making process for the Proposed Action (implementation of the Volk Field CRTC and Hardwood Range INRMP) involved an examination of all environmental issues pertinent to the action proposed. Impact evaluations determined that no significant environmental impacts would result from implementation of the Proposed Action or any identified alternative. This determination was based on thorough review and analysis of existing resource information, and coordination with knowledgeable, responsible personnel from Volk Field CRTC and Hardwood Range, along with other relevant local, state, and federal agencies. The EIAP for the implementation of the 2008 Volk Field CRTC and Hardwood Range INRMPs does not include an analysis of effects for individual actions or projects. Individual actions or projects that have the potential to impact the environment will be analyzed separately in accordance with the NEPA process. A new EIAP was not needed for the 2014 INRMP update nor this INRMP update.

If a future action or project has the potential to impact the environment, federal agencies facilitate compliance with environmental regulations through the EIAP. EIAP identifies a proposed action's potential environmental impacts along with how those impacts can be mitigated. The primary legislation affecting these agencies' decision-making process is the National Environmental Policy Act of 1969 (NEPA; 42 USC § 4321 et seq.). NEPA requires that any organization using federal monies, proposing work on federal lands or requiring a federal permit consider potential environmental consequences of proposed actions. The law's intent is to protect, restore, or enhance the environment through well informed decisions. Air National Guard installations initiate EIAP by completing Air Force Form 813 through ANG Readiness Center's (ANGRC's) online NEPA Tool. The ANGRC reviews the Form 813 and associated information to determine if the proposed action requires a categorical exclusion, EA, or environmental impact statement (EIS).

2.3.3 Responsibilities

The updated Volk Field CRTC and Hardwood Range INRMP has been organized to ensure the implementation of year-round, cost-effective management projects that meet the requirements of the installation. Various personnel and organizations within the ANG are responsible for the implementation of this INRMP are described in the following subsections.

2.3.3.1 Installation Commander

The Installation Commander oversees the installation and is responsible for ensuring the goals and objectives of the INRMP are implemented to the fullest extent practicable based on funding and manpower availability. The Installation Commander is the official signatory for the Volk Field CRTC and Hardwood Range INRMP.

2.3.3.2 Base Civil Engineer

The Base Civil Engineer (CE) plans, budgets, approves, and oversees all maintenance and construction activities performed on the installation. All maintenance and construction-related projects or management activities proposed in this INRMP should be approved by the Base CE to ensure that funding is available, and these projects are complementary to the installation's comprehensive planning processes.

2.3.3.3 ANG NGB/A4AM Natural Resources Program Manager

The ANG NGB/A4AM Natural Resources Program Manager (ANG NR Program Manager) is the technical point of contact on all-natural resource related activities for the ANG. The ANG NR Program Manager tracks DoD and USAF policies and approves funding for projects identified as a priority in the Volk Field CRTC and Hardwood Range INRMP. The development of projects included in the INRMP and any deviations from those projects will be submitted to the ANG NR Program Manager for review. Decisions resulting from those reviews will be a cooperative effort between the ANG NR Program Manager and the EM and/or the installation's Natural Resources Manager, when applicable.

2.3.3.4 Environmental Manager

The EM plans, budgets, approves, and oversees all environmental activities performed on the installation and is responsible for ensuring that activities associated with the implementation of this INRMP adhere to applicable federal, state, local, and USAF environmental regulations and guidelines. Projects proposed in the Volk Field CRTC and Hardwood Range INRMP are reviewed by the EM and the ANG NR Program Manager. The EM should independently review deviation from the projects proposed in this INRMP. Persons responsible for implementation of the INRMP are required to attend the Civil Engineer Corps Officers School (CECOS) DoD Natural Resources Compliance course (http://www.netc.navy.mil/centers/csfe/cecos/CourseDetail2.htm#tab25).

2.3.3.5 Natural Resources Manager

The Natural Resources Manager oversees the management of natural resources on the installation. The Natural Resources Manager provides onsite management of most of the ongoing natural resources management activities presented in this Plan. However, several management activities (e.g., BASH) fall under the responsibilities listed for other installation organizations. The Natural Resources Manager will act as a technical point-of-contact for those activities for which they are not directly responsible for implementing.

2.3.3.6 Pest Management Coordinator

The Installation Pest Management Coordinator (IPMC) is responsible for the protection of real estate, control of potential disease vectors or animals of other medical importance, control of undesirable or nuisance plants and animals (including insects), and prevention of damage to natural resources. Pest management personnel utilize Integrated Pest Management (IPM) approaches and are responsible for the implementation of the IPM Plan (WIANG 2014b). The IPMC is also responsible for coordinating with US Department of Agriculture Wildlife Services (USDA-WS) for all depredation activities, regarding required permitting, and for permit

clarification, when required, while keeping the INRMP Working Group appraised of proposed modifications or changes to permits as they occur or are proposed.

2.3.3.7 Flight/Ground Safety Office

The Volk Field CRTC and Hardwood Range Flight/Ground Safety Office is responsible for development, implementation, and management of the Volk Field CRTC and Hardwood Range BASH Program. The Flight/Ground Safety Office also ensures that bird/wildlife strikes resulting from aircraft assigned to transient units at Volk Field CRTC and Hardwood Range are accurately documented and reported to the EM and the USAF BASH Team. In addition, the Flight/Ground Safety Office participates in the Volk Field CRTC and Hardwood Range Bird Hazard Working Group (BHWG), which conducts meetings to evaluate and refine strategies for the reduction of BASH risk. The Flight/Ground Safety Office is responsible for coordinating with and providing required information on BASH activities with the EM.

2.3.3.8 Airfield Management

Airfield Management is responsible for ensuring that the airfield is acceptable and appropriate for flight activity. Airfield Management (AM), in conjunction with the Natural Resources Manager, is responsible for implementing all activities presented in this Plan that pertain to the BASH Reduction Program at Volk Field CRTC. Airfield Management also ensures that bird/wildlife strikes that occur with aircraft assigned to host tenant transient units at Volk Field CRTC are accurately documented and reported to the USAF BASH Team. In addition, AM ensures that the BHWG conducts meetings to implement reduction of the BASH threat on the installation.

2.3.3.9 Range Management

Range Management (RM), in conjunction with the Natural Resources Manager, is responsible for implementing activities presented in this INRMP that pertain to Hardwood Range. RM is also responsible for approving any Range improvement or construction projects.

2.3.3.10 US Department of Agriculture Wildlife Services

US Department of Agriculture Wildlife Services (USDA-WS) is responsible for monitoring hazardous wildlife that have the potential to create an aircraft strike hazard. USDA-WS personnel support activities that pertain to the BASH Program and are responsible for wildlife depredation requirements within the installation, as well as dispersal/harassment, capture and translocation, trapping and removal, surveillance and monitoring, and depredation permit acquisition.

2.3.3.11 Operations and Maintenance

Operations and Maintenance personnel are responsible for all grounds maintenance activities on the installation. In addition, this office will ensure completion of the habitat management protocols established in this INRMP taking into account mission requirements, natural resource management goals, and regulatory compliance requirements. The Operations and Maintenance personnel will also periodically review grounds maintenance equipment to determine if new or additional equipment is needed for the proper maintenance of the installation’s landscapes.

2.3.3.12 Legal Office

The Legal Office is responsible for ensuring the implementation of the management objectives contained within the Volk Field CRTC and Hardwood Range INRMP meet all regulatory and statutory requirements that pertain to natural resources management. The Legal Office will review any future natural resources management proposals and alert the Installation Commander and EM should there be any regulatory conflicts or shortfalls. In addition, the Legal Office will keep participating INRMP parties informed of any new statutes or regulations that might affect natural resources management.

2.3.3.13 Public Affairs Office

The Public Affairs Office located at Joint Force Headquarters serves as the point of contact to interface between the Installation Commander and civilian groups interested in the installations for environmental, educational, or other purposes.

2.3.3.14 US Fish and Wildlife Service

The USFWS is a signatory of the INRMP and provides input regarding natural resource projects and operational component plans. The EM and/or the ANG NR Program Manager can request updates of new species added to the federal threatened and endangered species lists which have the potential for inhabiting Volk Field CRTC or Hardwood Range. In addition, the USFWS, when feasible, will support ANG wildlife and vegetation surveys conducted at the Volk Field CRTC and Hardwood Range.

2.3.3.15 Wisconsin Department of Natural Resources

The WDNR is a signatory of the INRMP and provides input regarding natural resource projects and operational component plans. The EM and/or the ANG NR Program Manager can request updates of new species added to the state threatened and endangered species lists which have the potential for inhabiting Volk Field CRTC or Hardwood Range. In addition, the WDNR, when feasible, will support ANG wildlife and vegetation surveys conducted at the Volk Field CRTC and Hardwood Range.

2.4 Integration with Other Plans

By its nature, an INRMP is multidisciplinary and provides the summary for natural resources at a specific installation. As a result, information from an INRMP is incorporated into other plans and other plans are written to support the INRMP. The Volk Field CRTC and Hardwood Range INRMP plans include the following:

- BASH Management Plan – provides summary of the BASH program on Volk Field CRTC and Hardwood Range, including techniques, processes, responsibilities, and management recommendations (WIANG 2018b).
- Integrated Pest Management Plan (IPM Plan) – plan for management of pest species, including nuisance wildlife and invasive species, to minimize impact to mission, natural resources, and the environment (WIANG 2014c).
- Stormwater Management Plan (SWMP) – plan for management of stormwater and pollution prevention (WIANG 2018a).
- Wildland Fire Management Plan – an operational guide to ensure that procedures are in place to suppress wildfires and conduct prescribed burns, and defines levels of

protection needed to ensure the safety of military personnel, civilians, and infrastructure (WIANG 2018e).

In addition, this INRMP is also integrated with the following plans from other agencies.

- Wisconsin Wildlife Action Plan (WWAP) –The 2015-2025 WWAP the comprehensive resource for the conservation of rare and declining species and their habitats in Wisconsin (WDNR 2015b).
- Karner blue butterfly (KBB) Recovery Plans – USFWS prepared a Final Recovery Plan in September 2003 (USFWS 2003), with a Recovery Plan Update in February 2011 (USFWS 2011) and the 5-Year Review in September 2012 (USFWS 2012).

3.0 INSTALLATION OVERVIEW

3.1 Location and Area

Volk Field CRTC

Volk Field CRTC is approximately 90 miles northwest of Madison, Wisconsin, and 50 miles east of La Crosse, Wisconsin (**Figures 2** and **3**). The ANG occupies approximately 2,231 acres leased from the State of Wisconsin in Juneau County (Gonnering 2006). Volk Field CRTC is directly surrounded by numerous rural communities. Croplands and pasture dominate the region, but grasslands and woodlands are interspersed throughout the landscape (USDA 1997; **Figure 5**).

Hardwood Range

Hardwood Range is approximately 25 miles north-northeast of Volk Field CRTC in Juneau County, Wisconsin (**Figures 2** and **4**). The ANG occupies approximately 7,263 acres of state-owned land through a lease with the State of Wisconsin Department of Military Affairs. The Range has associated military airspace that is 8 nautical miles (NM) wide, 9 NM long, extends to 17,000 feet above ground level, and is designated as Restricted Area R-6904. The Range and surrounding area are primarily forested; however, there are some scattered agricultural lands adjacent to the property (WIANG 1997; **Figure 6**).

Figure 2. Volk Field CRTC and Hardwood Range Regional Map

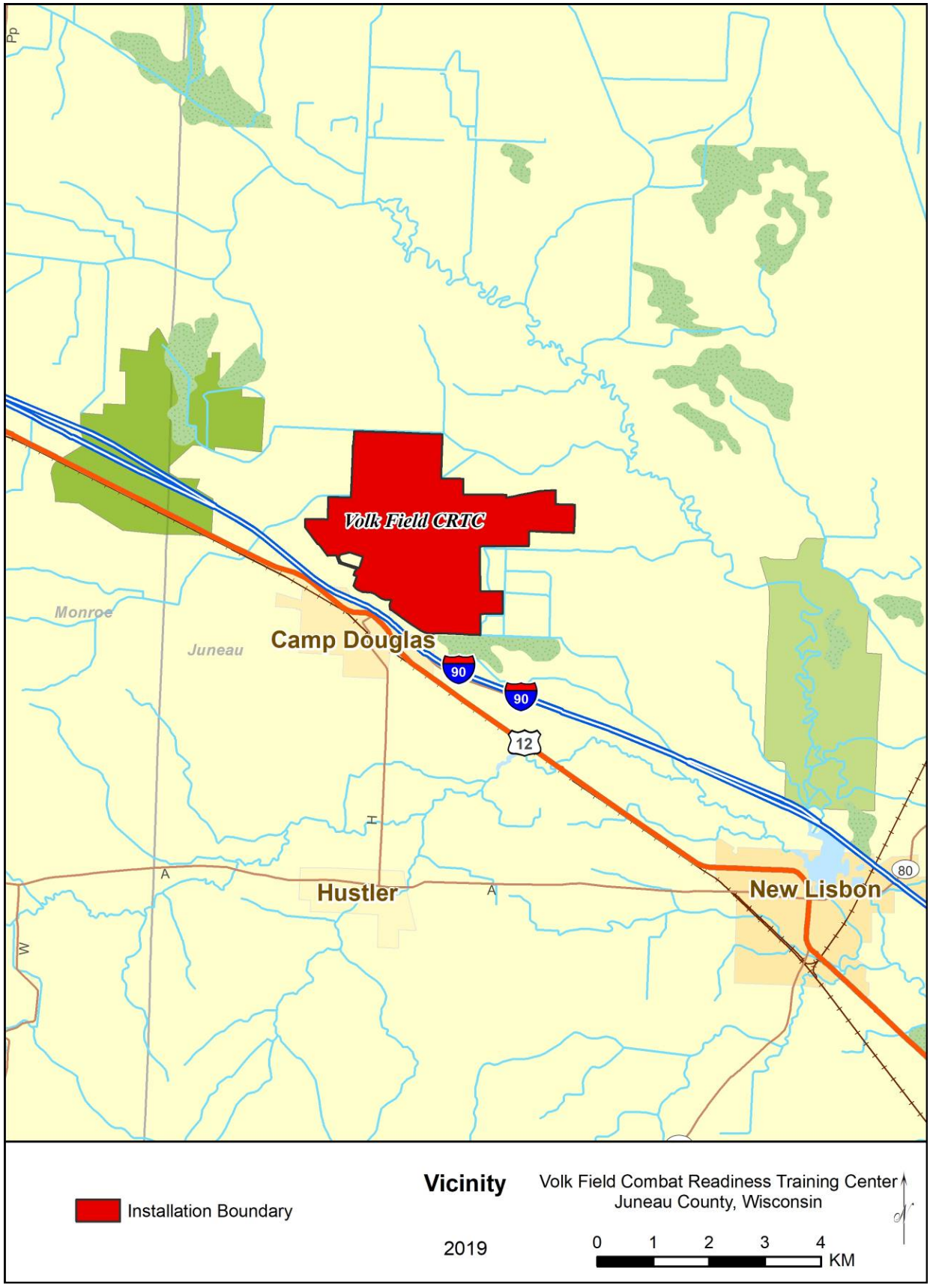

Figure 3. Volk Field CRTC Vicinity Map

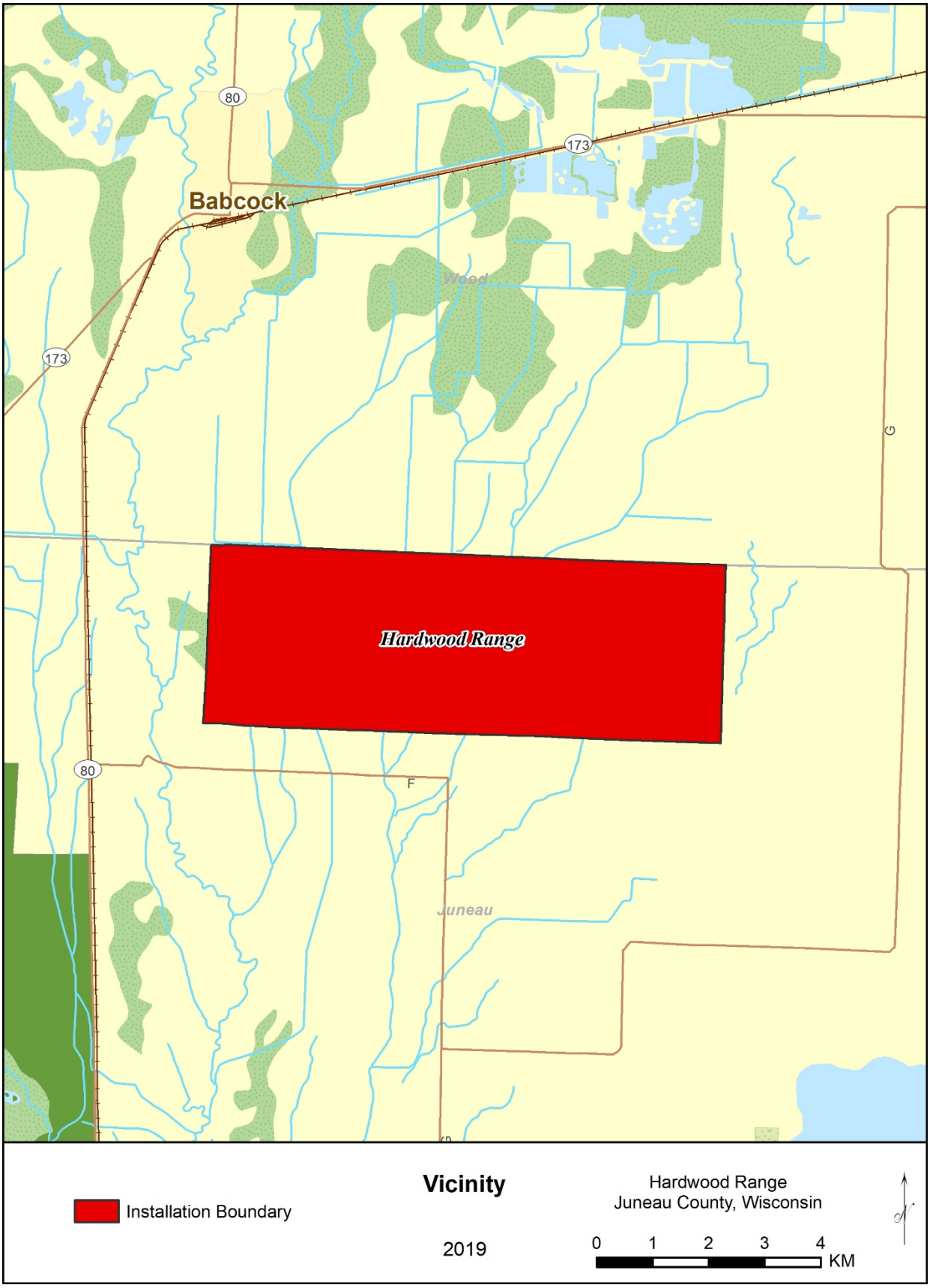

Figure 4. Hardwood Range Vicinity Map

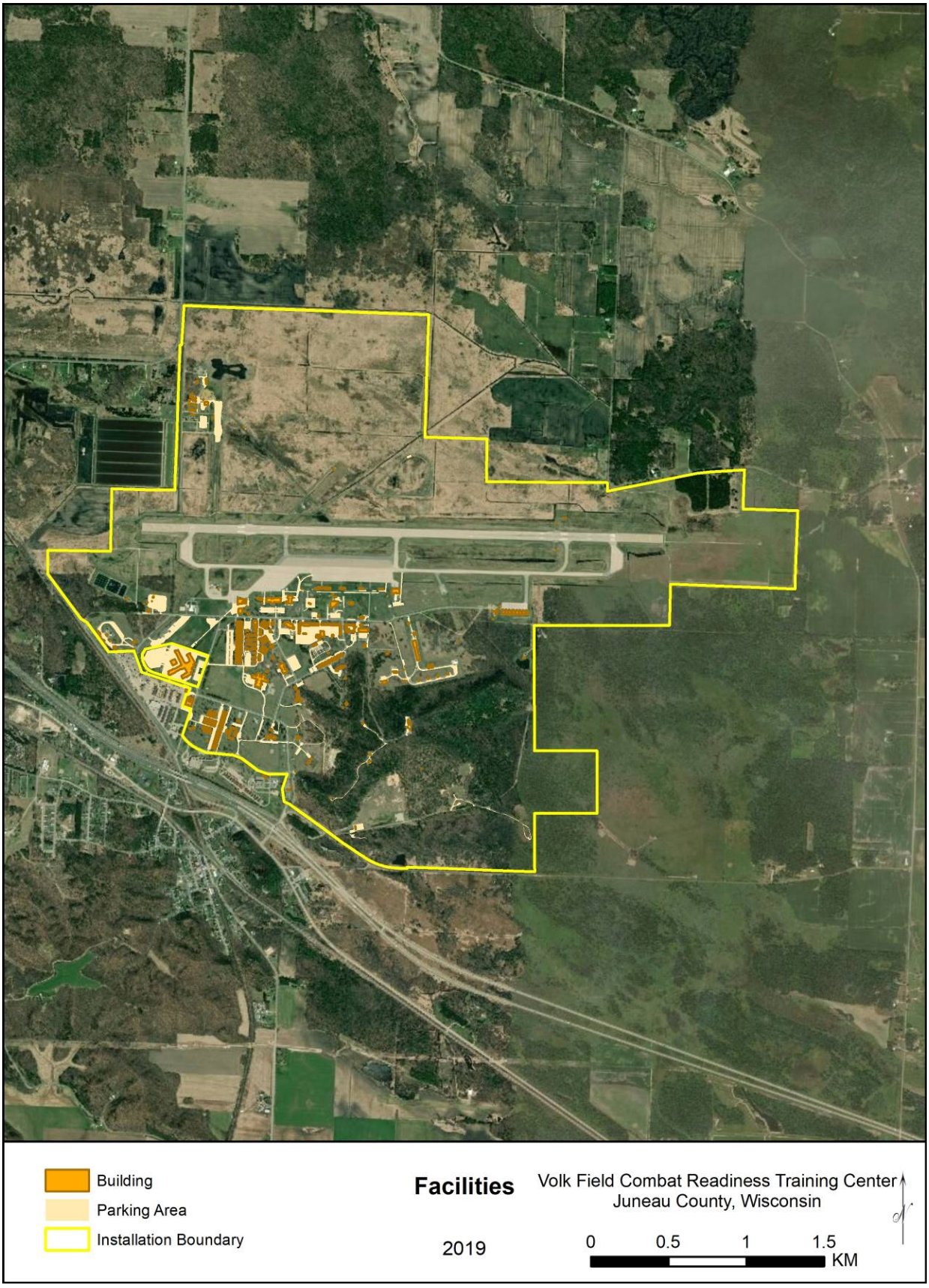

Figure 5. Volk Field CRTC Facilities Map

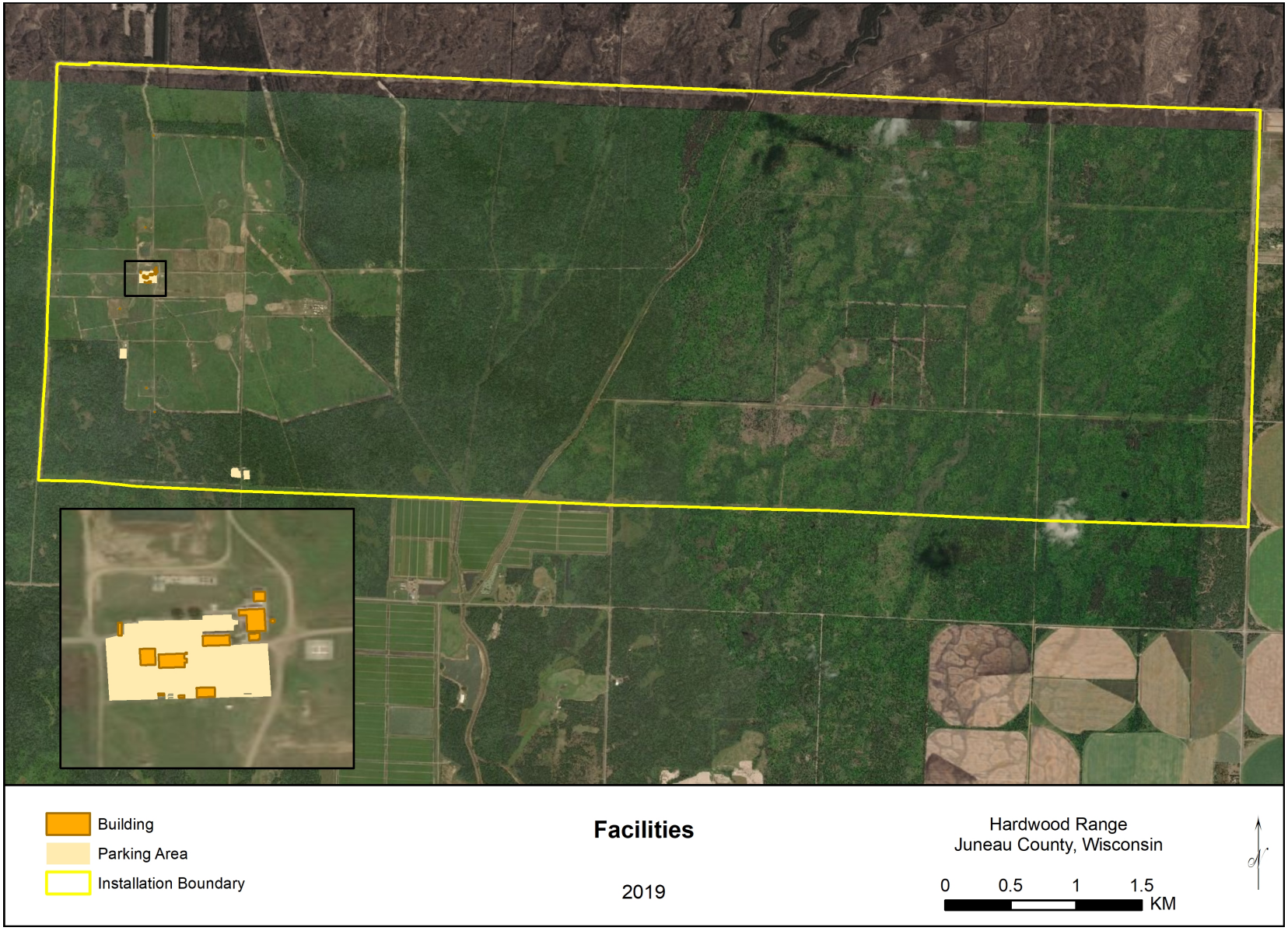

Figure 6. Hardwood Range Facilities Map

3.2 Installation History

Volk Field CRTC

In 1888, the Wisconsin Adjutant General, Chandler R. Chapman, purchased 400 acres of land 1/2 mile north of the village of Camp Douglas for rifle practice. Citizen volunteers from Camp Douglas cleared the brush from a 100 x 600-yard strip of land to create the initial firing range. This land became known as the Wisconsin Military Reservation. Adjutant General Charles Boardman, appointed in 1897, initiated annual encampments at the site for training purposes. To accommodate this activity and to permit the use of smokeless powder, the site was expanded to 800 acres (WIANG 1994).

In response to the outbreak of World War I, the Wisconsin and Michigan National Guards joined to form the 32nd Division known as the Red Arrow Division of the American Expeditionary Force. In 1927, the Wisconsin Military Reservation was renamed to Camp Williams in honor of the Military Quartermaster Lieutenant Colonel Charles R. Williams who had passed away the year before (WIANG 1994). Following World War I, hard-surface runways were constructed at Camp Williams to accommodate the increasing use of aircraft in combat missions (WIANG 1992).

During World War II, the airfield was expanded to include 3 runways with associated taxiways, aircraft parking aprons, landing lights, and a beacon. In 1947, the Department of Defense Reorganization Act allowed for the establishment of the WIANG. The 32nd Division became a unit of the WIANG and began training at the US Army complex at Camp McCoy (later Fort McCoy) near Sparta, Wisconsin, as it outgrew Camp Williams (WIANG 1992). Units from Minnesota, Indiana, North Dakota, and South Dakota began conducting 2-week annual training activities at Camp Williams in 1949.

In 1957, the field was renamed Volk Field in memory of Jerome A. Volk, the first WIANG pilot killed in action during the Korean War. During the 1960s, Volk Field became a dispersed operating base with a detachment of 200 active-duty Air Force personnel carrying out an air defense mission (WIANG 1992). The added operational use of Volk Field necessitated growth of the installation. By 1961, the size of Camp Williams and Volk Field had grown to more than 2,300 acres.

By the mid-1980s, military units from all service branches began using Volk Field year-round. In 1987, the NGB established the ANG's role in Air Base Operability. A year later, Volk Field was chosen to house the ANG training program, and in 1990 the installation was designated a CRTC (WIANG 1992). In 1992, the Air Combat Maneuvering Instrumentation system was completed for combat aircrew air-to-air and air-to-ground training (WIANG 1992).

Volk Field CRTC airfield and control tower

Hardwood Range

Hardwood Range was established in 1955 near Finley, Wisconsin as an air-to-ground range. Hardwood Range was established to allow military units within operating distance of Volk Field (i.e., unrefueled) to use Hardwood Range to conduct the air-to-ground training mission. The establishment of Hardwood Range came 1 year after the Federal government began leasing Camp Williams in response to increased use of the field by ANG units.

3.3 Military Missions

The ANG mission is two-fold with federal and state components. The federal mission is to maintain well-trained, well-equipped units available for prompt mobilization during war and to provide assistance during national emergencies (e.g., natural disasters or civil disturbances). During peacetime, combat-ready units and support units are assigned to USAF major commands to carry out missions compatible with training, mobilization readiness, humanitarian, and contingency operations. When units are not mobilized, they report to the Governor of their respective state. The state mission is to provide protection of life, property, and preserve peace, order, and public safety.

Volk Field CRTC
The Volk Field is a Combat Readiness Training Center. It offers Local Flyer Support, training opportunities for several units in the area (Madison, Milwaukee, Minneapolis, Duluth, Des Moines). Volk Field CRTC also serves as Deployed User Support, a training site for more than 200 units per year. Currently there are no aircraft stationed at Volk Field CRTC.

Encompassing 2,230 acres with a 9,000-foot-long landing strip, Volk Field CRTC is a full-service military readiness training complex. When considered along with nearby Fort McCoy and Hardwood Range, it is one of the most valuable national defense training facilities in the country. It is also base to the 128 Air Control Squadron and Air Traffic Control services that extend ATC support to 8 local civilian airports. The installation also manages more than 10,000 square miles of Special Use Airspace that stretches from Eau Claire to over Lake Michigan. Volk Field CRTC is also site of the Air Combat Training System (ACTS), a computerized three-dimensional tracking and recording system, the most powerful training aid for combat aircrews, and one of only 20 such systems in the world.

Volk Field CRTC serves as the Aerial Port of Embarkation/Debarkation for Fort McCoy, which has in recent years seen deployment of tens of thousands of troops to Afghanistan, Iraq, and other overseas locations, along with millions of pounds of cargo. Camp Williams (Army National Guard) is home to the US Property & Fiscal Office for the State of Wisconsin. Also located on-installation are training facilities for police, fire, EMS, and first responders.

Recently a number of Army National Guard Remotely Piloted Aircraft (RPA) have been stationed at Camp Williams. This is likely to be an increasing part of the installation's mission in the future. There will be more RPAs, and, as a result, there will be a greater need to train more operators in more areas of the country. There is also likely to be more simulator training, but also a greater need for more realistic, efficient live fly training. There will be less ordnance actually dropped as part of that training, but from much greater standoff distance with a need for more realistic target arrays. New aircraft, such as the F-35 and F-22, will come on-line in the future and are expected to deploy to the installation for training (WIANG 2011).

Hardwood Range
Hardwood Range is planned, developed, maintained, and improved to provide a realistic air-to-ground weapons training environment, consistent with the CRTC mission. The mission of Hardwood Range is to provide training for combat aircrews through the presentation of a variety of realistic target arrays for air-to-ground weapons delivery (WIANG 2006b). It provides visual scoring capability from the ground using targets and acoustic scoring for forward-firing ordnance (WIANG 2006b). It also provides airdrop and deployment training at designated drop zones (DZs). The majority of the airdrop training is conducted by C-130 aircraft.

Impact Area at Hardwood Range

3.4 Surrounding Communities

Volk Field CRTC

The area surrounding Volk Field CRTC is rural and agricultural and contains farms and large areas of marsh and undeveloped land (WIANG 1992). In the vicinity of Volk Field CRTC is Camp Douglas, a community with a population of approximately 600 people. Although a 10-acre site has been zoned for light and heavy industry within Camp Douglas, the area has yet to be developed (Juneau County Economic Development Corporation [JCEDC] 2006). Transportation corridors including Interstate 90-94, US Highway 12/Wisconsin Highway 16, and the Soo Line Railroad are all within a quarter mile of the installation. Much of the undeveloped land in the vicinity of Volk Field CRTC is composed of farm fields and wetlands.

Hardwood Range

Commercial forestry is prevalent in the vicinity of Hardwood Range. Forest products include pulp for paper mills, woodchips, and Christmas trees (ANG 2000). Commercial cranberry production is also widespread throughout the region. The Hatch Cranberry Farm owns cranberry bogs on the northern part of the east border and on the southern border of the Range. There are other scattered agricultural lands within the vicinity of Harwood Range. Despite high productive use of the land, much of the land surrounding Hardwood Range is managed for multiple-use conservation purposes. More than 100,000 acres of land are managed by various local, state, and Federal agencies as wildlife management areas, including the Necedah National Wildlife Refuge (NWR). Much of the undeveloped land in the vicinity of Hardwood Range is composed of Juneau County Forest lands. The Juneau County Forest lands are a valuable source for

commercial forestry activities. In addition, these areas provide diverse recreational opportunities and amenities for the public.

3.5 Local and Regional Natural Areas

Many local, state, and Federal Natural Resource and Recreation Management Areas are located within 5 miles of Volk Field CRTC and Hardwood Range. These include Sandhill Wildlife Area, the Meadow Valley Wildlife Area, Mill Bluff State Park, Necedah NWR, Wood County Wildlife Area, and Juneau and Wood County Forest lands.

4.0 PHYSICAL ENVIRONMENT

4.1 Climate

Volk Field CRTC and Hardwood Range are in an area that experiences a variety of weather patterns common to the Great Lakes region. The climate is seasonally temperate with cold winters and warm summers. Summer temperatures (June - August) in the nearby Madison, Wisconsin area range between approximately 56-82 degrees Fahrenheit (ºF). Temperatures greater than 90ºF occasionally occur during the summer months. Temperatures in winter (December - March) typically range between approximately 11-43ºF (NOAA 2018).

Average annual precipitation in the area of nearby Madison, Wisconsin, between 1981-2000 was 34.5 inches. Approximately 70% of the precipitation typically occurs in April – September (NOAA 2018). Average annual snowfall at nearby Mauston, Wisconsin is was 50.4 inches. The average length of the growing season is 138 days. The median date for the last frost in spring is May 15 and the median date of the first frost in the fall is September 26 (Wisconsin Online 2019).

Wisconsin's Task Force on Global Warming was formed in 2007 to satisfy EO 191 and create a climate change action plan. A climate change action plan lays out a strategy, including specific policy recommendations that a state will use to address climate change and reduce its greenhouse gas emissions. The Task Force's Final Report (Global Warming Task Force [GWTF] 2008) recommends reducing greenhouse gas emissions to 2005 levels by 2014, to 22% below 2005 levels by 2022, and to 75% below 2005 levels by 2050. The report also provides more than 50 policy recommendations that could lead to achieving those goals, including a proposed Federal or regional greenhouse gas cap and trade program (Department of Energy [DOE] 2008). As temperatures rise, more extreme weather can cause more intense rainstorms and flooding on the installations. Warmer temperatures could also cause longer periods of drought which can create conditions that could lead to more frequent wildfires (NRDC 2014).

4.2 Landforms

The installations lie on the beaches and nearshore sediments of an ancient lakebed, the remains of Glacial Lake Wisconsin from the past ice age. The advance and retreat of glacial ice during the Wisconsin glacial period greatly affected the present topography of Wisconsin. Because Volk Field CRTC and Hardwood Range are situated in a region called the Driftless Area, which was not covered by glacial ice, the area contains formations such as buttes and mesas, steep

bluffs, towers, and crags that are not found anywhere else east of the Mississippi River (WIANG 2005a). However, the topography of Volk Field CRTC and Hardwood Range also was affected by its proximity to the glacial ice sheets that lie just to the east and fall within the boundary of the Glacial Lake Wisconsin basin (WIANG 2005a).

Specifically, Volk Field CRTC is located on the southern boundary of the ancient lake. While most of Volk Field CRTC ranges between 900-920 feet above mean sea level (MSL), a large bluff in the southeast section of the installation rises to a height of approximately 1,120 feet above MSL (**Figure 7**). Hardwood Range is primarily flat with elevations between 950-960 feet above MSL. There is a small bluff known as Cranberry Rock east of the eastern boundary of the installation (**Figure 8**).

Topography of Volk Field CRTC

4.3 Geology and Soils

Volk Field CRTC and Hardwood Range are situated within the Central Plain physiographic province, which covers the northeastern three-quarters of Juneau County. This province forms a low concentric belt of land that is floored primarily by weak Cambrian-aged sandstone and is characterized by numerous, small, flat-topped ridges. Beneath the sandstone lie Pre-Cambrian igneous and metamorphic rocks (WIANG 2014a). The soils in Volk Field CRTC and Hardwood Range area reflect the ancient glacial lakebed. Soil associations for Volk Field CRTC and Hardwood Range are based on the Web Soil Survey (WSS; USDA NRCS 2013) and their properties are included in **Table 2**.

Soils found in the Volk Field CRTC area include those of the Meehan-Newson complex (MnA), Meehan sand (MeA), the Newson-Dawson complex (Ns), Friendship sands (FrB), the Boone-Plainfield-Rock complex (BpF), Dawson Muck (Dc), Loxley Muck (Lx), Palms Muck (Pa), Poygan silt loam (Po), Wautoma loamy sand (Wa), and Wyeville sand (WeA). The installation also has pockets of Plainfield sands (PfB, PfC, and PfD) with slopes that range between 1-6%, all the way to 12-20%. Meehan, Newson, Plainsfield, and Friendship soils are sandy soils that formed in the basin of extinct Glacial Lake Wisconsin. Wautoma and Wyeville soils formed in sandy deposits and in the underlying clayey lacustrine deposits. Loxley and Dawson formed from the organic material underlain by the sandy outwash. Soils in some portions of the Volk Field CRTC have been described as Udorthents (Ud); in these areas, soil, and in some cases the underlying sandstone, have been removed. Typically, the color, texture, and thickness of the soil material vary widely in areas described as Udorthents (**Figure 9**).

Soil found at Hardwood Range include those of the Meehan-Newson complex (MnA), Meehan sand (MeA), Newson-Dawson complex (Ns), and Friendship sands (FrB). Soils in some portions of the Hardwood Range have been described as Psammaquents (Ps; **Figure 10**).

Table 2. Soil Types Found at Volk Field CRTC and Hardwood Range

Name	Type	Drainage	Properties/Uses	Slope
Boone-Plainfield- Rock outcrop (BpF)	Sand/Rock	Excessively drained	Sandy soil with rapid permeability and a sandstone bedrock layer at a depth of 33 inches	12–60%
Dawson muck (Dc)	Muck	Very poorly drained	Upper 38 inches is black muck; Subject to ponding because of high water table; Has high available water capacity	0–1%
Friendship sand (FrB)*	Sand	Moderately well-drained	Seasonal high-water table during wet periods; Rapid permeability and low water-holding capacity	1–6%
Loxley muck (Lx)	Muck	Very poorly drained	Water table above or near surface much of the year; subject to ponding; Black muck organic layer that reaches 60 inches deep	0–1%
Meehan sand (MeA)*	Sand	Slightly poorly drained	Seasonal high-water table; Rapid permeability and low water-holding capacity	0–3%
Meehan-Newson soil complex (MnA)*	Sand/Loamy Sand	Slightly poorly drained	Combines Meehan Sand and Newson soil characteristics; Newson soil has a high-water table much of the year, and is frequently flooded; Rapid permeability and low water-holding capacity	0–3%
Newson-Dawson soil complex (Ns)*	Loamy Sand/Muck	Poorly drained	55-65% Newson soil, 30-40% Dawson; Has high water table above or near the surface most of the year	0–2%
Palms Muck (Pa)	Muck	Very poorly drained	Subject to ponding because of high water table; Has very high available water capacity	0–1%
Plainbo sand (PdC)	Sand	Excessively drained	Rapid permeability and very low water-holding capacity	6–12%
Plainfield sand (PfB)	Sand	Excessively drained	Low water-holding capacity, rapid permeability	1–6%
Plainfield sand (PfC)	Sand	Excessively drained	Low water-holding capacity, rapid permeability	6–12%
Plainfield sand (PfD)	Sand	Excessively drained	Low water-holding capacity, rapid permeability	12–20%
Poygan silt loam (Po)	Silt Loam	Poorly Drained	Subject to flooding and ponding because of high water table; Has high available water capacity	0–2%
Psammaquents (Ps)	Sand	Poorly drained	Subject to ponding because of high water table; Has high available water capacity	nearly level
Udorthents (Ud)	Varies	Varies	Areas where soil and, in some cases sandstone, have been removed; Depth to sandstone bedrock from a few inches to 60 inches; Soil has been smoothed, leveled, and covered with topsoil	0–2%
Wautoma loamy sand (Wa)	Loamy Sand	Poorly drained	Permeability and water-holding capacity vary with depth; In undrained areas the water table is above or near the surface much of the year	0–2%
Wyeville sand (WeA)	Sand	Slightly poorly drained	Has moderate available water capacity	0–3%

Source: USDA NRCS 2013
*Indicates the soil series is found at both Volk Field CRTC and Hardwood Range.

4.4 Hydrology

Volk Field CRTC

Volk Field CRTC is located within the drainage basin of the Lemonweir and Little Lemonweir Rivers. Both of these rivers are 303(d) impaired in Juneau County (WDNR 2013). The Lemonweir River flows from northwest to southeast and is located approximately 3,700 feet northeast of the CRTC boundary. The Little Lemonweir River is approximately 1.5 miles south of the Volk Field CRTC boundary and flows from west to east. The Little Lemonweir River joins the Lemonweir River approximately 4.5 miles southeast of Volk Field CRTC, at the town of New Lisbon. Runoff is conveyed off site by a system of ditches which drain toward the north and the east. These drainage ditches lead directly to either the Lemonweir River or Little Lemonweir River. Volk Field CRTC has low-lying swampy areas which are poorly drained (WIANG 2007; **Figure 11**).

Drainage ditch on Volk Field CRTC

The other surface water resources at Volk Field CRTC include 3 artificial ponds. Beck's Pond is a mitigation pond constructed just north of the old north-south runway (runway currently used for Rapid Runway Repair training). Green Pond is a small pond near the east face of the bluff, and Ice Pond, formerly used for ice production for the village of Camp Douglas, is near the southern boundary (WIANG 2001; **Figure 11**).

The groundwater aquifers in the vicinity of Volk Field CRTC occur in Pleistocene deposits and the Cambrian Wonewoc Sandstone Formation (WIANG 1994). The aquifers are recharged by infiltration from precipitation and snowmelt and from surface water courses (WIANG 1994).

The depth to the groundwater is frequently less than 10 feet below the surface. This depth fluctuates seasonally due to depletion by evapotranspiration. Water table depths also fluctuate in years when annual precipitation is abnormally high or low. Volk Field CRTC draws on this aquifer through wells that supply good quality water.

Volk Field CRTC Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) data shows all of Volk Field CRTC falls outside of 100 or 500-year floodplain (Zone X; **Figure 11**).

Hardwood Range

Hardwood Range lies in the central Wisconsin River drainage basin that spans 5,050 square miles. Locally, the Range is drained by Cranberry Creek and Cranberry Creek's small tributaries and drainage ditches. Cranberry Creek drains to the Yellow River (WIANG 1994). The Yellow River eventually joins the Wisconsin River approximately 25 miles south of the Range (WIANG 1994). Both of these rivers are 303(d) impaired in Juneau and Wood counties (WDNR 2013; **Figure 12**).

Major groundwater resources for Hardwood Range include the outwash aquifer and the underlying Cambrian sandstone aquifer. The outwash aquifer, formed in the sand deposits of Glacial Lake Wisconsin, is 30-100 feet thick. Water yield from this aquifer is estimated to be in the 50-500 gallons per minute range (ANG 2000). The water supply for the southern portions of the Range is derived from the Cambrian Mount Simon Formation functions. The Pre-Cambrian bedrock that lies under the other formations has a severely limited groundwater supply (ANG 2000). Infiltration of precipitation and snowmelt are the primary groundwater recharge sources, while evaporation (including evapotranspiration), surface drainage, and well pumping are the largest causes of groundwater depletion (ANG 2000; **Figure 12**).

Hardwood Range falls within the floodplains of the Yellow River and Cranberry Creek. Cranberry Creek drains most of Hardwood Range and eventually flows into the Yellow River drainage system (WIANG 1997) Most of the installation falls outside of 100 or 500-year floodplain (Zone X). Only the central portion and southwestern corner of the installation is within the 100-year floodplain (Zone AE; **Figure 12**).

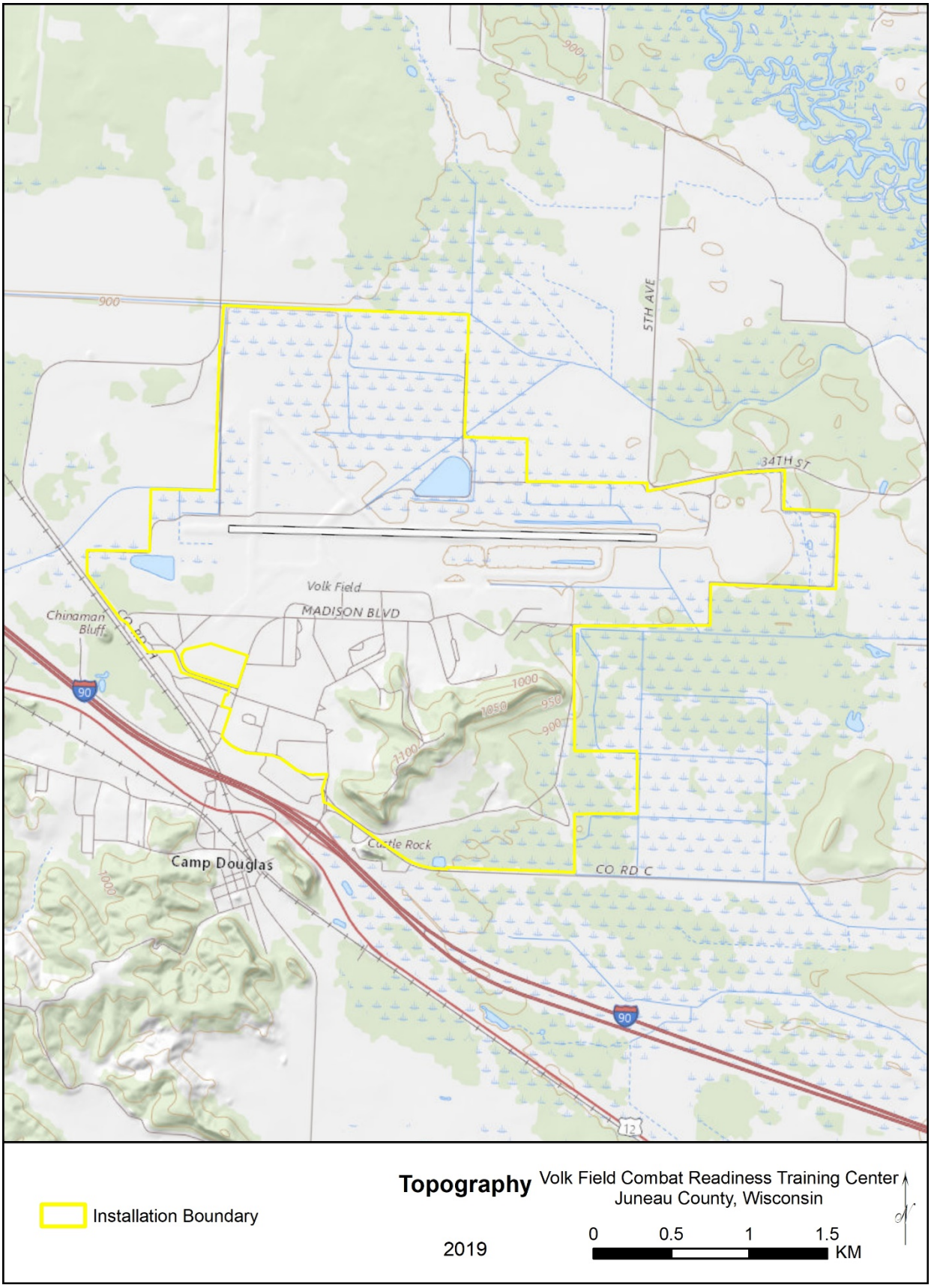

Figure 7. Volk Field CRTC Topography Map

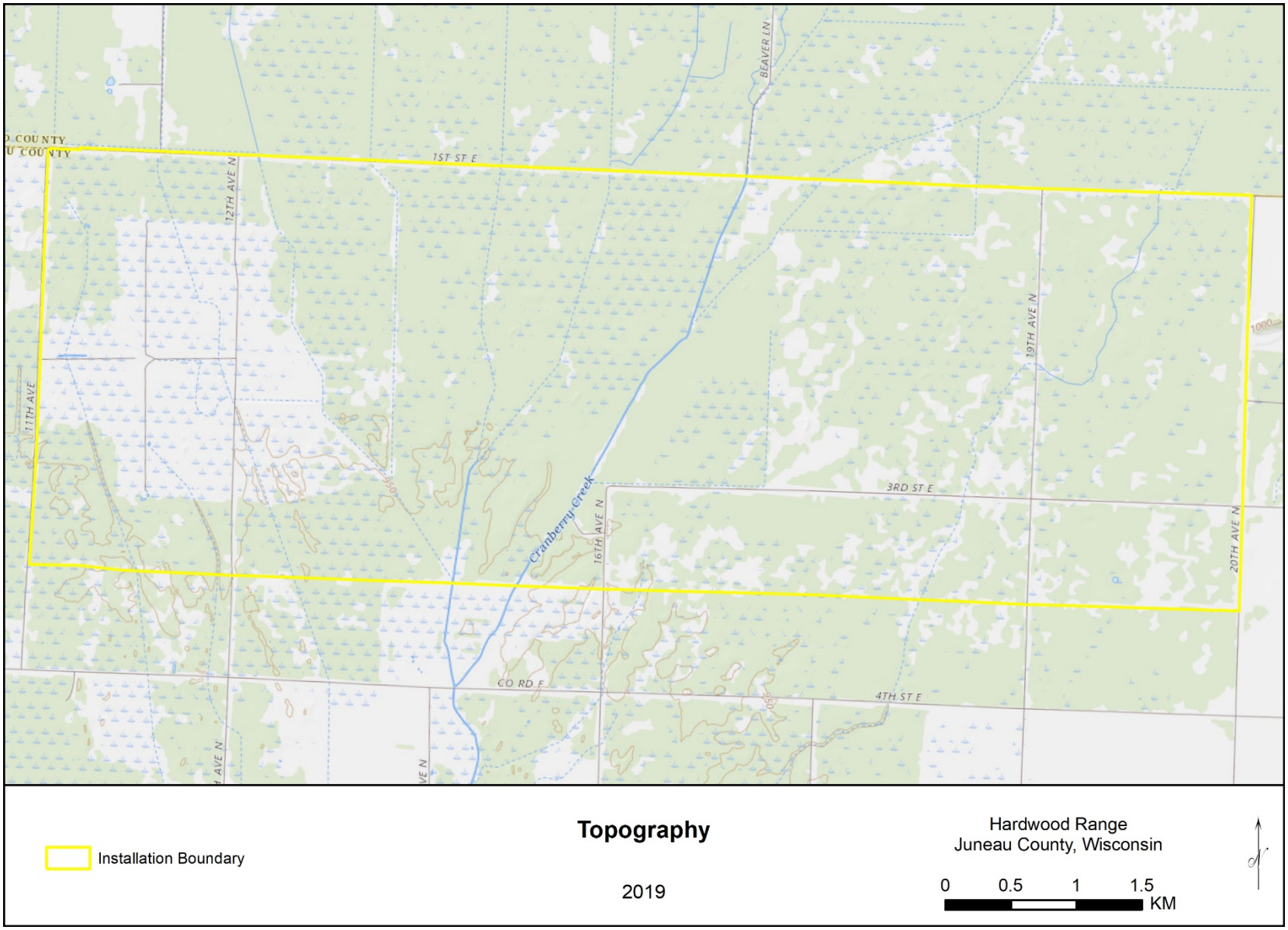

Figure 8. Hardwood Range Topography Map

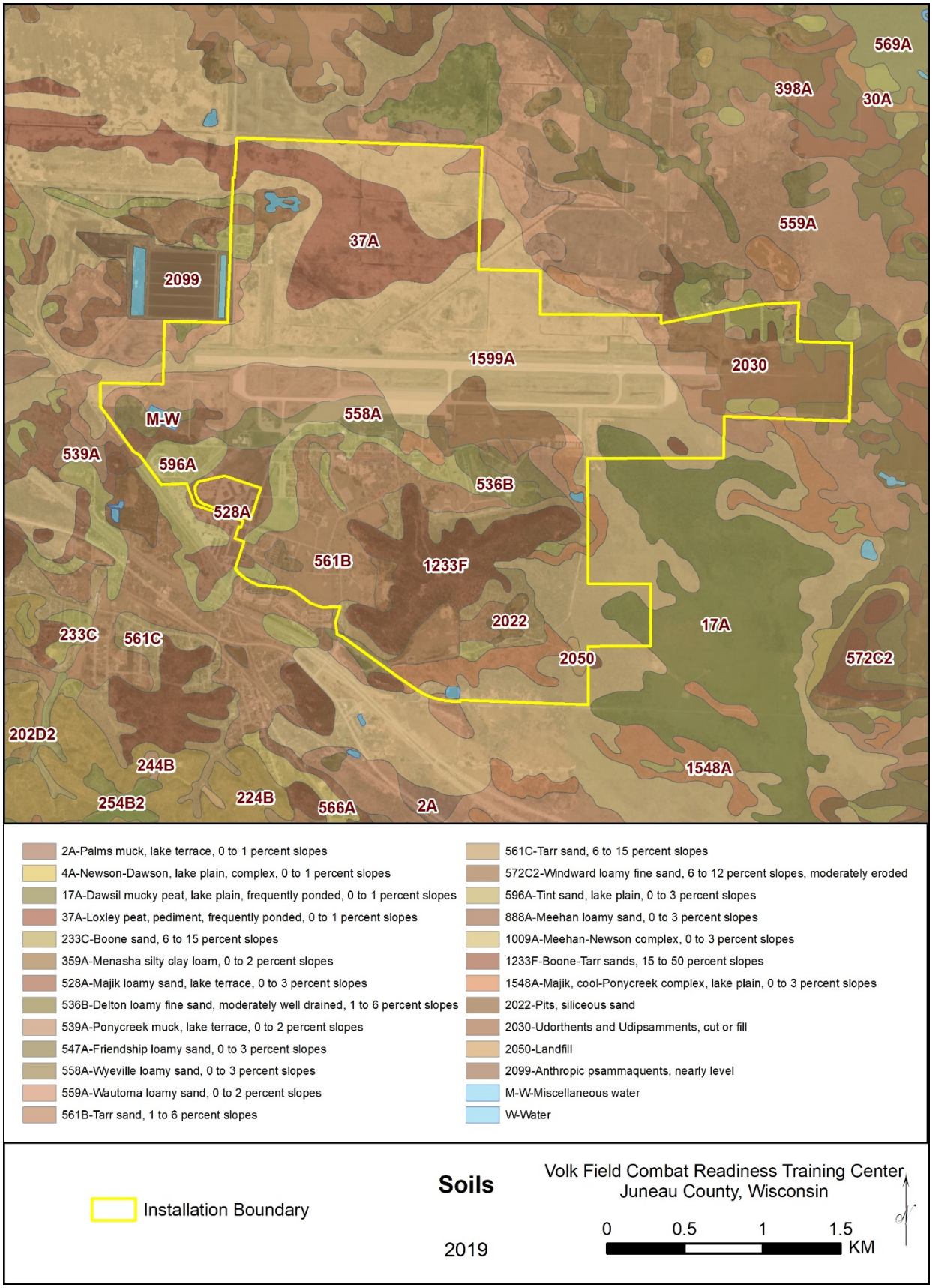

Figure 9. Volk Field CRTC Soils Map

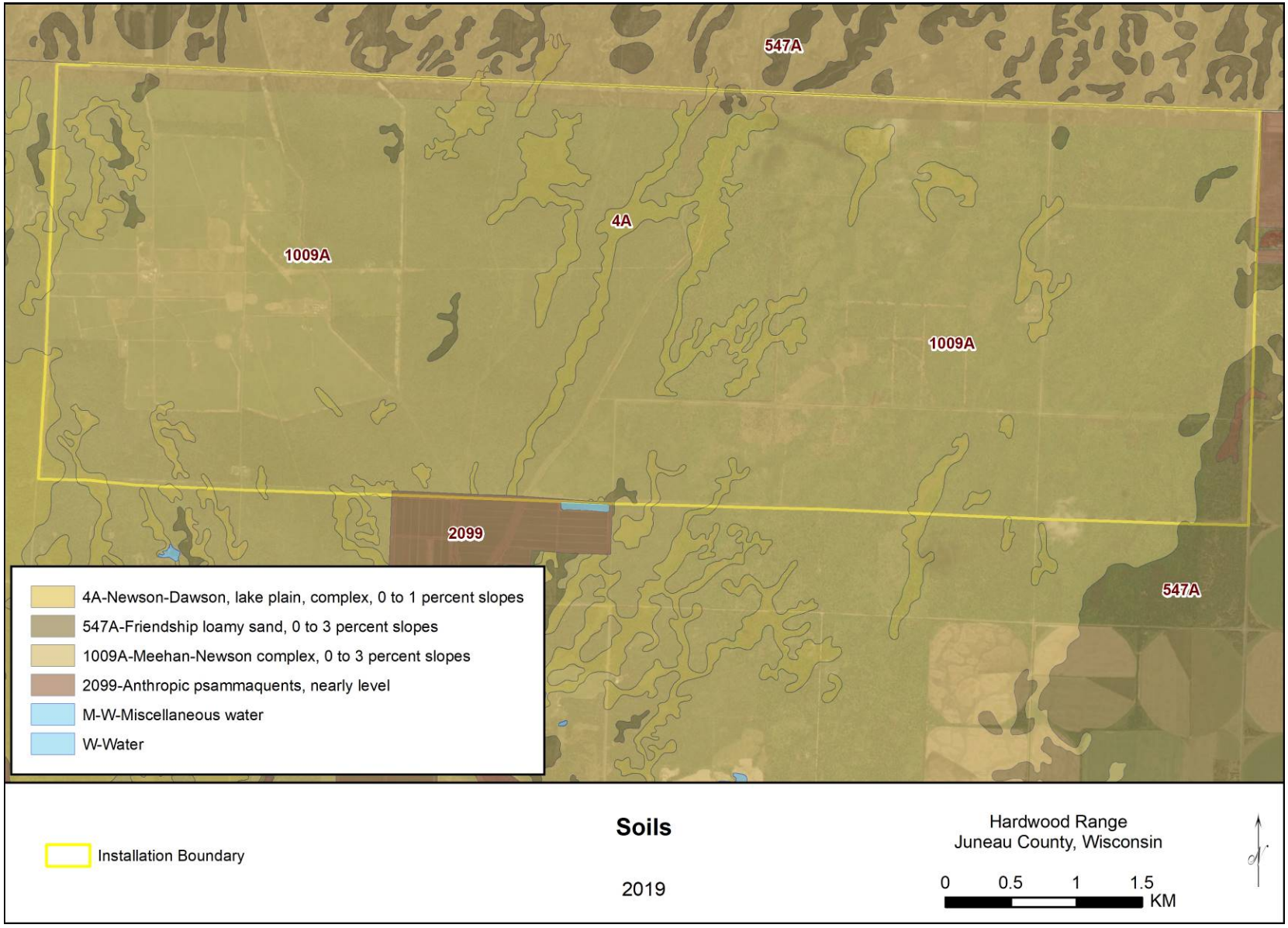

Figure 10. Hardwood Range Soils Map

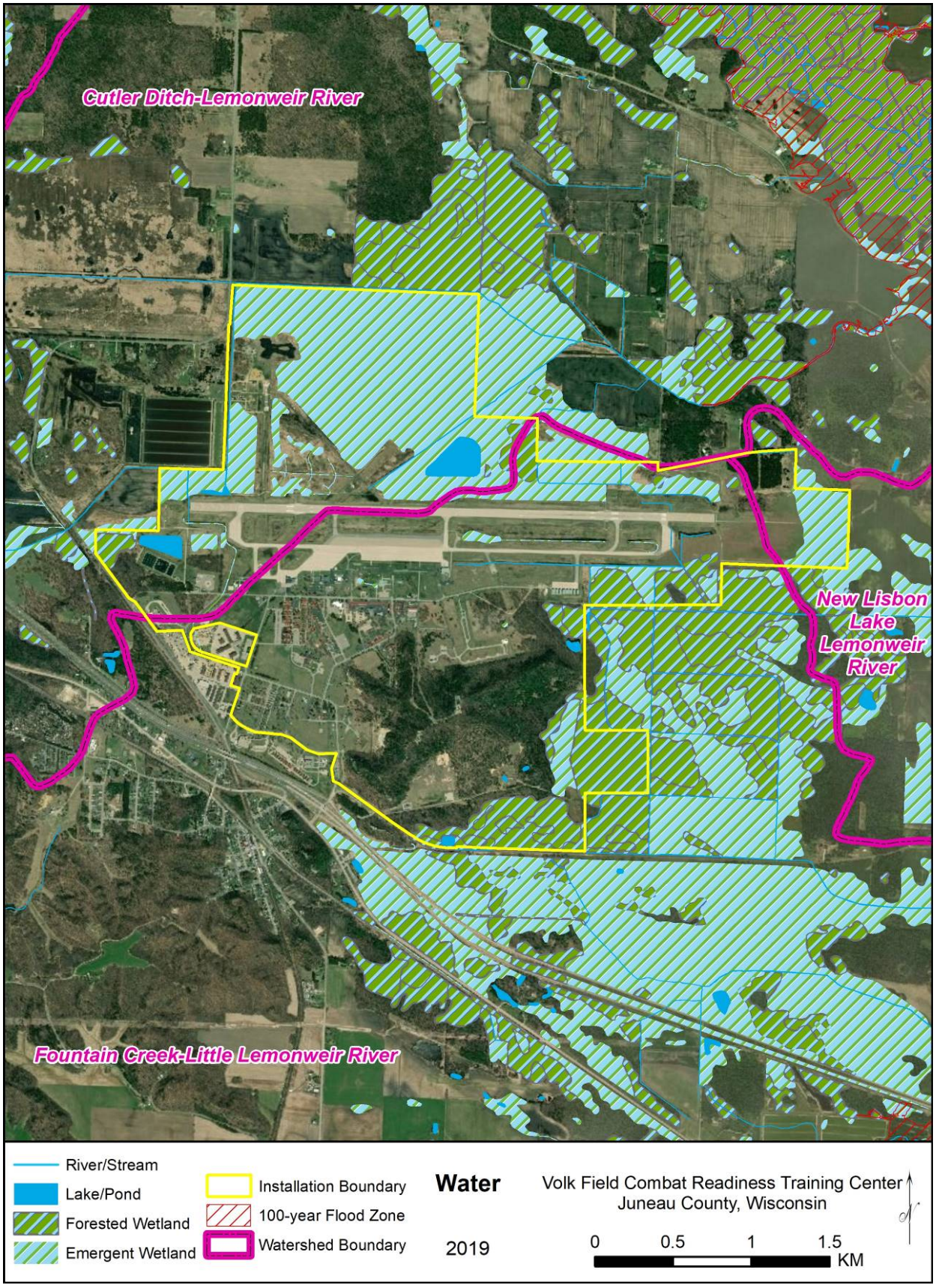

Figure 11. Volk Field CRTC Water Resources Map

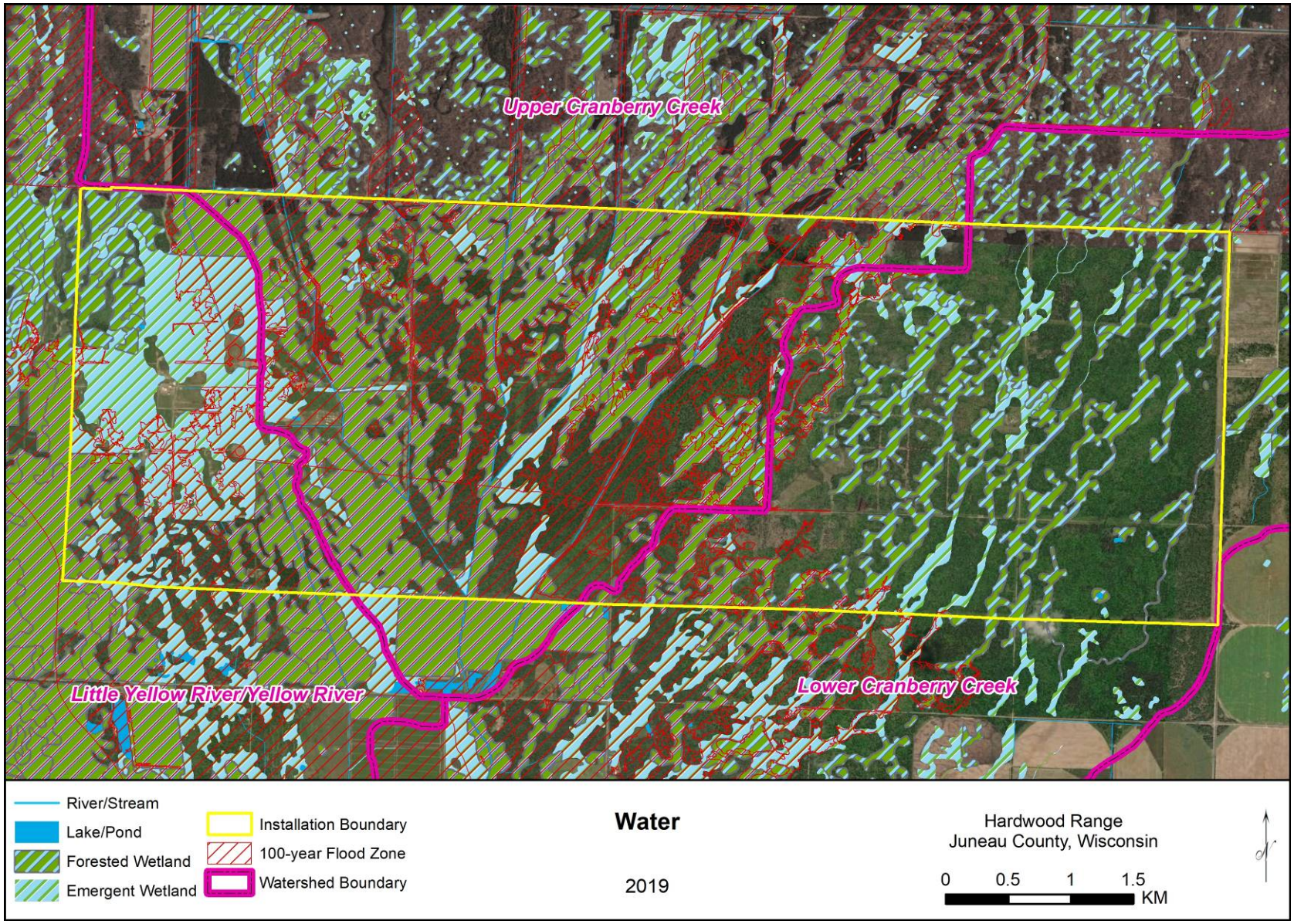

Figure 12. Hardwood Range Water Resources Map

5.0 ECOSYSTEMS AND THE BIOTIC ENVIRONMENT

5.1 Ecosystem Classification

Volk Field CRTC and Hardwood Range in Juneau County, Wisconsin, are generally within what is referred to as the *tension zone*—a vegetational transition area lying between the prairie forest province in the southwestern portion of the state and the northern hardwoods province in the northeast (Curtis 1959). According to Bailey (1995), this province lies between the Laurentian Mixed Forest Province and the Eastern Broadleaf (Continental) Forest. This transition zone, or ecotone, contains a blending of plant species from both provinces with southern species approaching their northern range limits and northern species approaching their southern limits (WIANG 2001).

5.2 Vegetation

5.2.1 Historic Vegetative Cover

Historic maps show the region of Volk Field CRTC to be on a boundary between the northeastern conifer-hardwood forest province and the southwestern prairie-oak grove-savanna province. Volk Field CRTC is a composite of swamp conifers, oak openings (bur, white, and black oaks), and prairie. The area of Hardwood Range is composed entirely of wetlands consisting of swamp conifers and a composite category of marsh and sedge meadow, wet prairie, and lowland shrubs (Finley 1976). Plant species include mixed stands of a few coniferous species and a few deciduous species, mainly yellow birch (*Betula alleghaniensis*), sugar maple (*Acer saccharum*), and American beech (*Fagus grandifolia*; Bailey 1995).

5.2.2 Current Vegetative Cover

The following are general descriptive accounts of the vegetative cover at Volk Field CRTC and Hardwood Range.

Volk Field CRTC
The 2230 acres comprising Volk Field CRTC has a diversity of plant species. Some plant communities have been heavily altered by humans. Other communities, such as those along the bluff (or dry mesa), still retain most of their native species. The composition of plant species in many of these communities reflects the transitional nature of the region, contributing to the enhanced natural biodiversity of the area. Flora and Fauna Surveys were conducted in 2018 and identified 8 distinct habitat units (WIANG 2019b). Their size, general location, and dominant vegetative species are described below in **Table 3**. A full list of species observed at Volk Field CRTC can be found in **Table 5**.

Volk Field CRTC Natural Vegetation Recovery Area

Forested area of Volk Field CRTC

Table 3. Habitat Units from Vegetation Surveys of Volk Field CRTC

Habitat Unit	Size (ac)	Community Location and/or Description	Dominant Species
Unit 1 – Deciduous Forest	55	Southeastern corner, southern fenceline, and near the water treatment facility	White oak (*Quercus alba*), paper birch (*Betula papyrifera*), white pine (*Pinus strobus*), common winterberry (*Ilex verticillata*), dewberry (*Rubus hispidus*), and western bracken fern (*Pteridium aquilinum*)
Unit 2 – Mixed Forest	223	Both coniferous and deciduous species	Black oak (*Quercus velutina*), jack pine (*Pinus banksiana*), eastern white pine, lowbush blueberry (*Vaccinium angustifolium*), Pennsylvania sedge (*Carex pennsylvanica*), Canada mayflower (*Maianthemum canadense*), and wild sarsaparilla (*Aralia nudicaulis*)
Unit 3 – Grassland	98	Un-maintained or infrequently maintained grassland areas	Smooth brome (*Bromus inermis*), rosette grass (*Dicanthelium* sp.), Canada bluegrass (*Poa compressa*), yellow salsify (*Trapogon dubius*), butterfly weed (*Asclepias tuberosa*), and common milkweed (*Asclepias syrica*)
Unit 4 – Developed Land	896	Mowed grass, landscaped trees, and maintained landscaped beds	Red clover, white clover, common ragweed (*Ambrosia artemisiifolia*), plantain species (*Plantago lanceolata*, *P. patagonica*, and *P. rugelii*), black medick (*Medicago lupulina*), honey locust (*Gleditsia triacanthos*), white ash (*Fraxinus americana*), lilac bush (*Syringa vulgaris*), red pine (*Pinus resinosa*), blue spruce (*Picea pungens*), and arborvitae (*Thuja occidentalis*)
Unit 5 – Herbaceous Wetland	625	North of airfield, near forested areas to west/east, adjacent to streams in airfield, and east of airfield	Reed canarygrass, sensitive fern, elderberry (*Sambucus canadensis*), prairie cordgrass (*Spartina pectinata),* sedge species (*Carex* spp.) and woollyfruit sedge (*C. lasiocarpa*)
Unit 6 – Coniferous Forest	39	Large stands in northeast, central eastern, and central western fenceline	Red pine, and little bluestem (*Schizachyrium scoparium*)
Unit 7 – Forested Wetland	135	Southeastern and west-central areas	Red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanica*), swamp white oak (*Quercus bicolor*), speckled alder (*Alnus incana*), orange jewelweed (*Impatiens capensis*), cinnamon fern (*Osmunda cinnamomea*), reed canarygrass, skunk cabbage (*Symplocarpus foetidus*), and eastern marsh fern (*Thelypteris palustris*)
Unit 8 – Scrub-Shrub Wetland	107	--	Red maple, green ash, red maple, speckled alder, lady fern (*Athyrium filix-femina*), cinnamon fern, and reed canarygrass

Source: WIANG 2019b

Hardwood Range

The open area of Hardwood Range (the Impact and 90 Series Areas) consists almost entirely of disturbed fresh (wet) meadow and low prairie drained by one major creek, which is ditched. Big bluestem and, very likely, other prairie-associated species are present throughout the area. Disturbances include ordnance impacts and associated construction and clean-up activities, and annual burning of the open area. The area along both sides of the western entrance road is seldom disturbed, with the exception of annual burning, and provides perhaps the best example of native vegetation. Some small ponds also occur in this portion of the Range. The lands surrounding the open portion of the Range (the buffer area) are a mosaic of forested wetlands (primarily lowland hardwoods) with pockets of forested uplands and open wetlands (e.g., sedges, cattails; WIANG 1994).

Flora and Fauna Surveys were conducted in 2018 and identified 8 distinct habitat units (WIANG 2019a). Their size, general location, and dominant vegetative species are described below in **Table 4**. Open water areas and streams comprised 107 acres of the area of review but are not included as habitat units. A full list of species observed at Hardwood Range can be found in **Table 5**.

Table 4. Habitat Units from Vegetation Surveys of Hardwood Range

Habitat Unit	Size (ac)	Community Location and/or Description	Dominant Species
Unit 1 – Partially Maintained Lands	975	Frequently or infrequently maintained including roadways, mowed grass, training areas, and around buildings; found largely to the west and along roadways.	Common mullein (*Verbascum thapsus*), sweet fern (*Comptonia peregrina*), western bracken fern, Canadian louswort, (*Pedicularis canadensis*), spotted knapweed (*Caentaurea stoebe*), clover species (*Trifolium* spp.), black medick, needletip blue-eyed grass (*Sisyrinchium mucronatum*), sweet vernalgrass (*Anthoxanthum odoratum*), and white meadowsweet (*Spiraea alba*)
Unit 2 – Deciduous Forest	2,821	Deciduous forest and mixed forest; most of the eastern two-thirds of the area	White poplar (*Populus alba*), native white oak, northern red oak (*Quercus rubra*), bigtooth aspen (*Populus grandidentata*), gray dogwood (*Cornus racemosa*), red maple, American elm (*Ulmus americana*), speckled alder (ssp. *rugosa*), silver maple, sugar maple, lowbush blueberry, wild sarsaparilla, clubmoss (*Lycopodium* sp.), Canada mayflower, hazelnut (*Corylus* sp.), and bristly greenbriar (*Smilax tamnoides*)
Unit 3 – Herbaceous Wetland	343	Wet and low-lying areas in open/partially maintained areas, and within open patches of larger forested wetland complexes; western third and along roads to east	Woolgrass (*Scirpus cyperinus*), dark green bulrush (*Scirpus atrovirens*), broadleaf cattail (*Typha latifolia*), fewseeded sedge (*Carex oligosperma*), hairy sedge (*C. lacustris*), sedge species (*C. crinata*, *C. lasiocarpa*, *C. echinata*), rush species (*Juncus* spp.), broadleaf arrowhead (*Saggitaria latifolia*), white meadowsweet, cinnamon fern, and Willows (*Salix* spp.)
Unit 4 – Scrub-Shrub Wetland	716	Large scrub-shrub wetlands; western third in parts of open areas, southern and eastern portions intermixed with forested habitat, and along canals	Bog birch (*Betula pumila*), paper birch (*Betula papyrifera*), red maple, steeplebush (*Spiraea tomentosa*), water sedge (*Carex aquatilis*), hairy sedge, quaking aspen (*Populus tremuloides*), several willow species, western bracken fern, cinnamon fern, green bulrush, and common winterberry (*Ilex verticillata*)
Unit 5 – Forested Wetland	965	Wet and low-lying areas of forested stands in the central portion, and within forested areas that border partially maintained habitat in the western third	Silver maple and red maple, winterberry, northern dewberry, speckle alder, pin oak (*Quercus palustris*), quaking aspen, river birch (*Betula nigra*), sensitive fern (*Onoclea sensibilis*), cinnamon fern, royal fern (*Osmunda regalis*), western bracken fern, and lady fern
Unit 6 – Clearcut Lands	122	Northern and eastern boundary, partially maintained areas (e.g., roads and training areas)	Western bracken fern, blackberry (*Rubus* sp.), common yarrow (*Achillea millefolium*), common cinquefoil (*Potentilla simplex*), sundial lupine (*Lupinus perennis*), and blueberry species (*Vaccinium* spp.)
Unit 7 – Mixed Forest	1,029	Second-largest habitat	Red maple, red pine, eastern white pine, quaking aspen, black cherry, black oak, slippery elm (*Ulmus rubra*), pin oak, wood fern (*Dryopteris marginalis*), western bracken fern, hay scented fern (*Dennestaedtia punctiloba*), Pennsylvania sedge (*Carex pensylvanica*), lowbush blueberry, dogwood species (*Cornus obliqua*, *C. canadensis*), hazelnut species (*Corylus cornuta*, *C. americana*), Canada mayflower, and wild sarsaparilla
Unit 8 – Coniferous Forest	185	Former plantation stands located in the north and south	Eastern white pine and jack pine, Allegheny blackberry (*Rubus allegheniensis*), Pennsylvania sedge, hazelnut (*Corylus* sp.), bristly dewberry, western bracken fern, cinquefoil species (*Potentilla recta, P. simplex*), sweet fern, and yellow Indian-grass (*Sorghasrum nutans*)

Source: WIANG 2019a

Table 5. Plant Species at Volk Field CRTC and Hardwood Range			
Scientific Name	**Common Name**	**Scientific Name**	**Common Name**
Acer negudo	boxelder	*Liatrus pycnostachya*	prairie blazing star
Acer rubrum	red maple	*Lilium lancifolium*	tiger lily
Acer saccharinum	silver maple	*Lindera benzoin*	northern spicebush
Acer saccharum	sugar maple	*Lobelia spicata*	palespike lobelia
Achillea millefolium	common yarrow	*Lonicera* sp.	honeysuckle
Alisma sp.	water plantain	*Lonicera tatarica*	tatarian honeysuckle
Alnus incana	speckled alder	*Lotus corniculatus*	bird's-foot trefoil
Alnus incana ssp. *rugosa*	speckled alder	*Lupinus perennis*	sundial lupine
Ambrosia artemisiifolia	annual ragweed	*Lycopodiella inundata*	inundated clubmoss
Amelanchiar sp.	serviceberry	*Lycopodium* sp.	clubmoss
Amelanchier laevis	Allegheny serviceberry	*Lysimachia quadrifolia*	whorled yellow loosestrife
Amphicarpaea bracteata	American hogpeanut	*Lysimachia terrestris*	earth or yellow loosestrife
Antennaria plantaginifolia	plantain pussytoes	*Maianthemum canadense*	Canada mayflower
Anthoxanthum odoratum	sweet vernalgrass	*Maianthemum racemosum*	false Solomon's seal
Apocynum androsaemifolium	spreading dogbane	*Matricaria discoidea*	disk mayweed, pineapple weed
Aquilegia sp.	columbine	*Medeola virginiana*	Indian cucumber
Aralia hispida	bristly sarsparilla	*Medicago lupulina*	black medick
Aralia nudicaulis	wild sarsaparilla	*Medicago* sp.	alfalfa
Arcticum minus	common or lesser burdock	*Melampyrum lineare*	narrowleaf cowwheat
Arisaema triphyllum	Jack in the pulpit	*Melilotus officinalis*	sweetclover
Aronia arbutifolia	red chokeberry	*Mitchella repens*	partridgeberry
Aronia melanocarpa	black chokeberry	*Monarda didyma*	scarlet beebalm
Asclepias incarnata	swamp milkweed	*Monarda fistulosa*	wild bergamot
Asclepias sp.	milkweed	*Oenothera biennis*	common evening primrose
Asclepias syriaca	common milkweed	*Onoclea sensibilis*	sensitive fern
Asclepias tuberosa	butterfly milkweed	*Osmunda cinnamomea*	cinnamon fern
Asclepias verticillata	whorled milkweed	*Osmunda claytoniana*	interrupted fern
Asparagus officinalis	garden asparagus	*Osmunda regalis*	royal fern
Athyrium filix-femina	lady fern	*Oxalis* sp.	woodsorrel
Baptisia alba	white wild indigo	*Panicum* sp.	panicgrass
Berberis thunbergii	Japanese barberry	*Parthenocissus quinquefolia*	Virginia creeper
Berteroa incana	hoary alyssum	*Parthenocissus vitacea*	woodbine
Betula nigra	river birch	*Pedicularis canadensis*	Canadian lousewort, wood betony
Betula papyrifera	paper birch	*Phalaris arundinacea*	reed canarygrass
Betula pumila	bog birch	*Phleum pratense*	Timothy grass
Betula sp.	birch	*Phragmites australis*	common reed
Boehmeria cylindrica	smallspike false nettle	*Picea abies*	Norway spruce
Bromus inermis	smooth brome	*Picea pungens*	blue spruce
Bromus tectorum	cheatgrass	*Pinus banksiana*	jack pine
Calopogon tuberosus var. *tuberosus*	tuberous grasspink	*Pinus resinosa*	red pine
Calystegia sepium	hedge false bindweed	*Pinus strobus*	eastern white pine
Campanula rotundifolia	bluebell blueflower	*Plantago lanceolata*	narrowleaf plantain
Carex aquatilis	water sedge	*Plantago major*	common plantain
Carex bebbii	Bebb's sedge	*Plantago patagonica*	woolly plantain
Carex brevior	shortbeak sedge	*Plantago rugelii*	blackseed plantain
Carex crinita	gringed sedge	*Poa compressa*	Canada bluegrass
Carex echinata	star sedge	*Polygala polygama*	racemed milkwort
Carex haydenii	Hayden's sedge	*Polygala sanguinea*	purple milkwort
Carex hystericina	bottlebrush or porcupine sedge	*Polygonatum biflorum*	smooth Solomon's seal
Carex intumescens	greater bladder sedge	*Polygonatum pubescens*	hairy Solomon's seal
Carex lacustris	hairy sedge	*Polygonatum* sp.	Solomon's seal
Carex lasiocarpa	woollyfruit sedge	*Polygonum sagittatum*	arrowleaf tearthumb

Table 5. Plant Species at Volk Field CRTC and Hardwood Range			
Scientific Name	**Common Name**	**Scientific Name**	**Common Name**
Carex lupulina	hop sedge	*Polypodium virginianum*	tock polypody
Carex lurida	shallow sedge	*Populus alba*	white poplar
Carex oligosperma	fewseeded sedge	*Populus deltoides*	eastern cottonwood
Carex ovalis	eggbract sedge	*Populus grandidentata*	bigtooth aspen
Carex pensylvanica	Pennsylvania sedge	*Populus tremuloides*	quaking aspen
Carex sp.	sedge	*Potentilla norvegica*	Norwegian cinquefoil
Carex stipata	awlfruit sedge	*Potentilla recta*	sulphur cinquefoil
Carex stipata var. *stipata*	owlfruit sedge	*Potentilla simplex*	common cinquefoil
Carex vulpinoidea	fox sedge	*Potentilla* sp.	cinquefoil
Castilleja coccinea	scarlet Indian paintbrush	*Prunella vulgaris*	common selfheal
Catalpa sp.	catalpa	*Prunus serotina*	black cherry
Centaurea stoebe	spotted knapweed	*Prunus* sp.	cherry
Chamaedaphne calyculata	leatherleaf	*Pteridium aquilinum*	western bracken fern
Chenopodium album	lambsquarters	*Quercus alba*	white oak
Cicuta maculata	spotted water hemlock	*Quercus bicolor*	swamp white oak
Cirsium vulgare	bull thistle	*Quercus ellipsoidalis*	northern pin oak
Clematis virginiana	virgin's bower	*Quercus palustris*	pin oak
Comptonia peregrina	sweet fern	*Quercus rubra*	northern red oak
Conium maculatum	poison hemlock	*Quercus velutina*	black oak
Conyza canadensis var. *canadensis*	Canadian horseweed	*Rhus* sp.	sumac
Cornus amomum	silky dogwood	*Rhus typhina*	staghorn sumac
Cornus canadensis	sunchberry dogwood	*Ribes* sp.	currant
Cornus obliqua	silky or narrowleaf dogwood	*Robinia pseudoacacia*	black locust
Cornus racemosa	gray dogwood	*Rosa multiflora*	multiflora rose
Cornus sp.	dogwood	*Rosa* sp.	rose
Corylus americana	American hazelnut	*Rubus allegheniensis*	Allegheny blackberry
Corylus cornuta	beaked hazelnut	*Rubus flagellaris*	northern dewberry
Corylus sp.	hazelnut	*Rubus hispidus*	bristly dewberry
Crepis tectorum	narrowleaf hawksbeard	*Rubus idaeus*	American red raspberry
Cuscuta sp.	dodder	*Rubus occidentalis*	black raspberry
Cypripedium acaule	pink lady's slipper	*Rubus* sp.	blackberry
Daucus carota	Queen Anne's lace	*Rubus* sp.	raspberry
Dennstaedtia punctilobula	hay scented fern	*Rudbeckia hirta*	black-eyed susan
Desmodium glutinosum	pointedleaf ticktrefoil	*Rumex acetosella*	sheep sorrel, red sorrel
Dichanthelium sp.	rosette grass	*Sagittaria latifolia*	broadleaf arrowhead
Drosera intermedia	spoonleaf sundew	*Salix bebbiana*	bebb willow
Dryopteris intermedia	intermediate wood fern	*Salix discolor*	pussy willow
Dryopteris marginalis	marginal wood fern	*Salix interior*	sandbar willow
Elaeagnus umbellata	autumn olive	*Salix nigra*	black willow
Eleocharis sp.	spikerush	*Sambucus canadensis*	American black elderberry
Elymus repens	quackgrass	*Saponaria officinalis*	bouncingbet or soapwort
Equisetum arvense	common horsetail	*Schizachyrium scoparium*	little bluestem
Equisetum hyemale	scouringrush horsetail	*Scirpus atrovirens*	green bulrush
Equisetum laevigatum	smooth horsetail	*Scirpus cyperinus*	woolgrass
Equisetum pratense	meadow horsetail	*Scutellaria galericulata*	marsh skullcap
Equisetum sp.	horsetail	*Securigera varia*	crownvetch
Equisetum sylvaticum	woodland horsetail	*Silene latifolia* ssp. *alba*	white bladder campion
Erigeron sp.	fleabane species	*Sisyrinchium mucronatum*	needletip blue-eyed grass
Erigeron strigosus	prairie fleabane	*Smilax tamnoides*	bristly greenbriar
Eriophorum viridicarinatum	thinleaf cottonsedge	*Solanum dulcamara*	bittersweet nightshade
Erodium cicutarium	redstem storksbill	*Solidago canadensis*	Canada goldenrod
Euonymus alatus	burning bush, winged euonymus	*Solidago* sp.	goldenrod

Table 5. Plant Species at Volk Field CRTC and Hardwood Range			
Scientific Name	**Common Name**	**Scientific Name**	**Common Name**
Eupatorium perfoliatum	common boneset	*Sorghastrum nutans*	yellow Indiangrass
Euphorbia corollata	flowering spurge	*Spartina pectinata*	prairie cordgrass
Euphorbia esula	leafy spurge	*Spergularia rubra*	red sandspurry
Euphorbia sp.	spurge	*Sphagnum* sp.	sphagnum moss
Euthamia graminifolia	flat-top goldentop	*Spiraea alba*	white meadowsweet
Festuca rubra	red fescue	*Spiraea* sp.	spirea
Fragaria	strawberry	*Spiraea tomentosa*	steeplebush
Fragaria vesca	woodland strawberry	*Stachys palustris*	marsh hedgenettle
Fraxinus Americana	white ash	*Stellaria graminea*	grass-like starwort
Fraxinus pennsylvanica	green ash	*Stellaria* sp.	starwort
Fraxinus sp.	ash	*Streptopus lanceolatus*	twistedstalk
Galium aparine	cleavers, stickywilly	*Symplocarpus foetidus*	skunk cabbage
Galium boreale	northern bedstraw	*Syringa vulgaris*	lilac
Galium obtusum	bluntleaf bedstraw	*Taraxacum officiniale*	common dandelion
Galium sp.	bedstraw	*Taxus canadensis*	Canadian yew
Galium triflorum	fragrant bedstraw	*Thalictrum dasycarpum*	purple meadow rue
Gaultheria procumbens	eastern teaberry	*Thelypteris palustris*	eastern marsh fern
Geranium bicknellii	Bicknell's cranesbill	*Thuja occidentalis*	arborvitae
Geranium maculatum	spotted geranium	*Toxicodendron radicans*	eastern poison ivy
Geranium sp.	geranium	*Toxicodendron vernix*	poison sumac
Gleditsia triacanthos	honey locust	*Tradescantia ohiensis*	bluejacket
Glyceria striata	fowl mannagrass	*Tragopogon dubius*	yellow salsify
Goodyera pubescens	downy rattlesnake plantain	*Tragopogon porrifolius*	salsify
Helianthemum bicknellii	hoary frostweed	*Trientalis borealis*	starflower
Helianthemum canadense	longbranch frostweed	*Trifolium pratense*	red clover
Hemerocallis 'Stella de Oro'	Stella de Oro daylily	*Trifolium repens*	white clover
Hesperis matronalis	dames rocket	*Trifolium* sp.	clover
Hieracium aurantiacum	orange hawkweed	*Trilium* sp.	trilium
Hieracium caespitosum	meadow hawkweed	*Trillium grandiflorum*	white trilium
Hieracium sp.	hawkweed	*Typha angustifolia*	narrowleaf cattail
Hypericum gentianoides	orange grass	*Typha latifolia*	broadleaf cattail
Hypericum prolificum	shrubby St. John’s wort	*Ulmus americana*	American elm
Hypericum punctatum	spotted St. John’s wort	*Ulmus pumila*	Siberian elm
Ilex verticillata	common winterberry	*Ulmus rubra*	slippery elm
Impatiens capensis	jewelweed	*Urtica dioica*	stinging nettle
Ipomoea purpurea	tall or common morning glory	*Utricularia macrorhiza*	common bladderwort
Iris versicolor	blue iris	*Vaccinium angustifolium*	lowbush blueberry
Iris versicolor	harlequin blueflag	*Vaccinium cespitosum*	dwarf bilberry
Juglans cinereal	butternut	*Vaccinium corymbosum*	highbush blueberry
Juncus acuminatus	tapertip rush	*Vaccinium macrocarpon*	cranberry
Juncus effusus	common rush	*Vaccinium myrtilloides*	velvetleaf huckleberry
Juncus sp.	rush	*Vaccinium* sp.	blueberry
Juncus tenuis	poverty rush	*Verbascum thapsus*	common mullein
Juniperus horizontalis	creeping juniper	*Verbena stricta*	hoary verbena
Koeleria macrantha	prairie junegrass	*Veronicastrum virginicum*	Culver's root
Lemna minor	duckweed	*Vicia* sp.	vetch
Lepidium campestris	peppergrass	*Vicia villosa*	winter vetch
Lepidium densiflorum	common pepperweed	*Viola macloskeyi*	small white violet
Leucanthemum vulgare	oxeye daisy	*Vitis riparia*	riverbank grape
Source: WIANG 2019a; WIANG 2019b			

5.3 Fish and Wildlife

Formal wildlife surveys were conducted in 2018 for Volk Field CRTC and Hardwood Range including surveys of birds, mammals, herpetofauna, and invertebrates (WIANG 2019a, WIANG 2019b). **Tables 6-10** display all animals identified from these surveys as well as those identified in additional plans or surveys.

Table 6. Bird Species at Volk Field CRTC and Hardwood Range

Scientific Name	Common Name	Scientific Name	Common Name
Accipiter cooperii	Cooper's hawk	*Hirundo rustica*	barn swallow
Accipiter striatus	sharp-shinned hawk	*Hylatomus pileatus*	pileated woodpecker
Actitis macularia	spotted sandpiper	*Icterus galbula*	Baltimore oriole
Agelaius phoeniceus	red-winged blackbird	*Larus argentatus*	herring gull
Aix sponsa	wood duck	*Larus delawarensis*	ring-billed gull
Ammodramus savannarum	grasshopper sparrow	*Larus Philadelphia*	Bonaparte's gull
Anas acuta	northern pintail	*Leuconotopicus villosus*	hairy woodpecker
Anas americana	American wigeon	*Limnodromus griseus*	short-billed dowitcher
Anas clypeata	northern shoveler	*Limnodromus scolopaceus*	long-billed dowitcher
Anas crecca	green-winged teal	*Lophodytes cucullatus*	hooded merganser
Anas discors	blue-winged teal	*Megaceryle alcyon*	belted kingfisher
Anas platyrhynchos	mallard	*Melanerpes carolinus*	red-bellied woodpecker
Anas rubripes	American black duck	*Meleagris gallopavo*	wild turkey
Anas strepera	gadwall	*Melospiza melodia*	song sparrow
Archilochus colubris	ruby-throated hummingbird	*Mergus merganser*	common merganser
Ardea herodias	great blue heron	*Molothrus ater*	brown-headed cowbird
Asio flammeus	short-eared owl	*Nycticorax nycticorax*	black-crowned night heron
Aythya affinis	lesser scaup	*Otus asio*	eastern screech owl
Aythya americana	redhead	*Oxyura jamaicensis*	ruddy duck
Aythya collaris	ring-necked duck	*Pandion haliaetus*	osprey
Aythya valisineria	canvasback	*Passerina cyanea*	indigo bunting
Bombycilla cedrorum	cedar waxwing	*Perdix perdix*	grey partridge
Botaurus lentiginosus	American bittern	*Petrochelidon pyrrhonota*	cliff swallow
Branta canadensis	Canada goose	*Phalacrocorax auritis*	double-crested cormorant
Bubo scandiacus	snowy owl	*Phalaropus tricolor*	Wilson's phalarope
Bubo virginianus	great horned owl	*Phasianus colchicus*	ring-necked pheasant
Bucephala albeola	bufflehead	*Pheucticus ludovicianus*	rose-breasted grosbeak
Bucephala clangula	common goldeneye	*Picoides pubescens*	downy woodpecker
Buteo jamaicensis	red-tailed hawk	*Pipilo erythrophthalmus*	eastern towhee
Buteo lagupus	rough-legged hawk	*Piranga olivacea*	scarlet tanager
Buteo lineatus	red-shouldered hawk	*Pluvialis dominica*	lesser golden plover
Buteo platypterus	broad-winged hawk	*Pluvialis squatarola*	black-bellied plover
Butorides striatus	green-backed heron	*Poecile atricapillus*	black-capped chickadee
Calidris himantopus	stilt sandpiper	*Porzana carolina*	sora
Calidris minutilla	least sandpiper	*Quiscalus quiscula*	common grackle
Calidris pusilla	semipalmated sandpiper	*Rallus elegans*	king rail
Cardinalis cardinalis	northern cardinal	*Rallus limicola*	Virginia rail
Casmerodius albus	great egret	*Riparia riparia*	bank swallow
Cathartes aura	turkey vulture	*Sayornis phoebe*	eastern phoebe
Catharus fuscescens	veery	*Scolopax minor*	American woodcock
Chaetura pelagica	chimney swift	*Seiurus aurocapilla*	ovenbird
Charadrius semipalmatus	semipalmated plover	*Setophaga pinus*	pine warbler
Charadrius vociferus	killdeer	*Setophaga ruticilla*	American redstart
Chen caerulescens	snow goose	*Sialia sialis*	eastern bluebird
Chlidonias niger	black tern	*Sitta carolinensis*	white-breasted nuthatch

Table 6. Bird Species at Volk Field CRTC and Hardwood Range			
Scientific Name	**Common Name**	**Scientific Name**	**Common Name**
Chordeiles minor	common nighthawk	*Spinus tristis*	American goldfinch
Circus cyaneus	northern harrier	*Spiza americana*	dickcissel
Cistothorus platensis	sedge wren	*Spizella passerina*	chipping sparrow
Colaptes auratus	northern flicker	*Stelgidopteryx serripennis*	northern rough-winged swallow
Columba livia	rock pigeon	*Sterna forsteri*	Forster's tern
Contopus virens	eastern wood-pewee	*Strix varia*	barred owl
Corvus brachyrhynchos	American crow	*Sturnella magna*	eastern meadowlark
Corvus corax	common raven	*Sturnella neglecta*	western meadowlark
Cyanocitta cristata	blue jay	*Sturnus vulgaris*	European starling
Cygnus columbianus	tundra swan	*Tachycineta bicolor*	tree swallow
Dolichonyx oryzivorus	bobolink	*Toxostoma rufum*	brown thrasher
Dumetella carolinensis	gray catbird	*Tringa flavipes*	lesser yellowlegs
Eremophila alpestris	horned lark	*Tringa melanoleuca*	greater yellowlegs
Euphagus carolinus	rusty blackbird	*Tringa solitaria*	solitary sandpiper
Euphagus cyanocephalus	brewer's blackbird	*Troglodytes aedon*	house wren
Falco sparverius	American kestrel	*Turdus migratorius*	American robin
Fulica americana	American coot	*Tyrannus tyrannus*	eastern kingbird
Gallinula chloropus	common moorhen	*Vermivora cyanoptera*	blue-winged warbler
Geothlypis trichas	common yellowthroat	*Vireo flavifrons*	yellow-throated vireo
Grus americana	whooping crane	*Vireo olivaceus*	red-eyed vireo
Grus canadensis	sandhill crane	*Xanthocephalus xanthocephalus*	yellow-headed blackbird
Haliaeetus leucocephalus	bald eagle	*Zenaida macroura*	mourning dove
Hirundo pyrrhonota	cliff swallow		
Source: WIANG 2014a, WIANG 2018b, WIANG 2019a, WIANG 2019b			

Table 7. Mammal Species at Volk Field CRTC and Hardwood Range			
Scientific Name	**Common Name**	**Scientific Name**	**Common Name**
Blarina brevicauda	northern short-tailed shrew	*Ondatra zibethicus*	muskrat
Canis latrans	coyote	*Pekania pennanti*	fisher
Canis lupus	gray wolf	*Peromyscus maniculatus bairdii*	prairie deer mouse
Castor canadensis	beaver	*Procyon lotor*	raccoon
Didelphis virginana	Virginia opossum	*Rattus norvegicus*	Norway rat
Erethizon dorsatum	north American porcupine	*Sciurus carolinensis*	eastern gray squirrel
Felis catus	feral cat	*Sorex arcticus*	arctic shrew
Glaucomys volans	flying squirrel	*Sylvilagus floridanus*	eastern cottontail rabbit
Lutra canadensis	river otter	*Synaptomys cooperi*	southern bog lemming
Lynx rufus	bobcat	*Tamias striatus*	eastern chipmunk
Mephitis mephitis	striped skunk	*Urocyon cinereoargenteus*	gray fox
Microtus ochrogaster	meadow vole	*Ursus americanus*	American black bear
Mustela vision	mink	*Vulpes vulpes*	red fox
Myodes gapperi	southern red-backed vole	*Zapus hudsonius*	meadow jumping mouse
Odocoileus virginianus	white-tailed deer		
Source: WIANG 2014a, WIANG 2019a, WIANG 2019b			

Table 8. Herpetofauna Species at Volk Field CRTC and Hardwood Range

Scientific Name	Common Name	Scientific Name	Common Name
Ambystoma laterale	blue-spotted salamander	*Lithobates clamitans*	green frog
Anaxyrus americanus	American toad	*Lithobates pipiens*	northern leopard frog
Bufo americanus	American toad	*Opheodrys vernalis*	smooth greensnake
Chelydra serpentina	snapping turtle	*Plestiodon fasciatus*	common five-lined skink
Chrysemys picta	painted turtle	*Pseudacris crucifer*	spring peeper (metamorph)
Chrysemys picta belli	western painted turtle	*Pseudacris maculata*	boreal chorus frog
Emydoidea blandingii	Blanding's turtle	*Sistrurus catenatus*	eastern Massasauga rattlesnake
Eumeces fasciatus	five-lined skink	*Storeria dekayi*	midland brown snake
Heterodon platyrhinos	eastern hognose snake	*Storeria occipitomaculata*	red-bellied snake
Hyla chrysoscelis	cope's gray tree frog	*Thamnophis sirtalis*	common gartersnake
Hyla versicolor	gray tree frog	*Thamnophis sirtalis*	eastern garter snake
Lithobates catesbeianus	American bullfrog		

Source: WIANG 2013, WIANG 2019a, WIANG 2019b

Table 9. Invertebrate Species at Volk Field CRTC and Hardwood Range

Scientific Name	Common Name	Scientific Name	Common Name
Calopteryx maculata	ebony jewel-wing damselfly	*Junonia coenia*	common buckeye butterfly
Danaus plexippus	monarch butterfly	*Libellula quadrimaculata*	four-spotted chaser
Junonia coenia	common buckeye butterfly	*Limenitis arthemis*	red-spotted purple butterfly
Limenitis arthemis	white admiral butterfly	*Macrodactylus subspinosus*	rose chafer beetle
Lycaeides melissa samuelis	Karner blue butterfly	*Monochamus* sp.	long-horned beetle
Monochamus sp.	long-horned beetle	*Ogcodocera leucoprocta*	bee fly
Orgyia leucostigma	white marked tussock moth	*Phyciodes cocyta*	northern crescent butterfly
Papilio glaucus	tiger swallowtail butterfly	*Polygonia comma*	eastern comma butterfly
Cicindela formosa	big sand tiger beetle	*Tetraopes tetrophthalmus*	red milkweed beetle
Cicindela scutellaris	festive tiger beetle	*Thymelicus lineola*	European skipper
Cicindela sexguttata	six-spotted tiger beetle	*Vanessa atalanta*	red admiral butterfly
Cupido comyntas	eastern tailed-blue butterfly	*Xanthotype urticaria*	false crocus geometer moth
Danaus plexippus	monarch butterfly		

Source: *WIANG 2019a*; *WIANG 2019b*

Bat surveys were conducted at Volk Field CRTC and Hardwood Range in 2016 and 6 bat species were identified using both mist net and acoustic surveys (WIANG 2017a, WIANG 2017b; **Table 10**). These reports include descriptions of habitat preferences as well as management recommendations.

Table 10. Bat Survey Results at Volk Field CRTC and Hardwood Range

Species	Mist Net	Acoustic
Big brown bat (*Eptesicus fuscus*)	V & H	V & H
Silver-haired bat (*Lasionycteris noctivagans*)	--	V & H
Eastern red bat (*Lasiurus borealis*)	V & H	V & H
Hoary bat (*Lasiurus cinereus*)	H	V & H
Little brown bat (*Myotis lucifugus*)	V & H	V & H
Northern long-eared bat (*Myotis septentrionalis*)	V & H	V & H
Eastern pipistrelle (*Perimyotis subflavus*)	--	--

Source: WIANG 2017a, WIANG 2017b
V = Volk Field CRTC; H = Hardwood Range

5.4 Threatened and Endangered Species and Species of Concern

Review of federal and state-listed species for Volk Field CRTC and Hardwood Range showed 30 species have the potential to occur on or adjacent to either installation. In particular, the gray wolf (*Canis lupus*), northern long-eared bat (*Myotis septentrionalis*), Karner blue butterfly (*Lycaeides melissa samuelis*), whooping crane (*Grus americana*), black tern (*Chlidonias niger*), red-shouldered hawk (*Buteo lineatus*), and big brown bat (*Eptesicus fuscus*) have been observed on the installation (WIANG 2018b, WIANG 2019a, WIANG 2019b; see **Section 7.2.3**).

Federally-listed species known to occur, or with the potential to occur on Volk Field CRTC and Hardwood Range include:

- Federally endangered gray wolf
- Federally and state threatened northern long-eared bat
- Federally threatened and state endangered eastern Massasauga rattlesnake (*Sistrurus catenatus catenatus*)
- Federally endangered Karner blue butterfly
- Whooping Crane (experimental nonessential population [see Section 7.2.3])

State-listed species known to occur or with the potential to occur on Volk Field CRTC and Hardwood Range include:

- State endangered Blanchard's cricket frog (*Acris blanchardi*)
- State endangered black tern
- State endangered wolf spike-rush (*Eleocharis wolfii*)
- State endangered loggerhead shrike (*Lanius ludovicianus*)
- State endangered slender glass lizard (*Ophisaurus attenuates*)
- State endangered spotted pondweed (*Potamogeton pulcher*)
- State endangered incurvate emerald (*Somatochlora incurvata*)
- State endangered regal fritillary (*Speyeria idalia*)
- State threatened muskroot (*Adoxa moschatellina*)
- State threatened roundstem foxglove (*Agalinis gattingeri*)
- State threatened woolly milkweed (*Asclepias lanuginose*)
- State threatened dwarf milkweed (*Asclepias ovalifolia*)
- State threatened red-shouldered hawk
- State threatened frosted elfin (*Callophrys irus*)
- State threatened Henslow's sparrow (*Ammodramus henslowii*)
- State threatened Acadian flycatcher (*Empidonax virescens*)
- State threatened big brown bat
- State threatened wood turtle (*Glyptemys insculpta*)
- State threatened yellow-crowned night-heron (*Nyctanassa violacea*)
- State threatened pale green orchid (*Platanthera flava* var. *herbiola*)
- State threatened prairie parsley (*Polytaenia nuttallii*)
- State threatened cliff cudweed (*Pseudognaphalium saxicola*)
- State threatened cerulean warbler (*Setophaga cerulean*)
- State threatened salamander mussel (*Simpsonaias ambigua*)
- State threatened buckhorn (*Tritogonia verrucosa*)

5.5 Waters of the US, Wetlands, and Floodplains

Volk Field CRTC

Water Resource surveys were conducted for Volk Field CRTC in June 2017 and identified 5 wetland and 2 stream types that are jurisdictional. A total of 802.09 acres of wetlands and/or streams, and approximately 60,549 linear feet of stream were delineated (**Table 11**; WIANG 2018d). These jurisdictional wetlands were confirmed by the US Army Corps of Engineers (USACE; USACE 2019b). The 5 wetland types identified within the installation, exhibited characteristics of all 3 wetland parameters as defined in the *US Army Corps of Engineers [USACE] Wetland Delineation Manual* (USACE 1987) and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0*; USACE 2011). Additionally, the 2 identified stream types that exhibited a defined bed and bank with an ordinary high-water mark (WIANG 2018d).

Surveyors also identified 3 open water features on the west side of the installation that appeared to meet the characteristics of a wetland, but were man-made features excavated in upland to treat wastewater. The open water features are aerated basins that are non-jurisdictional and part of the installation's wastewater infrastructure. The wastewater basins identified within the installation were considered maintained features that appear to be constructed completely in uplands with no wetlands or streams contributing to them from upslope locations. Therefore, the wastewater basins were not included in the wetland delineation as jurisdictional features (WIANG 2018d).

Table 11. Water Resources Survey Results at Volk Field CRTC

Delineated Type	Area (ac)	Approximate Location and/or Description	Dominant Species
Palustrine, Emergent wetland (PEM)	551.4	Undeveloped area north of airfield; north of forested areas to west and east; adjacent to streams within the airfield; and east of the airfield within scrub-shrub wetland and upland areas	Lance-fruited oval sedge (*Carex scoparia*), blunt spike-rush (*Eleocharis obtuse*), reed canary grass, and marsh fern
Perennial Stream	14.39	Open maintained area in mowed area; within the airfield; and in undeveloped grassland extending north, northeast, and southeast from airfield	Reed canary grass, *Carex* spp., *Equisetum* spp., *Potamogeton* spp., *Sagittaria* spp., Soft-stem bulrush (*Schoenoplectus tabernaemontani*), Prairie cordgrass, and *Typha* spp.
Intermittent Stream	21.78	Undeveloped area north of airfield; north from west central portion of installation; and west side of airfield	Reed canary grass, *Carex* spp., *Equisetum* spp., *Potamogeton* spp., *Sagittaria* spp., Soft-stem bulrush, Prairie cordgrass, and *Typha* spp.
Palustrine, Forested wetland (PFO)	87.90	Forested area in southeastern portion and west central portion of installation	Red maple, bitternut hickory (*Carya cordiformis*), swamp white oak, speckled alder, orange jewelweed, cinnamon fern, reed canary grass, skunk cabbage, and marsh fern
Palustrine, Forested/Scrub-Shrub wetland (PFO/SS)	20.08	Forested area in eastern portion of installation	Red maple, bitternut hickory, speckled alder, northern lady fern, cinnamon fern, and reed canary grass
Palustrine, Scrub-Shrub/Emergent wetland (PSS/EM)	99.14	Undeveloped area north and east of airfield; and adjacent to forested area on the southeastern portion of installation	speckled alder, meadow willow (*Salix petiolaris*), black elderberry (*Sambucus nigra),* Lake sedge, reed canary grass, royal fern, and marsh fern
Palustrine Open Water (POW)	7.39	Undeveloped area north of airfield; in mowed recreation area in the southeast; and in forested area on southern portion of installation	*Carex* spp., reed canary grass, and *Typha* spp.

Source: WIANG 2018d

Hardwood Range

Field investigations were conducted in the summer of 2017 and identified 6 wetlands and 2 stream types that are jurisdictional within the installation. A total of 2,138.23 acres of wetlands and/or streams, and approximately 152,757 linear feet of streams were delineated (**Table 12;** WIANG 2018c). These jurisdictional wetlands were confirmed by the USACE (USACE 2019a). The 6 wetland types identified within the installation also exhibited characteristics of all 3 wetland parameters as defined in the *Corps of Engineers Wetland Delineation Manual* (USACE 1987) and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0;* USACE 2011). Additionally, field personnel identified 2 stream types that exhibited a defined bed and bank with an ordinary high-water mark (WIANG 2018c).

Table 12. Water Resources Survey Results at Hardwood Range

Delineated Type	Area (ac)	Approximate Location	Dominant Species
Palustrine, Emergent wetland (PEM)	346.32	Maintained area in the west and within the natural clearings and maintained areas in the forested areas	Blue-joint grass (*Calamagrostis canadensis*), lake sedge, few-seeded sedge, lance-fruited oval sedge, tussock sedge (*Carex stricta*), narrow-leaved oval sedge (*Carex tenera*), *rattlesnake mana grass (Glyceria canadensis*), *woolgrass*, and prairie cordgrass
Perennial Stream	64.30	Central forested area	River bulrush (*Bolboschoenus fluviatilis*), reed canary grass, Carex spp., *Potamogeton* spp., *Sagittaria* spp., and *Typha* spp.
Intermittent Stream	41.76	Western, central, and northeast	Bulrush, reed canary grass, *Carex* spp., *Potamogeton* spp., *Sagittaria* spp., and *Typha* spp.
Palustrine, Forested wetland (PFO)	220.85	Central to western forested area	Red maple, cinnamon fern, and royal fern
Palustrine, Forested/Emergent wetland (PFO/EM)	38.53	Central forested area	Red maple, silver maple, quaking aspen, graceful sedge *(Carex gracillima*), and woolgrass
Palustrine, Forested/Scrub-Shrub wetland (PFO/SS)	705.07	Central and eastern forested area	Red maple, quaking aspen, common winterberry, bristly dewberry, northern lady fern, river bulrush, blue joint grass, rattlesnake mana grass, interrupted fern, sensitive fern, royal fern, reed canary grass, and prairie cordgrass
Palustrine, Scrub-Shrub/Emergent wetland (PSS/EM)	717.48	Western maintained area, natural clearings in the forested areas, and in the northwestern deforested	Red maple, quaking aspen, bristly dewberry, meadow willow, white meadowsweet, river bulrush, blue-joint grass, lake sedge, lance-fruited oval sedge, tussock sedge, common yellow lake sedge (*Carex utriculata*), rattlesnake mana grass, royal fern, reed canary grass, woolgrass, and marsh fern
Palustrine Open Water (POW)	3.92	Within or bordering the western maintained area, and southeastern forests	River bulrush, reed canary grass, and *Carex* spp.

Source: WIANG 2018c

5.6 Other Natural Resource Information

Additional natural resource surveys or management plans specific to Volk Field CRTC and Hardwood Range include the following:

- Karner Blue Butterfly Management Plan: Provides a long-range plan for the conservation and management of the KBB, its habitat, and host plant (i.e., wild lupine), on Volk Field CRTC and Hardwood Range (WIANG 2005b).
- 2006 USFWS Biological Opinion for the implementation of the Karner Blue Butterfly Management Plan (USFWS 2006). In 2019, the USFWS confirmed the conditions of the 2006 formal consultation remained valid.
- Final Invasive and Nonnative Species Survey and Management Plan for Volk Field CRTC and Hardwood Air-to-Ground Gunnery Range (WIANG 2006a).
- Final Environmental Impact Statement Addressing the Hardwood Range Expansion and Associated Airspace Actions (ANG 2000).
- Blanding's Turtle, Wood Turtle, and Western Slender Glass Lizard Surveys at Volk Field Combat Readiness Training Center and Hardwood Air-to-Ground Gunnery Range, Wisconsin: Provides comprehensive installation-wide surveys for reptile species of

interest. Management recommendations are provided for avoiding impacts on and habitat improvement for Blanding's turtles, which includes general habitat maintenance, wetland habitat protection and maintenance, and vegetation management (Gomez 2013).

Karner blue butterfly habitat on Hardwood Range

6.0 MISSION IMPACTS ON NATURAL RESOURCES

6.1 Natural Resources Needed to Support the Military Mission

Degradation of natural resources can result in unintended impacts to the military mission, impaired readiness, and funds spent on natural resources crisis management and interventions rather than the military mission. Volk Field CRTC and Hardwood Range need the land and its natural resources to function together in a healthy ecosystem to support the military mission. Management activities in this INRMP are designed to support the desired habitats and ecosystem functions.

6.2 Natural Resources Constraints to Mission and Mission Planning

6.2.1 Land Use

Volk Field CRTC is predominantly managed as improved space. Of the approximately 2,230 acres managed by the ANG, approximately 1,685 acres are considered improved. Approximately 77 acres of land at Volk Field CRTC are considered semi-improved, which includes grounds on which maintenance is performed primarily for operational and safety purposes such as BASH reduction, erosion control, vegetation control, and fire hazard reduction. Semi-improved areas include road shoulders; ditch slopes; and drainage canals, ditches, and swales. Approximately 485 acres of land at Volk Field CRTC are considered unimproved. The forested areas within this

category are composed of commercial tree species and include approximately 200 acres on the bluff in the southern part of the installation and 135 acres in lowland areas where the water table is at or near the ground surface. The location of these stands makes them inaccessible and limits their potential for timber harvesting and other forest management activities (WIANG 1992).

Hardwood Range is primarily managed as unimproved space. Of the 7,263 acres of land, approximately 6,100 acres are considered unimproved. This includes the forested areas, the grasslands, and the wetlands at Hardwood Range. These areas require no maintenance, with the exception of timber harvesting and forest management activities in the forested areas. Approximately 1,142 acres of land at Hardwood Range are considered semi-improved, which includes grounds on which landscape maintenance is performed primarily to provide an erosion-resistant stand of grass, to control weeds and brush, and to reduce fire hazard. Semi-improved areas include road shoulders; ditch slopes; drainage canals, ditches, and swales; and the target complex at Hardwood Range including the Impact and 90 Series Areas. The improved areas consist of approximately 22 acres of roads, buildings, and other structures interspersed with turf and a few trees.

6.2.2 Current Major Impacts

Some of the natural resources topics of concern mentioned in the previous sections could have an adverse impact on the Range's flying mission or future planning operations. The potential negative impacts could range from a delay in the construction of new buildings to a loss of life as a result of severely damaged aircraft. These issues should be clearly identified and a schedule for their resolution should be prepared. The natural resources constraints to installation planning and missions are summarized as follows.

- Presence of wetlands and waters of the United States on Volk Field CRTC and Hardwood Range
- The existence and distribution of state and federally-listed and other sensitive species could result in inadvertent takes of these species, ESA Notices of Violation, and postponement of mission- related activities.
- Land-disturbing activities on the installations and draining activities adjacent to the installations are causing erosion and sedimentation, which could result in land conditions that degrade for training.
- Both installations possess abundant populations of, and habitat features that are attractive to high BASH threat species.
- Land management at Volk Field CRTC involves the management of some acreage as improved or semi-improved grounds, which increases maintenance costs in areas that are not essential to the mission.

6.2.3 Potential Future Impacts

There are no known projected changes in mission or potential impacts.

7.0 NATURAL RESOURCES PROGRAM MANAGEMENT

7.1 Natural Resources Program Management

The guiding philosophy of the Volk Field CRTC and Hardwood Range INRMP is to take an ecosystems approach to managing natural resources. Ecosystem management is based on clearly stated goals and objectives, and associated projects. The Volk Field CRTC and Hardwood Range INRMP identifies goals and objectives, and presents the means to accomplish them as well as the methodologies to monitor results.

7.2 Fish and Wildlife Management

Wildlife management involves manipulating various aspects of an ecosystem to benefit chosen wildlife species. Management of habitats generally is focused to benefit native species, particularly listed species and game species.

7.2.1 Federal Wildlife Policies and Regulations

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) prohibits, unless permitted by regulations, the pursuit, hunting, take, capture, killing or attempting to take, capture, kill, or possess any migratory bird included in the MBTA, including any part, nest, or egg of any such bird (16 USC § 703). The DoD has a Memorandum of Understanding (MOU) with the USFWS pursuant to EO 13186 Responsibilities of Federal Agencies to Protect Migratory Birds, which outlines a collaborative approach to promote the conservation of migratory bird populations. This MOU specifically pertains to natural resource management activities, including, but not limited to, habitat management, erosion control, forestry activities, invasive weed management, and prescribed burning. It also pertains to installation support functions, operation of industrial activities, construction and demolition activities, and hazardous waste cleanup. In February 2007, the USFWS finalized regulations for issuing incidental take permits to the DoD. If any of the Armed Forces determine that a proposed or an ongoing military readiness activity may result in a significant adverse effect on a population of migratory bird species, then they must confer and cooperate with the USFWS to develop appropriate and reasonable conservation measures to minimize or mitigate identified significant adverse effects (50 CFR Part 21).

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA; 16 USC 668-668c), enacted in 1940 and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from “taking” bald eagles, including their parts, nests, or eggs. The Act provides criminal penalties for persons who “take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof.”

In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death, or nest abandonment. The BGEPA also prohibits disturbances, which includes loss of productivity.

Permits are available for nest removal and nest disturbance, as well as incidental take (e.g., aircraft strike, etc.; 50 CFR 22.26 and 22.27).

Partners in Flight

The DoD Partners in Flight (PIF) program consists of natural resources personnel from military installations across the United States working collaboratively with partners throughout the Americas to conserve migratory and resident birds and their habitats on DoD lands. PIF sustains and enhances the military mission through proactive, habitat-based conservation and management strategies that maintain healthy landscapes and training lands. Additionally, PIF works beyond installation boundaries to facilitate cooperative partnerships, determine the current status of bird populations, and prevent the listing of additional birds as threatened or endangered. DoD PIF provides a scientific basis for maximizing the effectiveness of resource management, enhancing the biological integrity of DoD lands, and ensuring continued use of these lands to fulfill military training requirements.

Pollinator Conservation

DoD has emphasized the importance of pollinator conservation to the military services by developing partnerships to support their conservation. DoD has MOUs with Bat Conservation International (BCI) and Pollinator Partnership (P2) and has developed the USAF Pollinator Conservation Reference Guide (March 2018). The MOU with BCI "establishes a policy of cooperation and coordination between DoD and BCI to identify, document and maintain bat populations and their habitats on DoD installations" (signed Oct 2006, renewed Dec. 2011). The MOU with P2 is "to establish a framework for cooperative programs that promote the conservation and management of pollinators, their habitats and associated ecosystems" (signed February 9, 2015).The MOU states that this framework is important to "ensure that pollinator management activities are incorporated where practicable, into INRMPs and practices." Conservation of pollinators by USAF alone or in collaboration with groups such as BCI and P2 supports these DoD initiatives.

The USAF Pollinator Conservation Reference Guide provides specific pollinator conservation measures which can be implemented by the USAF and ANG. It was finalized March 2018 and is available on USFWS and AFCEC eDASH Natural Resources website. This guide, developed by the USFWS, establishes guidance as a National Pollinator Conservation Strategy on lands owned by the USAF. It supplements existing policy and instructions to guide USAF actions to contribute to pollinator conservation under Presidential Memo and Federal Pollinator Health Strategy. Further, it provides Technical Guides as reference materials for pollinators of conservation concern (listed species, birds of conservation concern, bees, and monarch butterflies), and native plant recommendations specific to ecoregions.

Some areas of ANG installations are more suitable for pollinator habitat conservation due to current use and/or habitat condition. For example, conservation on unimproved (natural) areas, buffers, recreation areas, rights-of-way, golf courses, and landscaped areas may be more compatible with mission requirements than other areas. These areas should be a priority for implementing pollinator habitat improvements and using land management practices in ways beneficial to pollinators.

7.2.2 Nuisance Wildlife and Wildlife Diseases

Other than those that present a BASH risk, there are few nuisance wildlife species at Volk Field CRTC and Hardwood Range. Historically, in order of perceived nuisance, skunk, woodchuck (*Marmota monax*), squirrel, and raccoon have all required management. Additionally, beaver (*Castor canadensis*) is also mentioned in the BASH Plan (WIANG 2018b), dogs are typically lost pets, and cats are either abandoned or occasionally feral (D. Gonnering, personal communication, August 2019). Future hazardous wildlife problems will be evaluated in conjunction with USDA-WS personnel, if appropriate. Any solutions to hazardous wildlife problems will follow the IPM Plan and BASH Plan.

Diseases affecting fish and wildlife may occur on the installation. Any large-scale fish and wildlife deaths and unnatural behavior occurring on the installation will be reported, recorded, and investigated, in conjunction with USFWS, USDA-WS, US Environmental Protection Agency (US EPA), and WDNR personnel, as appropriate.

7.2.3 Management of Threatened and Endangered Species and Habitats

This section presents information about the management of special status species located within or with the potential to occur at Volk Field CRTC and Hardwood Range, along with requirements and strategies for their management. As additional surveys and natural resources management activities are conducted, it is possible other species may be added in the future. Currently, there are 30 special status species which includes 6 recently documented on either installation (WIANG 2014a, 2017a, 2017b, 2018b, 2019a).

7.2.3.1 Federal Special Status Wildlife Species

The Volk Field CRTC and Hardwood Range are required to manage for federally-listed species. Four federally listed species have been identified on Volk Field CRTC and Hardwood Range and their management strategies are listed below.

Gray Wolf: Gray wolf scat and tracks were documented at Hardwood Range in Habitat Unit 1 (partially maintained habitat; see Section 5.2.2) during recent flora/fauna surveys (WIANG 2019a). Historically, gray wolf tracks have been observed at both locations (WIANG 2014a). They are social animals, living in a family group or pack whose territory may cover 20-120 square miles (WDNR 2018). The following management strategies are recommended for gray wolves if documented on Volk Field CRTC or Hardwood Range:

- Maintain habitat corridors
- Maintain prey species (e.g., deer and moose)

Gray Wolf
Photo by USFWS

Northern Long-Eared Bat: The northern long-eared bat was detected at both Volk Field CRTC and Hardwood Range during recent bat surveys (WIANG 2017a, WIANG 2017b). Often considered a forest obligate species (Barbour and Davis 1969), northern long-eared bats rely heavily on forests for roosting and foraging habitat. In particular, the foraging habitat of this species is closely tied to the forest interior where it commonly feeds in 'cluttered' areas below the canopy but above the shrub layer (LaVal et al. 1977). Prey items most commonly include flies, moths, beetles, and spiders. Northern long-eared bats hibernate in caves and mines from October - April. The following management strategies are recommended for northern long-eared bats if documented on Volk Field CRTC or Hardwood Range:

Northern Long-Eared Bat
Photo by USFWS

- Protect large diameter snags in early to medium stages of decay where they do not pose a safety hazard
- Maintain living and dead trees in adjacent forested areas, particularly those with loose bark
- Maintain forests and riparian corridors
- Reduce the use of pesticides in potential bat foraging areas
- Maintain vegetation and reduce bank erosion to surface water features which serve as critical foraging areas
- Maintain buffer trees around known maternity roosts and hibernaculum; can coordinate with WDNR or USFWS to help identify these locations

Eastern Massasauga Rattlesnake: Eastern Massasauga rattlesnakes were historically seen near Hardwood Range (WIANG 2014a) but none were identified during recent surveys. The species is strongly associated with floodplain habitats along medium to large rivers where they primarily occupy open canopy wetlands. Overwintering usually occurs in terrestrial crayfish burrows or rotted out root channels in open canopy wetlands, and lowland hardwood forests. The following management strategies are recommended for eastern Massasauga rattlesnakes if documented on Volk Field CRTC or Hardwood Range:

Eastern Massasauga
Photo by USFWS

- Maintain upland prairie connected to open canopy uplands
- Where feasible, use wildlife-safe materials for erosion control and site restoration

Karner Blue Butterfly: Karner blue butterflies were documented at Hardwood Range in Habitat Unit 1 (partially maintained habitat) and Habitat Unit 6 (clearcut habitat; see Section 5.2.2) during recent flora/fauna surveys (WIANG 2019a). Their habitat includes pine and oak savannas/barrens that support wild lupine and other nectar-bearing plants (USFWS 2008). The following management strategies for Karner blue butterflies are recommended if documented on Volk Field CRTC or Hardwood Range:

Karner Blue Butterfly
Photo by USFWS

- Protect stands of wild lupine which are the larval host plant
- Prevent woody vegetation encroachment
- Rotational burning

Whooping Crane
Photo by USFWS

Whooping Crane: Whooping cranes were historically seen adjacent to Volk Field CRTC (WIANG 2014a) and have been observed on Volk Field CRTC during either BASH surveys or within strike records (WIANG 2018b). A population is present in the area as a result of an ongoing reintroduction effort. This population is designated as experimental nonessential, which affords it most of the protections of a species listed as threatened, with the exception of Section 7 consultation. In general, whooping cranes depend on large, open wetland ecosystems to eat, roost, and make their nests. The following management strategies for whooping cranes are recommended if documented on Volk Field CRTC or Hardwood Range:

- Implement stormwater management measures as appropriate to maintain water quality
- Limit disturbance to habitat
- Remove all remaining trees and brush within the Airport Operating Area and ensure surface water ditches are maintained free of vegetation
- Additional recommendations and management activities are summarized in the BASH Plan (WIANG 2018b)

7.2.3.2 State Special Status Species

Wisconsin state law provides for the protection of native threatened and endangered species. Three state-listed species have been identified on Volk Field CRTC and Hardwood Range and their management strategies are listed below.

Black Tern
Photo by WDNR

Black Tern: Black terns have been observed on Volk Field CRTC during either BASH surveys or within strike records (WIANG 2018b). Colonies generally occur in freshwater marshes and wetlands along lake margins and occasionally in rivers. Areas are typically dominated by cattails or bulrushes (Currier 2000). The following management strategies are recommended for black terns if documented on Volk Field CRTC or Hardwood Range (WDNR 2019):

- Maintain wetland habitat including natural hydrologic regimes
- Control invasive species (e.g., carp and purple loosestrife) in wetlands

Red-Shouldered Hawk: Red-shouldered hawks have been observed on Volk Field CRTC during either BASH surveys or within strike records (WIANG 2018b). It inhabits moist, well-drained woodlands, wooded river swamps, bottomlands, and wooded margins of marshes often close to cultivated fields. This species seems to prefer mature forests and is usually more common in lowland areas than in mountainous regions. They perch on a fence post, tree, or telephone pole overlooking a meadow, marsh, open field, or forest to sight prey. Red-shouldered hawks feed primarily on small mammals such as rabbits and squirrels, along with small birds, frogs, small snakes, toads, lizards, fish, and large insects. The following management strategies for red-shouldered hawks are recommended if documented on Volk Field CRTC or Hardwood Range:

Red-Shouldered Hawk
Photo by WDNR

- Maintain contiguous tracks of forests with few openings
- Do not conduct tree removal from approximately February through August in areas where nesting may occur
- Remove all remaining trees and brush within the Airport Operating Area and ensure surface water ditches are maintained free of vegetation
- Additional recommendations and management activities are summarized in the BASH Plan (WIANG 2018b)

Big Brown Bat: Big brown bats were documented at both Volk Field CRTC and Hardwood Range during recent bat surveys (WIANG 2017a, WIANG 2017b). The big brown bat is considered a habitat generalist (Agosta 2002) and can be found throughout most of North America (Kurta and Baker 1990). This species occurs in various wooded and semi-open habitats, especially near riparian areas, and they are commonly found in urban and suburban settings. Big brown bats take advantage of insect swarms around streetlights (Geggie and Fenton 1985) and they readily occupy manmade structures as roosts (Whitaker and Hamilton 1998). During winter, big brown bats hibernate in buildings, caves, and mines. Big brown bats specialize on beetles and other hard-bodied insects, including several important agricultural pests (Whitaker 1995), for the majority of their diet (Kurta 2008). The following management strategies for big brown bats are recommended if documented on Volk Field CRTC or Hardwood Range:

Big Brown Bat
Photo by WDNR

- Reduce the use of pesticides in potential bat foraging areas
- Maintain forests and riparian corridors

7.3 Water and Wetland Resource Protection

Volk Field CRTC and Hardwood Range currently protect water resources through compliance with a number of Federal, state, local, and USAF environmental regulations that require the installations to have detailed spill control and response procedures and to implement stormwater pollution prevention best management practices (BMPs). The objective of these regulations is to

prevent pollutants (e.g., fuels, solvents, sediments) from entering the watershed, thus protecting water resources. Specific watershed protection measures used by the installation include spill clean-up equipment at industrial locations, integrated pest management, and reduction of fertilizer applications.

One of the primary concerns to water quality at Volk Field CRTC and Hardwood Range is the deposition of sediment in the installations' waterways. The watershed protection management objectives and actions presented in this INRMP are designed to reduce/control nutrient and sediment inputs into the watershed. In addition, the Volk Field CRTC Environmental Management Office seeks to minimize nonpoint source pollution of both surface and groundwater in the watershed.

Hardwood Range possesses additional watershed management challenges because of the influence of adjacent landowners on hydrology and water quality. The Cranberry Creek Drainage District was established in the 1950's to purchase and supply the water needs of the cranberry growers in the region. The rights to the operation and maintenance of the dams and ditches that cross through Hardwood Range were formerly leased to that organization. The Drainage District has since failed and Cranberry Creek Cranberries, Inc. retained a maintenance easement to the water systems on Hardwood Range. The dams and ditches are not being actively maintained, however, and many are in need of repair. The Air Force and/or ANG may revoke the easement at any time should it interfere with the mission.

The major goal in wetland management is to minimize the impact that Volk Field CRTC and Hardwood Range missions have on wetlands. To minimize impacts on wetlands Volk Field CRTC natural resources staff strives to create healthy, functional wetlands that can sustain minor operational influences outside indirect infringement of wetlands. When possible, it is the goal to enhance wetland functions to create wetlands that maximize the values that wetlands have to the ecosystem and to society (e.g., floodwater retention, water quality protection).

Details on the Waters of the US, including wetlands founds on Volk Field CRTC and Hardwood Range can be found in **Section 5.5**.

7.3.1 Regulatory and Permitting

The US Army Corps of Engineers (USACE) regulates the discharge of dredged or fill material into Waters of the US, including wetlands, under Section 404 of the Clean Water Act (CWA). Even an inadvertent encroachment resulting in a displacement or movement of soil or fill material has the potential to be viewed as a violation of the CWA if an appropriate permit has not been issued by the USACE. Waters of the US including wetlands are defined under 33 CFR Part 328.3(a) and referred to as Jurisdictional Waters. Jurisdictional Waters may include coastal and inland waters, lakes, rivers, ponds, streams, intermittent streams, vernal pools, wetlands, and other waters, that if degraded or destroyed could affect interstate commerce.

A jurisdictional determination is made based on multiple criteria, but the relationship of the wetland to other Waters of the US is important. Management of wetlands on federal lands and military installations is further governed by EO 11990 and DoDI 4715.03, respectively. Under those instructions, wetlands are required to be managed for no net loss on federal lands, including military installations. In support of these policies, long and short-term adverse impacts associated

with the destruction or modification of wetlands and support of new construction in wetlands must be avoided to the maximum extent possible.

According to the US EPA regulations issued under Section 404(b)(1) of the CWA, permitting of fill activities will not be approved unless the following conditions are met: no practicable, less environmentally damaging alternative to the action exists; the activity does not cause or contribute to violations of state water quality standards (or compliance under Section 401 of the CWA); the activity does not jeopardize listed species or sensitive cultural resources (33 CFR Part 320.3 [e] and [g]); the activity does not contribute to significant degradation of Waters of the US; and all practicable and appropriate steps have been taken to minimize potential adverse impacts to the aquatic ecosystem (40 CFR Part 230.10).

Section 401 of the CWA gives the State of Wisconsin the authority to regulate, through the state water quality certification program, proposed federally permitted activities resulting in a discharge to water bodies, including wetlands. The state may issue certification, with or without conditions, or deny certification for activities that may result in a discharge to water bodies. In Wisconsin, the WDNR is responsible for issuing Section 401 Water Quality Certification. Wisconsin's process for certifying Federal wetland regulatory decisions is outlined in Administrative Rule Natural Resources 299, Water Quality Certification. Wisconsin Act 6 (2001) extends Wisconsin's water quality certification authority to include oversight of discharges into non-Federal (i.e., isolated) wetlands.

The State of Wisconsin implements additional protections to wetlands through the Shoreland and Wetland Zoning Oversight Statute (Ss. 59.971, 61.351 & 62.231, Stats.), which requires WDNR to provide technical assistance to local zoning officials, oversight of local decisions and general development, and wetland protection standards for "shorelands" adjacent to navigable waters, which are administered by local government.

7.3.2 Vegetation Buffers

Vegetated buffers are also referred to as riparian management zones, riparian buffers, wetland buffers, lake buffers, buffer strips, filter strips, or streamside management areas. Buffers can take many forms and may vary in size and function depending on the upland land use and the type of water resource being protected. They can either be grassland or forest and may or may not be mowed and maintained occasionally. One of the primary purposes of a vegetated buffer is for water quality protection by providing vegetation to interrupt water flow and to trap and filter out suspended sediments, nutrients, chemicals, and other polluting agents before they reach the body of water. Vegetated buffers should be maintained along all perennial and intermittent streams, wetlands, lakes, or ponds where nearby management activities result in surface/soil disturbance, earth changes, and where erosion and sediment transport occurs during rain events. Maintaining the forest cover around small water resources is also important for preventing sedimentation and impacts to water quality.

7.4 Grounds Maintenance

The primary goal of grounds maintenance management is to lessen or avoid adverse effects from project activities to the overall ecosystem and its sensitive resources. This can be accomplished by making maximum use of regionally native plant species, avoiding introduction of invasive, exotic species in revegetation and landscaping activities, and reducing chemical usage, and

maintenance inputs in terms of energy, water, manpower, equipment, and chemicals. The implementation of this goal will satisfy Sec. 207 of EO 13148 which requests agencies to strive to promote the sustainable management of Federal facility lands through the implementation of cost-effective, environmentally sound landscaping practices, and programs to reduce adverse impacts on the natural environment.

Two separate grounds maintenance teams perform most grounds maintenance activities at Volk Field CRTC and Hardwood Range. Normal grounds maintenance operations at Volk Field CRTC are focused on lawn care, drainage ditch maintenance, airfield management, landscaping maintenance, and pest management. Grounds maintenance activities performed at Hardwood Range consist of road, firebreak, drainage ditch maintenance, and target repair and replacement. Volk Field CRTC possesses a substantial urban forestry resource that requires continual management. These areas will be managed primarily for aesthetics, compatible wildlife preservation, and for visual and noise-buffering capacity. It is expected that this can be accomplished largely by removal of trees that are dead, dying, diseased, damaged, or that pose safety hazards, and by occasional brush removal. Trees that are native to the region and require minimal amounts of maintenance should be selected for planting.

7.5 Forest Management

Volk Field CRTC

Volk Field CRTC does not currently support a traditional forest management program. Due to a limited forested area, the forest is managed according to land use and BASH safety.

Hardwood Range

Hardwood Range supports a large forested ecosystem that is primarily managed as a commercial resource. Juneau County collects all profits from commercial forestry at Hardwood Range. The State of Wisconsin leases Hardwood Range to WIANG, but maintains an easement that allows Juneau County to manage and harvest timber from the leased property. Planning for timber harvest is accomplished primarily by Juneau County through the *Juneau County Forest Plan 2006–2020* (WDNR 2007). Through this plan, Juneau County specifies harvesting contractor responsibilities, describes the Juneau County forest setting, and outlines land use management objectives used in managing forest ecology and timber harvest. Specifically, land use planning areas described in the plan include aesthetic management zones, timber sales procedures, cultural practices, special uses, wetlands, wildlife management, fisheries management, and exceptional resources. In addition, fire and pest control, road and trail maintenance, and governing laws and agreements are described in the Juneau County Forest Plan.

The county maintains Hardwood Range forestlands to provide a sustained yield of timber that supports healthy ecosystem function and full operation of the mission. Juneau County and WDNR professionals trained in silvicultural principles develop specific management guidelines for forest planning efforts (WIANG 1997). A wide variety of economic, biological, and environmental considerations go into forest planning at Hardwood Range.

Harvest activities at Hardwood Range can be challenging, and therefore are restricted to a stand located just east of the Impact Area. Some timber is difficult to access with Range use, but it has been coordinated in the past. Interior stands that were historically harvested have been left to succession due to the high occurrence of metal in the trees due to shatter ordnance. No market

exists for wood containing metal shards because of the processing difficulties experienced at paper and sawmills. Areas in the interior of Hardwood Range are transitioning into later successional communities (primarily red maple). As the interior forest's species diversity continues to change, new management guidelines will need to be developed that address the directional transition.

7.6 Outdoor Recreation, Public Access, and Public Outreach

Due to security and/or safety measures, there is currently no outdoor recreation or public access at either Volk Field CRTC or Hardwood Range. Both installations possess abundant populations of game animals that are attractive to sportsmen. Trespassing, especially on Hardwood Range, can result in postponement of flying activities at the Range and could result in serious injury or death to the trespassers. Similarly, trespassing by all-terrain vehicles (ATVs) can result in postponement of flying activities at Hardwood Range, potential environmental damage, and serious injury or death to the trespassers.

7.7 Geographic Information Systems

Geographic Information Systems (GIS) is used to manage and catalog information acquired in natural resources research. GIS assists in planning by charting areas of environmental concern and providing a baseline for analyzing the potential impacts of any proposed natural resources management action. Managers can implement the capabilities of GIS to watershed, wetlands, wildlife, and various other natural resource management applications. GIS needs and requirements will be addressed through the ANG GeoBase Program. Volk Field CRTC and Hardwood Range GIS will be updated as new data becomes available and integrated into the Common Installation Picture (CIP).

7.8 Other Plans

7.8.1 Integrated Pest Management Plan

IPM objectives at Volk Field CRTC and Hardwood Range include the protection of real estate, control of potential disease vectors or animals of other medical importance, control of undesirable or nuisance plants and animals (including insects), and prevention of damage to natural resources. In addition, the potential presence of several zoonotics (e.g., Lyme disease and encephalitis) on the installation, and the potential threat to human health and safety (e.g., transmission of disease) cannot be underestimated. DoDI 4150.07 states that it is DoD policy to establish and maintain safe, effective, and environmentally sound integrated pest management programs to prevent or control pests and disease vectors that could adversely impact readiness or military operations by affecting the health of personnel or damaging structures, material, or property.

IPM should use mechanical, physical, cultural, biological, and educational methods to maintain pests at populations low enough to prevent undesirable damage or annoyance. Application of the least toxic chemical should be used as a last resort.

Prevention of damage to natural resources is an important objective of pest management. Natural resources damage can result from infestations of damaging insects or insect larvae, from overgrowths of vegetation where natural resources management concerns demand their removal, and from invasions of noxious or exotic plant species that displace natural and native vegetation.

Table 13 lists pest species identified for Volk Field CRTC and Hardwood Range in the IPM Plan (WIANG 2014b).

Table 13. Pest species and wildlife species presenting management issues at Volk Field CRTC and Hardwood Range

Category	Pest Species
Public Health-Related Pests	Rats and Mice German and American Cockroaches Wood and Deer Ticks Mosquitoes Bees, Hornets, and Wasps Brown Recluse Spiders House and Carpenter Ants House, Fruit, and Deer Flies Clover Mites
Pests Found in and Around Buildings	Stored Product Pests
Noxious or Invasive Plants and Animals	European Starling House Sparrow Skunks Raccoons Gypsy Moth
Undesirable Vegetation	Vegetation Overgrowth Broadleaf Weeds
Quarantine and Regulated Pests	Japanese Beetles Emerald Ash Borer Beetle
Wildlife Species with Management Concerns	Feral Cats Canada Goose Beaver Bats Opossum Squirrels Snakes White-Tailed Deer Woodchucks Loose/Stray Dog, Cat Bear

Source: WIANG 2014b

7.8.2 Invasive Species

EO 13112 *Invasive Species*, requires all federal agencies to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause. Invasive species found on Volk Field CRTC and Hardwood Range are identified below in **Tables 14** and **15.** Future hazardous wildlife problems will be evaluated in conjunction with USDA-WS personnel, if appropriate. Any solutions to hazardous wildlife problems will follow the IPM Plan and BASH Plan. Diseases affecting fish and wildlife may occur on either installation. Any large-scale fish and wildlife deaths and unnatural behavior occurring on the installation will be reported, recorded, and investigated, in conjunction with USFWS, USDA-WS, US EPA, and WDNR personnel, as appropriate.

Volk Field CRTC

During recent flora and fauna surveys, 23 invasive plant species were identified in Volk Field CRTC **(Table 14)**. All are on the Invasive Plant Association of Wisconsin (IPAW) Working List of Invasive Plants of Wisconsin (IPAW 2019) and 9 are listed as ‘restricted’ by the State of

Wisconsin under the *Invasive Species Identification, Classification, and Control Rule* (Chapter NR 40, Wis. Adm. Code; WDNR 2015a). NR 40 makes it illegal to transport, transfer, or introduce 'restricted' plants without a permit. Additionally, control is encouraged, but not required.

Table 14. Invasive Plant Species at Volk Field CRTC

Scientific Name	Common Name	IPAW Working List	WDNR NR 40
Berberis thunbergii	Japanese barberry	X	RESTRICTED*
Bromus inermis	smooth brome	X	
Centaurea stoebe	spotted knapweed	X	RESTRICTED
Crepis tectorum	narrowleaf hawksbeard	X	
Elaeagnus umbellata	autumn olive	X	RESTRICTED
Elymus repens	quackgrass	X	
Hesperis matronalis	Dame's rocket	X	RESTRICTED
Hieracium aurantiacum	orange hawkweed	X	
Hieracium caespitosum	meadow hawkweed	X	
Lonicera tatarica	Tartarian honeysuckle	X	RESTRICTED
Lotus corniculatus	bird's-foot trefoil	X	
Melilotus officinalis	sweetclover	X	
Phalaris arundinacea	reed canarygrass	X	RESTRICTED [var. picta]
Phragmites australis	common reed	X	RESTRICTED [non-native ecotype]
Poa compressa	Canada bluegrass	X	
Robinia pseudoacacia	black locust	X	RESTRICTED
Rumex acetosella	sheep sorrel	X	
Securigera varia	crownvetch	X	RESTRICTED
Solanum dulcamara	bittersweet nightshade	X	
Trifolium pratense	red clover	X	
Trifolium repens	white clover	X	
Typha angustifolia	narrow-leaf cattail	X	RESTRICTED
Ulmus pumila	Siberian elm	X	RESTRICTED

Source: IPAW 2019, WDNR 2015a, WIANG 2019b
**There are some excluded cultivars*

Hardwood Range

During recent flora and fauna surveys, 15 invasive plant species were identified in Hardwood Range (**Table 15**). All are on the Invasive Plant Association of Wisconsin (IPAW) Working List of Invasive Plants of Wisconsin (IPAW 2019) and 5 are listed as 'restricted' by the State of Wisconsin under NR 40 (WDNR 2015a).

Table 15. Invasive Plant Species at Hardwood Range

Scientific Name	Common Name	IPAW Working List	WDNR NR 40
Centaurea stoebe	spotted knapweed	X	RESTRICTED
Daucus carota	Queen Anne's lace	X	
Elaeagnus umbellata	autumn olive	X	RESTRICTED
Euphorbia esula	leafy spurge	X	RESTRICTED
Hieracium aurantiacum	orange hawkweed	X	
Hieracium caespitosum	meadow hawkweed	X	
Lotus corniculatus	bird's-foot trefoil	X	
Melilotus officinalis	sweetclover	X	
Phalaris arundinacea	reed canarygrass	X	
Populus alba	white poplar	X	RESTRICTED
Rosa multiflora	multiflora rose	X	RESTRICTED
Rumex acetosella	sheep sorrel	X	
Saponaria officinalis	bouncingbet or soapwort	X	
Trifolium pratense	red clover	X	
Trifolium repens	white clover	X	

Source: WDNR 2015a, WIANG 2019a, IPAW 2019

7.8.3 Stormwater Management

Per the WDNR, Volk Field CRTC does not fall under their jurisdiction and therefore does not require a Wisconsin Pollution Discharge Elimination System (WPDES) Permit. Therefore, a Stormwater Pollution Prevention Plan (SWPPP) is also not required. In order to support best management practices with regards to stormwater management at both Volk Field CRTC and Hardwood Range, a SWMP was established. It includes information on installation point of contacts, guidance on record keeping, training, a facility monitoring plan, and a BMP Action Plan (WIANG 2018a).

7.8.4 Bird/Wildlife Aircraft Strike Hazard (BASH)

BASH hazards exist at Volk Field CRTC and Hardwood Range due to resident and migratory bird species and other wildlife. Bird and wildlife strikes are an aircraft safety concern due to the potential damage that a strike might have on the aircraft or injury to aircrews. USDA-WS conducted a Wildlife Hazard Assessment (WHA) of Volk Field CRTC in 2011. The WHA concluded that among the larger bird species, Canada geese (*Branta canadensis*) were most frequently observed and were most associated with established open water, with the greatest numbers being in April and October. Sandhill cranes (*Grus canadensis)* were observed at about half the frequency, primarily in October, mostly in mowed grass or croplands (USDA-WS 2011). White-tailed deer are seen as a particular threat of wildlife strikes at Volk Field CRTC. The airfield is surrounded by a fence for security and to deter wildlife such as white-tailed deer (*Odocoileus virginianus*) and coyotes (*Canis latrans*) from entering the airfield, but the fence is currently below ideal heights to deter wildlife completely from entering the field and gates were left open much of the time. Breeches under the fence are repaired as required. Deer and other wildlife have been dispersed or killed under conditions of a depredation permit but are abundant in the surrounding areas and on the base itself.

Much of the airfield is covered in turf as recommended, but broad-leaved weeds, bare areas, broken tarmac, brush, patches of trees, and water features are potentially attractive to a variety of bird and other wildlife species. There are also several agricultural fields surrounding the airfield. All of these features attracted birds and other wildlife.

The installation currently implements a BASH Plan (WIANG 2018b), which establishes procedures to minimize the hazard to deployed WIANG aircraft both at the installation and in their operating areas. No single solution exists to this BASH problem, and a variety of techniques and organizations are involved in the control program including:

- Ensure gates are closed and gaps are no larger than 6 inches in perimeter fence.
- Regularly inspect perimeter fence for breeches and repair as required.
- Remove all remaining trees and brush from the air operations area and ensure surface water ditches are maintained free of vegetation.
- Maintain airfield turf at 7-14 inches and investigate options to reduce standing water on airfield.
- Monitor ponds for Canada goose nesting and removing nesting pairs.
- Conduct harassment or depredation activities on birds nesting and roosting in hangars and other airfield structures.
- Consider installing a wire grid system over the pond at Hardwood Range to prevent use by waterfowl (similar to that on the wastewater treatment pond at Volk Field CRTC).
- Prohibit all personnel from feeding or otherwise attracting birds or other wildlife on ANG property.
- Continue to ensure reporting of all bird strikes at Volk Field CRTC and Hardwood Range.

7.8.5 Wildland Fire Management

Wildfire management and control is a matter of concern for military training and natural resources management at Hardwood Range. Wildfires can have several undesirable aspects but in the region around Hardwood Range the positive effects normally outweigh the negative ones. Additionally, management of the grassland at Hardwood Range is vital to the management of Karner blue butterfly habitat.

Prescribed Burning

Unlike Volk Field CRTC, Hardwood Range burns annually. Approximately 830 acres within the Impact and 90 Series Area are burned annually, with the actual acreage subject to variations in the KBB burn rotation, presence of flooded areas, and changes within the established Blanding's turtle area (Gonnering 2014). Fires at Hardwood Range are management burns set to avoid an accidental fire from the air-to-ground training activities and for collecting training bombs. However, several small fires are inadvertently started annually as a result of mission activities at the Range. Incidental or unplanned ignitions have the potential to temporarily impact or cancel missions until any wildfire is extinguished. There are specific measures that can be taken to minimize the effects of wildfires and to provide a safe environment for conducting management burns. These measures include monitoring fire danger conditions, implementing fire reporting procedures, fire-related training restrictions, firebreak maintenance, and establishing a management burn plan.

Annually burned Impact Area on Hardwood Range

Planning for wildfires and management burns at Hardwood Range considers the risks, probabilities, and consequences of various management strategies (e.g., fire use versus fire exclusion). In a responsive planning process, management decisions must be monitored, integrated, and supported at each step. In order to carry out critical and effective "adaptive management" (a feedback approach to management that uses monitoring results to plan future actions) Hardwood Range maintains accurate records of time and conditions of burns and effect on sensitive species (e.g., KBB).

For the purpose of forecasting fire danger, Hardwood Range uses the Great Lakes Fire and Fuels web site (https://glff.mesowest.org/). This is a meteorological hazard analysis resource for wildland fire managers in the Great Lakes states under the auspices of the Great Lakes Forest Fire Compact, and with the support and direction of Michigan Department of Natural Resources, Minnesota Department of Natural Resources, and WDNR. The purpose of the web site is to provide retrospective, current, and future information regarding weather and fuel conditions in the Great Lakes region. Specifically, Hardwood Range references the local FFMC (Fine Fuel Moisture Index) and the ISI (Initial Spread Index). Between the two sets of data, Hardwood Range can determine its fire weather for the day; therefore, determine the range's level of readiness. Hardwood Range obtains a Burn Permit from the WDNR to comply with state burn and air quality procedures. Additionally, Hardwood Range personnel assist the lead Agency during prescribed burns

Wildland fire, whether planned or non-planned, can be a large, sporadic source of particulates that may possibly cause significant short-term impacts on human health, welfare, safety, and visibility. Hardwood Range will adhere to federal guidelines such as the Clean Air Act (42 USC 7401 et seq.). The Clean Air Act requires states to attain and maintain the national ambient air quality standards adopted to protect health and welfare.

Hardwood Range is under the jurisdiction of the WDNR which has published regulations for air quality and prescribed burn permitting. However, due to Hardwood Range being located within Juneau County, a county that is classified as being in attainment for all criteria pollutants, a conformity determination is not required. Additionally, this action does not result in air emissions that exceed the *de minimis* amounts listed in CFR 93.153, so an air permit is not required. Even though Hardwood Range is in an attainment county, Hardwood Range personnel and the lead Agency will make every effort to provide for good smoke management on each burn.

Safety

To manage fire danger and to control management burns within the installation, Hardwood Range implements a series of *pre-suppression* programs, *prevention* programs, and *suppression* programs. Pre-suppression programs include creating access to control wildfires and implement management burns, construction of firebreaks, and conducting management burns. Preventative programs include establishing proper operational procedures to limit wildfire and collection of data to compute National Fire Danger Rating System indices. Suppression programs include fire detection and reporting, fire behavior analysis, monitoring of ignitions to ensure that they burn out, initiating attacks on small fires with the potential to spread, and initiating interagency and inter-organizational suppression strategies. These fire ecology management programs have been used during all management burn events at Hardwood Range. The current fire suppression and control infrastructure, such as roads and firebreaks, has proved adequate for property and resource protection during fast-moving wildfires and management burns. Firebreaks surround the entire boundary of the installation and also encompass the impact area. Range personnel maintain these firebreaks for fireshed maintenance access and safety personnel access.

Wildland Fire Management Plan

The Wildland Fire Management Plan is an operational guide to ensure that procedures are in place to suppress wildfires, conduct prescribed burns, and defines levels of protection needed to ensure the safety of military personnel, civilians, and infrastructure. This is accomplished by identifying and managing wildfire risks associated with planned and non-planned ignitions. Options are included to solidify strategic and tactical decisions needed to achieve wildfire hazard planning goals and objectives (WIANG 2018e).

8.0 MANAGEMENT GOALS AND OBJECTIVES

Goals and objectives provide the framework for natural resources management programs. Goals provide a general guiding direction for each technical area and objectives are more specific actions that facilitate achieving those goals. The objectives then drive the development of specific projects. Management goals and objectives for the Volk Field CRTC and Hardwood Range INRMP were developed through a thorough evaluation of the natural resources present on the installation in accordance with AFI 32-7064 and the principles of adaptive ecosystem management by an interdisciplinary team of biologists, planners, and environmental scientists. Goals and objectives should be revised over time to reflect evolving environmental conditions, adaptive management, and the completion of tasks as the INRMP is implemented.

GOAL – Natural Resources Program Management (PM): Manage natural resources in a manner that is compatible with and supports the military mission while complying with applicable federal and state laws, and USAF regulations and policies.

OBJECTIVE PM1: Prepare a budget and identify projects to implement the natural resources management program at Volk Field CRTC and Hardwood Range.

PROJECT PM1.1: Prepare a budget to implement the natural resources management program at Volk Field CRTC and Hardwood Range.

PROJECT PM1.2: Submit work needs and proposed projects to the ANG NR Manager for budget and contracting.

OBJECTIVE PM2: Conduct annual INRMP review and coordination. Volk Field CRTC environmental management office will promote discussion with Installation Command, personnel, and pertinent internal stakeholders to review the INRMP on a yearly basis.

PROJECT PM2.1: Coordinate a yearly meeting of the INRMP Working Group to identify operational needs relative to natural resources management. Update and document any changes to the INRMP accordingly.

PROJECT PM2.2: Members of the Environmental Management Office must attend the CECOS Natural Resources Compliance Course as part of their training requirements for implementation of the INRMP.

OBJECTIVE PM3: Coordinate an annual review of the INRMP with USFWS and WDNR, and monitor the progress of goals and objectives. Update and document any changes to the INRMP accordingly.

PROJECT PM3.1: Conduct an annual review of the INRMP with the USFWS and WDNR to identify operational needs relative to natural resource management. Other participants can include local federal and state property managers, Wood and Juneau County public land managers, USDA-NRCS, USDA-WS, and Fort McCoy Natural Resource staff. Annual review can be conducted in-person or by email and should present actions taken during the fiscal year, successes and failures, and any changes to projects for the coming fiscal year. Update the INRMP and document any changes accordingly.

GOAL – Management of Threatened or Endangered Species Habitats (TE): Take a regional ecosystem-based approach that manages for potential sensitive species while protecting the operational functionality of the mission.

OBJECTIVE TE1: Update occurrences of listed species; information should be updated on a 5-year cycle.

PROJECT TE1.1: Determine need and timelines of additional surveys and/or survey updates based on completed studies (2016-2018).

PROJECT TE1.2: Develop gray wolf (*Canis lupus*) education and awareness materials to ensure accurate identification and ensure safe encounters for both wildlife and personnel.
PROJECT TE1.3: Maintain an up-to-date list of threatened and endangered species which occur or have the potential to occur in the region by annually consulting federal and state agency lists.

OBJECTIVE TE2: Continue to manage the Karner blue butterfly (*Lycaeides melissa samuelis*; KBB) while accomplishing the military mission.

PROJECT TE2.1: Maintain a positive disturbance regime and specific KBB habitat management practices; control invasive plant species that have the ability to displace lupine and nectar species.
PROJECT TE2.2: Implement the KBB Monitoring Plan to provide population estimates, presence and absence data, and for re-surveying the installation for KBB habitat on a 5-year interval.

GOAL – Waters of the US/Wetland Protection (WP): Manage water resources to ensure resiliency with no net loss of acreage or functions and values.

OBJECTIVE WP1: Maintain USACE Concurrence for all Waters of the US, including wetlands on Volk Field CRTC and Hardwood Range.

PROJECT WP1.1: Seek re-verification/concurrence of Waters of the US and wetland jurisdictional determination from USACE, every five years. Begin coordination with the USACE one-year early.

OBJECTIVE WP2: Maintain compliance with Waters of the US, including wetlands regulatory requirements. Plan development and training activities to avoid Waters of the US, including wetland impacts to the maximum extent possible and mitigate unavoidable impacts.

PROJECT WP2.1: Coordinate with ANG staff on Waters of the US, including wetlands avoidance strategies and permitting requirements.

GOAL – Grounds Maintenance and Integrated Pest Management (GM): Improve the aesthetic appearance of lands controlled by the ANG as well as contribute to overall biodiversity and ecosystem health. Use of regionally native plant species should be maximized in landscaping and restoration. Establish and maintain safe, effective, and environmentally sound integrated pest management programs to prevent or control pests that could adversely impact readiness or military operations.

OBJECTIVE GM1: Maintain an aesthetically pleasing landscaping that conserves natural ecosystem functions, as feasible. Utilize native grasses and landscape plant species that are well-adapted to the growing conditions in the central Wisconsin area. As needed, non-native cover crop species may also be required for soil stability and to ensure seedling establishment in sandy soils.

PROJECT GM1.1: Consult installation staff on soil stabilization and proper landscape plant selection.
PROJECT GM1.2: Determine the feasibility of attendance to state erosion and sediment control classes for the purposes of understanding the techniques used during construction and to ensure destabilization is limited.

OBJECTIVE GM2: Implement the IPM Plan to control plant and animal species that adversely affect natural resources management or affect the military mission or facilities

PROJECT GM2.2: Update the IPM Plan to ensure that the plan reflects changes in pest

populations and current management issues.
PROJECT GM2.2: Determine the need for an Invasive Species Management Plan based on the results of the recent Flora and Fauna Surveys.

GOAL – Forest Management (FOR): Manage forested areas to support healthy ecosystem function while protecting the operational functionality of the mission.

OBJECTIVE FOR1: Improve timber stand vertical diversity to create a well-structured canopy, midstory, and understory to benefit wildlife species and the military mission.

PROJECT FOR1.1: Develop management plan to address timber stand vertical diversity.
PROJECT FOR1.2: Coordinate all timber stand improvement projects, burn programs, and timber harvests with Juneau County, which owns the timber rights on Hardwood Range. Volk Field CRTC's timber is owned by the Wisconsin Department of Military Affairs.

GOAL – Wildland Fire Management (WFM): Assess the impact of fire on vegetative communities, and animal and plant populations of interest on Hardwood Range. Use fire as a tool to achieve Hardwood Range's natural resources management and training goals and objectives.

OBJECTIVE WFM1: Create and maintain firebreaks and access roads.
OBJECTIVE WFM2: Expand the Wildland and Prescribed Fire Management Program; Develop rotational prescribed burn regime for Hardwood Range which benefits protected/sensitive species while allowing for more efficient training missions and future base development goals.

PROJECT WFM 2.1: Review the Wildland Fire Management Plan annually, and every five years to ensure the plan meets Hardwood Range's needs. Update as needed.
PROJECT WFM 2.2: Develop a site-specific Prescribed Burn Plan for all fire management blocks.
PROJECT WFM 2.3: Continue implementing the Prescribed Burn Plan for the Hardwood Range Impact and 90 Series Areas.
PROJECT WFM 2.4: Investigate feasibility of expanding prescribed burn area into the remaining Hardwood Range buffer area given logistical, compliance, funding, and coordination considerations.

GOAL – Bird/Wildlife Aircraft Strike Hazard (BASH): Manage wildlife populations and their habitat in a manner consistent with recommendations of the BASH Plan to the best extent practicable while maintaining regional ecosystem integrity and function.

OBJECTIVE BASH1: Support goals and objectives of the BASH Plan.

PROJECT BASH 1.1: Attend quarterly BASH Working Group meetings.
PROJECT BASH 1.2: Continue coordinating with USDA-WS to ensure compliance requirements remain up to date, including depredation permits.
PROJECT BASH 1.3: Coordinate and assist as necessary, on installation BASH activities with the BASH Working Group, Airfield Management, and USDA-WS.
PROJECT BASH 1.4: Annually review and coordinate with Airfield Management for proper permit application and file maintenance.

GOAL – Geographic Information Systems (GIS): Employ the use of GIS in their planning processes to accurately and completely analyze the potential effects of all projects and activities to watersheds, wetlands, wildlife, and various other natural resource management applications.

OBJECTIVE GIS1: Integrate installation GIS data into the Common Installation Picture (CIP) and update Volk Field CRTC and Hardwood Range GIS as new data becomes available. Develop GIS to allow for integrated presentation of management alternatives. Collect, store, and maintain data about historical conditions, trends, and current status for critical indicators of ecological integrity and sustainability.

9.0 ANNUAL WORK PLANS

The INRMP Annual Work Plans contain projects listed by fiscal year (FY). For each project, a specific FY for implementation is provided (as applicable), as well as the office of primary responsibility (OPR), funding source, and priority for implementation (**Tables 16-20**). Priorities are defined as follows:

- High: The INRMP signatories assert that if the project is not funded the INRMP is not being implemented and the ANG is non-compliant with the Sikes Act; or that it is specifically tied to an INRMP goal and objective and is part of a "Benefit of the Species" determination necessary for ESA Sec 4(a)(3)(B)(i) critical habitat exemption.
- Medium: Project supports a specific INRMP goal and objective, and is deemed by INRMP signatories to be important for preventing non-compliance with a specific requirement within a natural resources law or by EO 13112 on Invasive Species. However, the INRMP signatories will not contend the INRMP is not being implemented if the project is not accomplished within the programmed year due to other priorities.
- Low: Project supports a specific INRMP goal and objective, enhances conservation resources or the integrity of the installation mission, and/or support long-term compliance with specific requirements within natural resources law; but is not directly tied to specific compliance within the proposed year of execution.

Table 166. Work Plans FY 2020		
Project	**Funding Source**	**Priority Level**
Prepare a budget to implement the natural resources management program at Volk Field CRTC.		High
Submit work needs and proposed projects to the ANG NR Manager for budget and contracting.		High
Coordinate a yearly meeting of the INRMP Working Group to identify operational needs relative to natural resources management. Update and document any changes to the INRMP accordingly.		High
Members of the Environmental Management Office must attend the CECOS Natural Resources Compliance Course as part of their training requirements for implementation of the INRMP.		High
Conduct an annual review of the INRMP with the USFWS and WDNR to identify operational needs relative to natural resource management. Other participants can include local federal and state property managers, Wood and Juneau County public land managers, USDA-NRCS, USDA-WS, and Fort McCoy Natural Resource staff. Annual review can be conducted in-person or by email and should present actions taken during the fiscal year, successes and failures, and any changes to projects for the coming fiscal year. Update the INRMP and document any changes accordingly.		High
Determine need and timelines of additional surveys and/or survey updates based on completed studies (2016-2018).		High
Develop gray wolf (*Canis lupus*) education and awareness materials to ensure accurate identification and ensure safe encounters for both wildlife and personnel.		Medium
Maintain an up-to-date list of threatened and endangered species which occur or have the potential to occur in the region by annually consulting federal and state agency lists.		High
Maintain a positive disturbance regime and specific KBB habitat management practices; control invasive plant species that have the ability to displace lupine and nectar species.		High
Implement the KBB Monitoring Plan to provide population estimates, presence and absence data, and for re-surveying the installation for KBB habitat on a 5-year interval.		High
Coordinate with ANG staff on Waters of the US, including wetlands avoidance strategies and permitting requirements.		High
Consult installation staff on soil stabilization and proper landscape plant selection.		High
Determine the feasibility of attendance to state erosion and sediment control classes for the purposes of understanding the techniques used during construction and to ensure destabilization is limited.		Medium
Update the IPM Plan to ensure that the plan reflects changes in pest populations and current management issues.		High
Determine the need for an Invasive Species Management Plan based on the results of the recent Flora and Fauna Surveys.		High
Develop management plan to address timber stand vertical diversity.		Medium
Coordinate all timber stand improvement projects, burn programs, and timber harvests with Juneau County, which owns the timber rights on base.		High
Review the Wildland Fire Management Plan annually, and every five years to ensure the plan meets Volk Field CRTC and Hardwood Range needs. Update as needed.		High
Develop a site-specific Prescribed Burn Plan for all fire management blocks.		High
Continue implementing the Prescribed Burn Plan for the Hardwood Range Impact and 90 series areas.		High
Investigate feasibility of expanding prescribed burn area into the remaining Hardwood Range buffer area given logistical, compliance, funding, and coordination considerations.		Medium
Attend quarterly BASH Working Group meetings.		High
Continue coordinating with USDA-WS to ensure compliance requirements remain up to date, including depredation permits.		High

Table 166. Work Plans FY 2020		
Project	**Funding Source**	**Priority Level**
Coordinate and assist as necessary, on installation BASH activities with the BASH Working Group, Airfield Management, and USDA-WS.		High
Annually review and coordinate with Airfield Management for proper permit application and file maintenance.		High

Table 17. Work Plans FY 2021		
Project	**Funding Source**	**Priority Level**
Prepare a budget to implement the natural resources management program at Volk Field CRTC.		High
Submit work needs and proposed projects to the ANG NR Manager for budget and contracting.		High
Coordinate a yearly meeting of the INRMP Working Group to identify operational needs relative to natural resources management. Update and document any changes to the INRMP accordingly.		High
Members of the Environmental Management Office must attend the CECOS Natural Resources Compliance Course as part of their training requirements for implementation of the INRMP.		High
Conduct an annual review of the INRMP with the USFWS and WDNR to identify operational needs relative to natural resource management. Other participants can include local federal and state property managers, Wood and Juneau County public land managers, USDA-NRCS, USDA-WS, and Fort McCoy Natural Resource staff. Annual review can be conducted in-person or by email and should present actions taken during the fiscal year, successes and failures, and any changes to projects for the coming fiscal year. Update the INRMP and document any changes accordingly.		High
Determine need and timelines of additional surveys and/or survey updates based on completed studies (2016-2018).		High
Develop gray wolf (*Canis lupus*) education and awareness materials to ensure accurate identification and ensure safe encounters for both wildlife and personnel.		Medium
Maintain an up-to-date list of threatened and endangered species which occur or have the potential to occur in the region by annually consulting federal and state agency lists.		High
Maintain a positive disturbance regime and specific KBB habitat management practices; control invasive plant species that have the ability to displace lupine and nectar species.		High
Implement the KBB Monitoring Plan to provide population estimates, presence and absence data, and for re-surveying the installation for KBB habitat on a 5-year interval.		High
Coordinate with ANG staff on Waters of the US, including wetlands avoidance strategies and permitting requirements.		High
Consult installation staff on soil stabilization and proper landscape plant selection.		High
Determine the feasibility of attendance to state erosion and sediment control classes for the purposes of understanding the techniques used during construction and to ensure destabilization is limited.		Medium
Update the IPM Plan to ensure that the plan reflects changes in pest populations and current management issues.		High
Determine the need for an Invasive Species Management Plan based on the results of the recent Flora and Fauna Surveys.		High
Develop management plan to address timber stand vertical diversity.		Medium
Coordinate all timber stand improvement projects, burn programs, and timber harvests with Juneau County, which owns the timber rights on base.		High
Review the Wildland Fire Management Plan annually, and every five years to ensure the plan meets Volk Field CRTC and Hardwood Range needs. Update as needed.		High
Develop a site-specific Prescribed Burn Plan for all fire management blocks.		High
Continue implementing the Prescribed Burn Plan for the Hardwood Range Impact and 90 series areas.		High
Investigate feasibility of expanding prescribed burn area into the remaining Hardwood Range buffer area given logistical, compliance, funding, and coordination considerations.		Medium
Attend quarterly BASH Working Group meetings.		High
Continue coordinating with USDA-WS to ensure compliance requirements remain up to date, including depredation permits.		High

Table 17. Work Plans FY 2021		
Project	**Funding Source**	**Priority Level**
Coordinate and assist as necessary, on installation BASH activities with the BASH Working Group, Airfield Management, and USDA-WS.		High
Annually review and coordinate with Airfield Management for proper permit application and file maintenance.		High

Table 18. Work Plans FY 2022		
Project	**Funding Source**	**Priority Level**
Prepare a budget to implement the natural resources management program at Volk Field CRTC.		High
Submit work needs and proposed projects to the ANG NR Manager for budget and contracting.		High
Coordinate a yearly meeting of the INRMP Working Group to identify operational needs relative to natural resources management. Update and document any changes to the INRMP accordingly.		High
Members of the Environmental Management Office must attend the CECOS Natural Resources Compliance Course as part of their training requirements for implementation of the INRMP.		High
Conduct an annual review of the INRMP with the USFWS and WDNR to identify operational needs relative to natural resource management. Other participants can include local federal and state property managers, Wood and Juneau County public land managers, USDA-NRCS, USDA-WS, and Fort McCoy Natural Resource staff. Annual review can be conducted in-person or by email and should present actions taken during the fiscal year, successes and failures, and any changes to projects for the coming fiscal year. Update the INRMP and document any changes accordingly.		High
Determine need and timelines of additional surveys and/or survey updates based on completed studies (2016-2018).		High
Develop gray wolf (*Canis lupus*) education and awareness materials to ensure accurate identification and ensure safe encounters for both wildlife and personnel.		Medium
Maintain an up-to-date list of threatened and endangered species which occur or have the potential to occur in the region by annually consulting federal and state agency lists.		High
Maintain a positive disturbance regime and specific KBB habitat management practices; control invasive plant species that have the ability to displace lupine and nectar species.		High
Implement the KBB Monitoring Plan to provide population estimates, presence and absence data, and for re-surveying the installation for KBB habitat on a 5-year interval.		High
Coordinate with ANG staff on Waters of the US, including wetlands avoidance strategies and permitting requirements.		High
Consult installation staff on soil stabilization and proper landscape plant selection.		High
Determine the feasibility of attendance to state erosion and sediment control classes for the purposes of understanding the techniques used during construction and to ensure destabilization is limited.		Medium
Update the IPM Plan to ensure that the plan reflects changes in pest populations and current management issues.		High
Determine the need for an Invasive Species Management Plan based on the results of the recent Flora and Fauna Surveys.		High
Develop management plan to address timber stand vertical diversity.		Medium
Coordinate all timber stand improvement projects, burn programs, and timber harvests with Juneau County, which owns the timber rights on base.		High
Review the Wildland Fire Management Plan annually, and every five years to ensure the plan meets Volk Field CRTC and Hardwood Range needs. Update as needed.		High
Develop a site-specific Prescribed Burn Plan for all fire management blocks.		High
Continue implementing the Prescribed Burn Plan for the Hardwood Range Impact and 90 series areas.		High
Investigate feasibility of expanding prescribed burn area into the remaining Hardwood Range buffer area given logistical, compliance, funding, and coordination considerations.		Medium
Attend quarterly BASH Working Group meetings.		High
Continue coordinating with USDA-WS to ensure compliance requirements remain up to date, including depredation permits.		High

Table 18. Work Plans FY 2022		
Project	**Funding Source**	**Priority Level**
Coordinate and assist as necessary, on installation BASH activities with the BASH Working Group, Airfield Management, and USDA-WS.		High
Annually review and coordinate with Airfield Management for proper permit application and file maintenance.		High
Begin coordination to seek re-verification/concurrence of Waters of the US and wetland jurisdictional determination from USACE.		High
Determine the need for a gray wolf study.		High

Table 19. Work Plans FY 2023		
Project	**Funding Source**	**Priority Level**
Prepare a budget to implement the natural resources management program at Volk Field CRTC.		High
Submit work needs and proposed projects to the ANG NR Manager for budget and contracting.		High
Coordinate a yearly meeting of the INRMP Working Group to identify operational needs relative to natural resources management. Update and document any changes to the INRMP accordingly.		High
Members of the Environmental Management Office must attend the CECOS Natural Resources Compliance Course as part of their training requirements for implementation of the INRMP.		High
Conduct an annual review of the INRMP with the USFWS and WDNR to identify operational needs relative to natural resource management. Other participants can include local federal and state property managers, Wood and Juneau County public land managers, USDA-NRCS, USDA-WS, and Fort McCoy Natural Resource staff. Annual review can be conducted in-person or by email and should present actions taken during the fiscal year, successes and failures, and any changes to projects for the coming fiscal year. Update the INRMP and document any changes accordingly.		High
Determine need and timelines of additional surveys and/or survey updates based on completed studies (2016-2018).		High
Develop gray wolf (*Canis lupus*) education and awareness materials to ensure accurate identification and ensure safe encounters for both wildlife and personnel.		Medium
Maintain an up-to-date list of threatened and endangered species which occur or have the potential to occur in the region by annually consulting federal and state agency lists.		High
Maintain a positive disturbance regime and specific KBB habitat management practices; control invasive plant species that have the ability to displace lupine and nectar species.		High
Implement the KBB Monitoring Plan to provide population estimates, presence and absence data, and for re-surveying the installation for KBB habitat on a 5-year interval.		High
Coordinate with ANG staff on Waters of the US, including wetlands avoidance strategies and permitting requirements.		High
Consult installation staff on soil stabilization and proper landscape plant selection.		High
Determine the feasibility of attendance to state erosion and sediment control classes for the purposes of understanding the techniques used during construction and to ensure destabilization is limited.		Medium
Update the IPM Plan to ensure that the plan reflects changes in pest populations and current management issues.		High
Determine the need for an Invasive Species Management Plan based on the results of the recent Flora and Fauna Surveys.		High
Develop management plan to address timber stand vertical diversity.		Medium
Coordinate all timber stand improvement projects, burn programs, and timber harvests with Juneau County, which owns the timber rights on base.		High
Review the Wildland Fire Management Plan annually, and every five years to ensure the plan meets Volk Field CRTC and Hardwood Range needs. Update as needed.		High
Develop a site-specific Prescribed Burn Plan for all fire management blocks.		High
Continue implementing the Prescribed Burn Plan for the Hardwood Range Impact and 90 series areas.		High
Investigate feasibility of expanding prescribed burn area into the remaining Hardwood Range buffer area given logistical, compliance, funding, and coordination considerations.		Medium
Attend quarterly BASH Working Group meetings.		High
Continue coordinating with USDA-WS to ensure compliance requirements remain up to date, including depredation permits.		High

Table 19. Work Plans FY 2023		
Project	**Funding Source**	**Priority Level**
Coordinate and assist as necessary, on installation BASH activities with the BASH Working Group, Airfield Management, and USDA-WS.		High
Annually review and coordinate with Airfield Management for proper permit application and file maintenance.		High
Seek re-verification/concurrence of Waters of the US and wetland jurisdictional determination from USACE.		High

Table 20. Work Plans FY 2024		
Project	**Funding Source**	**Priority Level**
Prepare a budget to implement the natural resources management program at Volk Field CRTC.		High
Submit work needs and proposed projects to the ANG NR Manager for budget and contracting.		High
Coordinate a yearly meeting of the INRMP Working Group to identify operational needs relative to natural resources management. Update and document any changes to the INRMP accordingly.		High
Members of the Environmental Management Office must attend the CECOS Natural Resources Compliance Course as part of their training requirements for implementation of the INRMP.		High
Complete review for operation and effect at least every 5 years with INRMP Task Force. Initiate update or revision as appropriate.		High
Determine need and timelines of additional surveys and/or survey updates based on completed studies (2016-2018).		High
Develop gray wolf (*Canis lupus*) education and awareness materials to ensure accurate identification and ensure safe encounters for both wildlife and personnel.		Medium
Maintain an up-to-date list of threatened and endangered species which occur or have the potential to occur in the region by annually consulting federal and state agency lists.		High
Maintain a positive disturbance regime and specific KBB habitat management practices; control invasive plant species that have the ability to displace lupine and nectar species.		High
Implement the KBB Monitoring Plan to provide population estimates, presence and absence data, and for re-surveying the installation for KBB habitat on a 5-year interval.		High
Coordinate with ANG staff on Waters of the US, including wetlands avoidance strategies and permitting requirements.		High
Consult installation staff on soil stabilization and proper landscape plant selection.		High
Determine the feasibility of attendance to state erosion and sediment control classes for the purposes of understanding the techniques used during construction and to ensure destabilization is limited.		Medium
Update the IPM Plan to ensure that the plan reflects changes in pest populations and current management issues.		High
Determine the need for an Invasive Species Management Plan based on the results of the recent Flora and Fauna Surveys.		High
Develop management plan to address timber stand vertical diversity.		Medium
Coordinate all timber stand improvement projects, burn programs, and timber harvests with Juneau County, which owns the timber rights on base.		High
Review the Wildland Fire Management Plan annually, and every five years to ensure the plan meets Volk Field CRTC and Hardwood Range needs. Update as needed.		High
Develop a site-specific Prescribed Burn Plan for all fire management blocks		High
Continue implementing the Prescribed Burn Plan for the Hardwood Range Impact and 90 series areas.		High
Investigate feasibility of expanding prescribed burn area into the remaining Hardwood Range buffer area given logistical, compliance, funding, and coordination considerations.		Medium
Attend quarterly BASH Working Group meetings.		High
Continue coordinating with USDA-WS to ensure compliance requirements remain up to date, including depredation permits.		High
Coordinate and assist as necessary, on installation BASH activities with the BASH Working Group, Airfield Management, and USDA-WS.		High
Annually review and coordinate with Airfield Management for proper permit application and file maintenance.		High

10.0 INRMP IMPLEMENTATION, UPDATE, AND REVISION PROCESS

10.1 INRMP Implementation

In accordance with AFI 32-7064, an INRMP is considered implemented if an installation:

- Actively requests, receives, and uses funds for "must fund" projects as defined by Chapter 4 of AFI 32-7001 (Environmental Quality Programming and Budgeting).
- Executes all "must fund" projects in accordance with specific time frames identified in the INRMP.
- Prepares the INRMP in cooperation with appropriate stakeholders. Notifies stakeholders when a new or revised INRMP will be prepared and solicits participation and input to the INRMP development and review process.
- Ensures that sufficient numbers of professionally trained natural resources management personnel are available to perform the tasks required by the INRMP.
- Ensures INRMP has been approved in writing by the appropriate representative from each cooperating agency within the past 5 years.
- Reviews the INRMP annually and coordinates annually with cooperating agencies.
- Establish and maintain regular communications with the appropriate federal and state agencies for the region where the installation is located.
- Documents specific INRMP action accomplishments undertaken each year.
- Ensures INRMP updates and reviews are conducted in cooperation with the USFWS, WDNR, and NOAA, where applicable.
- Ensures the INRMP implements ecosystem management on ANG installations by setting goals for attaining a desired land condition.

Natural resource and land use management issues are not the only factors contributing to the development and implementation of the INRMP. Facility management and other seemingly unrelated issues affect implementation. It is important to the implementation of this INRMP that Volk Field CRTC and Hardwood Range personnel take ownership of the INRMP to provide the necessary resources (e.g. personnel and equipment), and to utilize the appropriate funding allocated by the ANG NGB/A4AM to enact the INRMP. It is extremely important that the INRMP Working Group continue to participate in the implementation of this INRMP. The INRMP Working Group is made up of the key Volk Field CRTC and Hardwood Range personnel and has an oversight role to ensure the effective implementation of this INRMP. Top and middle-level management representation, as well as representation from several individuals with day-to-day on-site experience will provide the INRMP Working Group with the leadership and structure necessary for the successful implementation of this INRMP.

10.1.1 Monitoring INRMP Implementation

10.1.1.1 Volk Field CRTC and Hardwood Range INRMP Implementation Analysis

The Volk Field CRTC and Hardwood Range INRMP implementation will be monitored for meeting the legal requirements of the Sikes Act as well as for other mission and biological measures of effectiveness. The ultimate successful implementation of this INRMP is realized in no net loss in the capability of the Volk Field CRTC and Hardwood Range training lands to

support the military mission while at the same time providing effective natural resources management.

In order to monitor and evaluate the effectiveness of the INRMP implementation, the following will be reviewed as applicable and discussed within the context of the annual review and/or a formal review of operation and effect:

- Impacts to/from the military mission.
- Conservation program budget.
- Staff requirements.
- Program and project implementation.
- Trends in species and habitat diversity as evidenced by recurring biological surveys, land use changes, and opinions of natural resource experts.
- Compliance with regulatory requirements.
- Feedback from military trainers, the USFWS, the WDNR, and others.

Some of these areas may not be looked at every year due to lack of data or pertinent information. The effectiveness of this INRMP as a mission enabling conservation tool will be decided by mutual agreement of the USFWS, the WDNR, and Volk Field CRTC and Hardwood Range during annual reviews and/or reviews for operation and effect.

10.1.1.2 USAF and DoD INRMP Implementation Monitoring

The USAF uses the Defense Environmental Programs Annual Report to Congress (DEPARC) to monitor Sikes Act compliance. DEPARC is the automated system used to collect installation environmental information for reporting to DoD and Congress. Established to fulfill an annual requirement to report the status of DoD's Environmental Quality program to Congress, DEPARC collects information on enforcement actions, inspections and other performance measures for high-level reports and quarterly reviews. DEPARC also helps the USAF track fulfillment of DoD Measures of Merit requirements. The Deputy under Secretary of Defense's (DUSD) Updated Guidance for Implementation of the Sikes Act also includes an updated Conservation Metrics for Preparing and Implementing INRMPs section. Progress toward meeting these measures of merit is reported in the annual report to Congress.

10.1.2 Priorities and Scheduling

The Office of Management and Budget considers funding for the preparation and implementation of this INRMP, as required by the Sikes Act, to be a high priority. However, the reality is that not all of the projects and programs identified in this INRMP will receive immediate funding. Therefore, projects need to be funded consistent with timely execution to meet future deadlines. Projects are generally prioritized with respect to compliance. Highest priority projects are projects related to recurring or current compliance, and these are generally scheduled earliest. The prioritization of the projects is based on need, legal drivers, and ability to further implement the INRMP.

Current compliance includes projects needed because an installation is currently or will be out of compliance if projects are not implemented in the current program year. Examples may include:

- Environmental analyses, monitoring, and studies required to assess and mitigate potential effects of the military mission on conservation resources.

- Planning documents.
- Baseline inventories and surveys of natural and cultural resources (historical and archaeological sites).
- Biological Assessments (BAs), surveys, or habitat protection for a specific listed species.
- Mitigation to meet existing regulatory permit conditions or written agreements.
- Wetland delineations in support of subsequent jurisdictional determinations.
- Efforts to achieve compliance with requirements that have deadlines that have already passed.
- Initial documenting and cataloging of archaeological materials.

Maintenance requirements include those projects needed that are not currently out of compliance but shall be out of compliance if projects are not implemented in time to meet an established deadline beyond the current program year. Examples may include:

- Compliance with future requirements that have deadlines.
- Conservation and GIS mapping to be in compliance.
- Efforts undertaken in accordance with non-deadline specific compliance requirements of leadership initiatives.
- Wetlands enhancement in order to achieve the EO for no net loss or to achieve enhancement of existing degraded wetlands.

Lower priority projects include those that enhance conservation resources of the installation mission or are needed to address overall environmental goals and objectives, but are not specifically required under regulation or EO, and are not of an immediate nature. These projects are generally funded after those of higher priority are funded. Examples may include:

- Community outreach activities, such as Earth Day and Historic Preservation Week activities.
- Educational and public awareness projects, such as interpretive displays, oral histories, nature trails, wildlife checklists, and conservation teaching materials.
- BAs, biological surveys, or habitat protection for a non-listed species.
- Restoration or enhancement of cultural or natural resources when no specific compliance requirement dictates a course or timing of action.
- Management and execution of volunteer and partnership programs.

10.1.3 Funding

Implementation of this INRMP is subject to the availability of annual funding. Funding sources for specific projects can be grouped into 3 main categories by source: federal ANG or NGB funds, other federal funds, and non-federal funds. When projects identified in the plan are not implemented due to lack of funding, or other compelling circumstances, the installation will review the goals and objectives of this INRMP to determine whether adjustments are necessary. Funding options include:

- The Legacy Resource Management Program provides financial assistance to DoD efforts to conserve natural and cultural resources on federal lands. Legacy projects could include regional ecosystem management initiatives, habitat preservation efforts, archeological investigations, invasive species control, and/or flora or fauna surveys. Project proposals are submitted to the Legacy program during their annual funding cycle (https://www.dodlegacy.org/Legacy/index.aspx).

- There are also grant and assistance programs administered by other federal agencies that could be accessed for natural resources management at Volk Field CRTC and Hardwood Range. Examples include funds associated with the CWA and endangered species.
- Other non-federal funding sources that could be considered include The Public Lands Day Program, which coordinates volunteers to improve the public lands they use for recreation, education, and enjoyment, and the National Environmental Education and Training Foundation, which manages, coordinates, and generates financial support for the program (https://www.neefusa.org/npld).
- Volk Field CRTC and Hardwood Range may also consider entering into cooperative or mutual aid agreements with states, local governments, non-governmental organizations, and other individuals.

10.1.4 Cooperative Agreements

The DoD and subcommand entities have MOUs, Memorandums of Agreements (MOA), and other cooperative agreements with other federal agencies, conservation and special interest groups, and various state agencies in order to provide assistance with natural resources management at installations across the US. Generally, these agreements allow installations and agencies, or conservation and special interest groups to obtain mutual conservation objectives. The DoD agreements applicable to Volk Field CRTC and Hardwood Range include:

- MOU between DoD and USFWS/International Fund for Animal Welfare (IFAW) to promote the conservation of migratory birds (2011).
- MOU between DoD and USFWS/IFWA for a Cooperative Integrated Natural Resource Program associated with the ecosystem-based management of fish, wildlife, and plant resources on military lands (2006).
- MOU between the DoD and US EPA to form a working partnership to promote environmental stewardship by adopting IPM strategies to reduce the potential risks to human health and the environment associated with pesticides (2012).
- MOA for federal Neotropical Migratory Bird Conservation Program and addendum (Partners in Flight-Aves De Las Americas) among DoD, through each of the Military Services, and over 110 other federal and state agencies and non-governmental organizations (1991).
- MOU between the DoD and Ducks Unlimited, Inc. to provide a foundation for cooperative development of selected wetlands and associated uplands in order to maintain and increase waterfowl populations and to fulfill the objectives of the North American Waterfowl Management Plan, within the context of DoD's environmental security and military missions (2006).
- MOU between DoD and NRCS to promote cooperative conservation, where appropriate (2006).
- MOU with Watchable Wildlife Incorporated (2002).
- MOU between the DoD and BCI to identify, document, and maintain bat populations and habitats on DoD installations (2011).
- MOA between the Federal Aviation Administration (FAA), USAF, US Army, US EPA, USFWS, and USDA to address aircraft-wildlife strikes (2003).
- Cooperative Agreement between DoD and The Nature Conservancy to work cooperatively in areas of mutual interest (2010).
- Cooperative Agreement between WIANG and USDA-WS (2013).

- Interagency Agreement (2010) and MOU (2009) between USAF and US Forest Service (USFS) to enhance cooperation and improve public service, and management of natural and cultural resources on lands managed by the USAF and the USFS.

For a further list of cooperative agreements and MOUs please visit:
https://www.denix.osd.mil/announcements/unassigned/sikes-tripartite-mou/
https://www.denix.osd.mil/arc/derpfy2002/unassigned/appendix-d-interagency-agreements-dsmoas-atsdr-and-cooperative-agreements-derp-fy02/

10.1.5 Consultations Requirements

The Volk Field CRTC and Hardwood Range has multiple natural resources consultation requirements in addition to the INRMP development and review requirements as identified in the Sikes Act. Federally-listed species management requires ESA Section 7 consultation with the USFWS. State-listed species management, as well as game species management, requires consultation with WDNR. Actions that fall under the jurisdiction of Section 401 of the CWA necessitate permitting from WDNR, while Section 404 actions necessitate permitting from the USACE.

10.2 Annual INRMP Review and Coordination Requirements

Per DoD policy, Volk Field CRTC and Hardwood Range will review the INRMP annually in cooperation with the USFWS and WDNR. On an annual basis, the EM will invite the USFWS Regional Office, the USFWS Twin Cities Field Office, the WDNR, and ANG NGB/A4AM to attend a meeting or participate in a conference call to review previous year INRMP implementation and discuss implementation of upcoming programs and projects. Invitations will be either by letter or email. Attendance is at the option of those invited, but at minimum the USFWS Twin Cities Field Office and a representative of WDNR are expected to participate. The meeting will be documented with an agenda, meeting minutes, and sign-in roster of attendees.

At this annual meeting the need for updates or revisions will be discussed. If updates are needed, Volk Field CRTC and Hardwood Range will initiate the updates and, after agreement of all 3 parties, they will be added to the INRMP. If it is determined that major changes are needed, all 3 parties will provide input and an INRMP revision will be initiated with Volk Field CRTC and Hardwood Range acting as the lead coordinating agency. The annual meeting will be used to expedite the more formal review for operation and effect and, if all parties agree and document their mutual agreement, it can fulfill the requirement to review the INRMP for operation and effect.

If not already determined in previous annual meetings, by the fourth-year annual review a determination will be made jointly to continue implementation of the existing INRMP with updates or to proceed with a revision. If the parties feel that the annual reviews have not been sufficient to evaluate operation and effect and they cannot determine if the INRMP implementation should continue or be revised, a formal review for operation and effect will be initiated. The determination on how to proceed with INRMP implementation or revision will be made after the parties have had time to complete this review.

As part of the annual review, Volk Field CRTC and Hardwood Range will specifically:

- Invite feedback from USFWS and WDNR on the effectiveness of the INRMP.

- Inform USFWS and WDNR which INRMP projects are required to meet current natural resources compliance needs.
- Document specific INRMP action accomplishments from the previous year.

10.3 INRMP Update, and Revision Process

10.3.1 Review for Operation and Effect

Not less than every 5 years, the INRMP will be reviewed for operation and effect to determine if the INRMP is being implemented as required by the Sikes Act and contributing to the management of natural resources at Volk Field CRTC and Hardwood Range. The review will be conducted by the 3 cooperating parties to include the Commander responsible for the INRMP, the Supervisor of the USFWS Twin Cities Field Office, and Secretary of the WDNR. While these are the responsible parties, technical representatives generally are the personnel who actually conduct the review.

The review for operation and effect will either conclude that the INRMP is meeting the intent of the Sikes Act and only needs an update and implementation can continue; or that it is not effective in meeting the intent of the Sikes Act and it must be revised. The conclusion of the review will be documented in a jointly executed memorandum, meeting minutes, or in some way that reflects mutual agreement.

If only updates are needed, they will be completed in a manner agreed to by all parties. The updated INRMP will be reviewed by the local USFWS Twin Cities Field Office and WDNR. Once concurrence letters or signatures are received from the Supervisor of the USFWS Twin Cities Field Office and the WDNR Secretary, the update of the INRMP will be complete and implementation will continue. Generally, the environmental impact analysis will continue to be applicable to updated INRMPs, and a new analysis will not be required.

If a review of operation and effect concludes that an INRMP must be revised, there is no set time to complete the revision. The existing INRMP remains in effect until the revision is complete and USFWS and WDNR concurrence on the revised INRMP is received. Volk Field CRTC and Hardwood Range will endeavor to complete such revisions within 18 months, depending upon funding availability. Revisions to the INRMP will go through a detailed review process similar to development of the initial INRMP to ensure Volk Field CRTC and Harwood Range's military mission, USFWS, and WDNR concerns are adequately addressed, and the INRMP meets the intent of the Sikes Act.

11.0 APPENDICES

APPENDIX A. REFERENCES

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APPENDIX B. LAW, REGULATIONS, POLICIES, AND EXECUTIVE ORDERS

Federal Laws

American Indian Religious Freedom Act of 1978 (Public Law 95-341; 42 USC §1196) – requires the US, where appropriate, to protect and preserve religious rights of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites.

Animal Damage Control Act of 1931 (7 USC §426 et seq.) – provides broad authority for investigation, demonstrations and control of mammalian predators, rodents and birds.

Anti-Deficiency Act of 1982 (31 USC §1341 et seq.) - provides that no federal official or employee may obligate the government for the expenditure of funds before funds have been authorized and appropriated by Congress for that purpose.

American Antiquities Act of 1906 (Public Law 59-209; 16 USC §431-433) – authorizes the President to designate historic and natural resources of national significance, located on federal lands, as National Monuments for the purpose of protecting items of archeological significance.

Archeological and Historical Preservation Act of 1974 (Public Law 95-96; 16 USC §469 et seq.) – provides for the preservation of historical and archeological data, including relics and specimens, threatened by federally funded or assisted construction projects.

Archeological Resources Protection Act of 1979 (16 USC §470 et seq.) – prohibits the excavation or removal from federal or Indian lands any archeological resources without a permit.

Bald Eagle Protection Act of 1940 (Public Law 87-884; 16 USC §668a-d) – prohibits the taking or harming (i.e. harassment, sale, or transportation) of bald eagles or golden eagles, including their eggs, nests, or young, without appropriate permit.

Clean Air Act of 1970 (42 USC §7401 et seq.) – regulates air emissions from stationary, area, and mobile sources. This law authorizes the US EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment.

Clean Water Act of 1972 (Public Law 92-500; 33 USC §1251 et seq.) – aims to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Under Section 401, states have authority to review federal permits that may result in a discharge to wetlands or water bodies under state jurisdiction. Under section 404, a program is established to regulate the discharge of dredged or fill material into the Nation's waters, including wetlands.

Coastal Zone Management Act of 1972 (Public Law 92-583; 16 USC §1451 et seq.) – provides incentives for coastal states to develop coastal zone management programs. Federal actions that impact the coastal zone must be consistent to the maximum extent practicable with the state program.

Conservation and Rehabilitation Program on Military and Public Lands (Public Law 93-452; 16 USC §670 et seq.) – provides for fish and wildlife habitat improvements, range rehabilitation, and control of off-road vehicles on federal lands.

Conservation Programs on Military Reservations (Public Law 90-465; 16 USC §670 et seq.) – Requires each military department to manage natural resources and to ensure that services are provided which are necessary for management of fish and wildlife resources on each installation; to provide their personnel with professional training in fish and wildlife management; and to give priority to contracting work with federal and state agencies that

have responsibility for conservation or management of fish and wildlife. In addition, it authorizes cooperative agreements (with states, local governments, non-governmental organizations, and individuals) which call for each party to provide matching funds or services to carry out natural resources projects or initiatives.

Endangered Species Act of 1973, as amended (16 USC §1531 et seq.) – provides for the identification and protection of threatened and endangered plants and animals, including their critical habitats. Requires federal agencies to conserve threatened and endangered species and cooperate with state and local authorities to resolve water resources issues in concert with the conservation of threatened and endangered species. This law establishes a consultation process involving federal agencies to facilitate avoidance of agency action that would adversely affect species or habitat. Further, it prohibits all persons subject to US jurisdiction from taking, including any harm or harassment, endangered species.

Federal Insecticide, Fungicide, and Rodenticide Act of 1947 (Public Law 92-516; 7 USC §136 et seq.) – governs the use and application of pesticides in natural resource management programs. This law provides the principal means for preventing environmental pollution from pesticides through product registration and applicator certification.

Federal Land Policy and Management Act of 1976 (43 USC §1701) – establishes public land policy and guidelines for its administration and provides for the management, protection, development, and enhancement of the public lands.

Federal Noxious Weed Act of 1974 (Public Law 93-629; 7 USC §2801) – provides for the control and eradication of noxious weeds and their regulation in interstate and foreign commerce.

Fish and Wildlife Conservation Act of 1980 (Public Law 96-366; 16 USC §2901 et seq.) – encourages management of non-game species and provides for conservation, protection, restoration, and propagation of certain species, including migratory birds threatened with extinction.

Fish and Wildlife Coordination Act of 1934 (16 USC §661 et seq.) – provides a mechanism for wildlife conservation to receive equal consideration and coordinate with water-resource development programs.

Land and Water Conservation Act of 1965 (16 USC §4601 et seq.) – assists in preserving, developing, and assuring accessibility to outdoor recreation resources.

Migratory Bird Conservation Act of 1929 (16 USC §715 et seq.) – establishes a Migratory Bird Conservation Commission to approve areas recommended by the Secretary of the Interior for acquisition with Migratory Bird Conservation Funds.

Migratory Bird Treaty Act of 1918 (Public Law 65-186; 16 USC §703 et seq.) – provides for regulations to control taking of migratory birds, their nests, eggs, parts, or products without the appropriate permit and provides enforcement authority and penalties for violations.

National Environmental Policy Act of 1969 (Public Law 91-190; 42 USC §4321 et seq.) – mandates federal agencies to consider and document environmental impacts of proposed actions and legislation. In addition, it mandates preparation of comprehensive environmental impact statements where proposed action is “major” and significantly affects the quality of the human environment.

Native American Graves Protection and Repatriation Act of 1990 (Public Law 101-601; 25 USC §§3001-3013) – addresses the recovery, treatment, and repatriation of Native American and Native Hawaiian cultural items by federal agencies and museums. It includes provisions for data gathering, reporting, consultation, and issuance of permits.

Resource Conservation and Recovery Act of 1976 (42 USC §6901 et seq.) – establishes a comprehensive program which manages solid and hazardous waste. Subtitle C, Hazardous Waste Management, sets up a framework for managing hazardous waste from its initial generation to its final disposal. Waste pesticides and equipment/containers contaminated by pesticides are included under hazardous waste management requirements.

Sikes Act Improvement Act of 1997 (Public Law 105-85; 16 USC §670a et seq.) – amends the Sikes Act of 1960 to mandate the development of an INRMP through cooperation with the Department of the Interior (through the USFWS), DoD, and each state fish and wildlife agency for each military installation supporting natural resources.

Soil Conservation Act of 1935 (16 USC §590a et seq.) – provides for soil conservation practices on federal lands.

Federal Regulations

40 CFR 1500-1508 – CEQ Regulations on Implementing NEPA Procedures
40 CFR 6 – US EPA Regulations on Implementation of NEPA Procedures
40 CFR 162 – US EPA Regulations on Insecticide, Fungicide, and Rodenticide Use
15 CFR 930 – Federal Consistency with Approved Coastal Management Programs
50 CFR 17 – USFWS list of Endangered and Threatened Wildlife
50 CFR 10.13 – List of Migratory Birds
32 CFR 190 – Natural Resources Management Program

Federal Executive Orders (EOs)

Environmental Safeguard for Activities for Animal Damage Control on Federal Lands (EO 11870) - restricts the use of chemical toxicants for mammal and bird control.

Exotic Organisms (EO 11987) – restricts federal agencies in the use of exotic plant species in any landscape and erosion control measures.

Energy Efficiencies and Water Conservation at Federal Facilities (EO 12902) – federal agency use of energy and water resources is directed towards the goals of increased conservation and efficiency.

Floodplain Management (EO 11988) – specifies that agencies shall encourage and provide appropriate guidance to applicant to evaluate the effects of their proposals in floodplains prior to submitting applications. This includes wetlands that are within the 100-year floodplain and especially discourages filling.

Off-Road Vehicles on Public Lands (EO 11989) – The respective agency shall determines that the use of off-road vehicles will cause or is causing considerable adverse effects on the soil, vegetation, wildlife, wildlife habitat or cultural or historic resources of particular areas or trails of the public lands, immediately close such areas or trails to the type of off-road vehicle causing such effects, until such time as he determines that such adverse effects have been eliminated and that measures have been implemented to prevent future recurrence.

Greening the Government through Leadership in Environmental Management (EO 13148) – requires the head of each federal agency to be responsible for ensuring that all necessary actions are taken to integrate environmental accountability into agency day-to-day decision making and long-term planning processes across all agency missions, activities, and functions.

Indian Sacred Sites (EO 13007) – provides for the protection of and access to Indian sacred sites.

Invasive Species (EO 13112) – directs federal agencies to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.

Protection and Enhancement of Environmental Quality (EO 11514) – provides for environmental protection of federal lands and enforces requirements of NEPA.

Protection of Wetlands (EO 11990) – directs all federal agencies to take action to minimize the destruction loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. This applies to the acquisition, management, and disposal of federal lands and facilities; to construction or improvements undertaken, financed, or assisted by the federal government; and to the conduct of federal activities and programs which affect land use.

Responsibilities of Federal Entities to Protect Migratory Birds (EO 13186) – directs all federal agencies taking actions that have a potential to negatively affect migratory bird populations to develop and implement a MOU with the USFWS by January 2003 that shall promote the conservation of migratory bird populations.

DoDI, AFI, & Air Force Pamphlets (PAM)

DoDI 4715.03 – Natural Resources Conservation Program
DoDI 4165.57 – Air Installations Compatible Use Zones
DoDI 4150.07 – Pest Management Program
DoDI 6055.06 – Fire and Emergency Services Program
AFI 32-7064 – Integrated Natural Resources Management
AFI 32-1053 – Integrated Pest Management Program
AFI 32-7062 – Air Force Comprehensive Planning
AFI 32-7065 – Cultural Resources Management
AFPAM 91-212 – BASH Techniques

Department of Defense Memoranda

Memorandum, Assistant DUSD (Environment, Safety and Occupational Health), 20 Sept 11, Subject: *Interim Policy on Management of White Nose Syndrome in Bats.*

Memorandum, Assistant DUSD (Environment, Safety and Occupational Health), 3 Apr 07, Subject: *Guidance to Implement the Memorandum of Understanding to Promote the Conservation of Migratory Birds.*

Memorandum, Assistant DUSD (Environment, Safety and Occupational Health), 14 Aug 06, Subject: *Integrated Natural Resource Management Plan (INRMP) Template*

Memorandum, Assistant DUSD (Environment, Safety and Occupational Health), 17 May 05, Subject: *Implementation of Sikes Act Improvement Amendments: Supplemental Guidance concerning Leased Lands*

Memorandum, Assistant DUSD (Environment, Safety and Occupational Health), 1 Nov 04, Subject: *Implementation of Sikes Act Improvement Amendments: Supplemental Guidance concerning INRMP Reviews*

Memorandum, DUSD (Installations and Environment), 10 Oct 02, Subject: *Implementation of Sikes Act Improvement Act: Updated Guidance*

Memorandum, Assistant DUSD (Environment), 5 Aug 02, Subject: *Access to Outdoor Recreation Programs on Military Installations for Persons with Disabilities.*

Memorandum, Assistant Secretary of Army (Environment, Safety and Occupational Health), Deputy Assistant Secretary of the Navy (Environment), Deputy Assistant Secretary of the

Air Force (Environment, Safety and Occupational Health), 20 Sep 11, Subject: *Interim Policy on Management of White Nose Syndrome in Bats.*