Final Integrated Natural Resources Management Plan (INRMP) Jefferson Range Air National Guard

December 2018

Prepared for:

Air National Guard
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Cooperative Agreement:
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SIGNATURE PAGE

The Indiana Air National Guard (INANG) Integrated Natural Resources Management Plan (INRMP) has been prepared for the 181st Intelligence Wing (181 IW) Jefferson Range, to maintain significant natural resources in support of the training mission. Significant natural resources include the presence of federal and state-listed protected species, and Waters of the United States (US) to include jurisdictional wetlands on Jefferson Range. The Jefferson Range INRMP meets the intent of the Sikes Act (16 USC § 670a–670l, 74 Stat. 1052).

To the extent that resources permit, the US Fish and Wildlife Service (USFWS), Indiana Department of Natural Resources (IDNR), and the INANG by signature of their agency representative, do hereby enter into a cooperative agreement for the conservation, protection, and management of the natural resources present on Jefferson Range. This agreement may be modified and amended by mutual agreement of the authorized representatives of the three 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 this agreement.

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

Approving Officials:

Col Christopher R. Alderdice
Commander, 181 Intelligence Wing

31 Dec 2018
Date

Lt Col Mathew S. Perkins
Jefferson Range Commander

31 Dec 2018
Date

SCOTT PRUITT
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Scott Pruitt
US Fish and Wildlife Service
Field Supervisor, Bloomington Field Office

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Cameron E. Clark
Indiana Department of Natural Resources
Director

12/17/18
Date

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Mathew S. Perkins, Lt. Col. Jefferson Range Commander	Date
Scott Pruitt US Fish and Wildlife Service Field Supervisor, Bloomington Field Office	Date
Cameron E. Clark Indiana Department of Natural Resources Director	Date

ANNUAL REVIEW DOCUMENTS

This page is used to certify the annual review and coordination of the Jefferson Range INRMP.

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

Year: 2019

[ ]	Date
Commander, 181 Intelligence Wing	
[ ]	Date
Jefferson Range Commander	
[ ]	Date
US Fish and Wildlife Service	
[ ]	Date
Indiana Department of Natural Resources	

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Year: 2020

[ ]	Date
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Jefferson Range Commander	
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Indiana Department of Natural Resources	

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Year: 2021

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Indiana Department of Natural Resources	

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Year: 2022

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[ ]	Date
Jefferson Range Commander	
[ ]	Date
US Fish and Wildlife Service	
[ ]	Date
Indiana Department of Natural Resources	

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ACRONYMS

122 FW	122nd Fighter Wing
181 IW	181st Intelligence Wing
AF	Air Force
AFB	Air Force Base
AFI	Air Force Instruction
AHAS	Avian Hazard Advisory System
ANG	Air National Guard
ARNG	Army National Guard
ATCAA	Air Traffic Control Association Area
BASH	Bird/Wildlife Aircraft Strike Hazard
BDU	Bomb Dummy Unit
BFO	Bloomington Field Office
BMP	Best Management Practice
BRAC	Base Realignment and Closure
CAS	Close Air Support
CCP	Comprehensive Conservation Plan
CE	Civil Engineer
CEQ	Council on Environmental Quality (CEQ)
CFR	Code of Federal Regulations
CIP	Common Installation Picture
CWA	Clean Water Act
dbh	Diameter Breast Height
DEPARC	Defense Environmental Programs Annual Report to Congress
DoD	Department of Defense
DoDI	DoD Instruction
DU	Depleted Uranium
DUSD	Deputy under Secretary of Defense
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EM	Environmental Manager
EMS	Environmental Management System
EQ	Environmental Quality
EO	Executive Order
EROS	USGS Earth Resources Observation and Science
ESA	Endangered Species Act
ESCP	Erosion Sediment Control Plan
F	degrees Fahrenheit
FEMA	Federal Emergency Management Agency
FGDC	Federal Geographic Data Committee
FIRM	Federal Insurance Rate Maps
FNW	Federal Noxious Weed
FONSI	Finding of No Significant Impact
ft bgs	feet below ground surface
FTU	Flight Training Unit
FSC	Federal Species of Concern

FY	Fiscal Year
gpm	gallons per minute
GIS	Geographic Information System
HARB	High Altitude Release Bomb
HUC	Hydrologic Unit Code
IAC	Indiana Administrative Code
IC	Indiana Code
ICAPS	Indiana Cooperative Agricultural Pest Survey
ICRMP	Integrated Cultural Resources Management Plan
IDEM	Indiana Department of Environmental Management
IDNR	Indiana Department of Natural Resources
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
IN	Indiana
IN CWS	Indiana Comprehensive Wildlife Strategy
INANG	Indiana Air National Guard
INRMP	Integrated Natural Resources Management Plan
IPM	Integrated Pest Management
IPMC	Integrated Pest Management Coordinator
ISO	International Standards Organization
JFAC-IN-DET2	Joint Forces Air Component Headquarters Detachment 2, Indiana Air National Guard
JPG	Jefferson Proving Ground
JR INRMP	Jefferson Range Integrated Natural Resource Management Plan
JPR/JR MOA	Jefferson Proving Grounds / Jefferson Range and USFWS, BIG Oaks NWR-US Army Memorandum of Agreement
LANTIRN	Low Altitude Navigation and Targeting Infrared for Night
MBTA	Migratory Bird Treaty Act
MOA	Memorandum of Agreement
MOAs	Military Operations Area
MOU	Memorandum of Understanding
MUTC	Muscatatuck Urban Training Center
NCOIC	Non-Commissioned Officer-In-Charge
NDAA	National Defense Authorization Act
NEPA	National Environmental Policy Act
NGB	National Guard Bureau
NGB/A7AN	National Guard Bureau, Environmental Division, Environmental Branch
NHPA	National Historic Preservation Act
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory
NWP	Nation Wide Permit
NWR	National Wildlife Refuge
PGM	Precision Guided Munitions
PLS	Planning Level Survey
RGP	Regional General Permit

ROW	Right of Way
SAIA	Sikes Act Improvement Act
SGCN	Species of Greatest Conservation Need
SNW	State Noxious Weed
SWANCC	Solid Waste Agency of Northern Cook County
SWAP	State Wildlife Action Plan
SWCD	Soil and Water Conservation District
SWPPP	Stormwater Pollution Prevention Plan
T&E	Threatened and Endangered
UAV	Unmanned Aerial Vehicles
US	United States
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USC	United States Code
USDA	United States Department of Agriculture
USDA-APHIS	United States Department of Agriculture Animal and Plant Health Inspection Services
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USMC	United States Marine Corps
UXO	Unexploded Ordinance
WFMP	Wildland Fire Management Plan
WQC	Water Quality Certification

1.0 EXECUTIVE SUMMARY

The Sikes Act Improvement Act of 1997, 16 US Code (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 Jefferson Range INRMP (JR INRMP) is intended to be in support of and consistent with the intent of the Sikes Act.

The JR INRMP is the primary guidance document and tool for managing natural resources on Jefferson Range by the INANG. Jefferson Range includes approximately 1,038 acres of federally-owned land under the command of the INANG in Ripley County near Madison, Indiana, and surrounded by Big Oaks National Wildlife Refuge (NWR). Jefferson Range's primary purpose is to support military training, but it contains diverse habitats and species. The natural resources management of Jefferson Range must be conducted in a way that provides for sustainable land use, complies with applicable environmental laws and regulations, and provides for no net loss in the capability to support the military mission. The JR INRMP provides a structure and plan to manage natural resources more effectively and ensure that Jefferson Range remains available to support the installation's military mission into the future.

Specific goals in the JR 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** of this plan, and projects are summarized in **Section 9**. The JR 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 training. The implementation of the JR 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. It also will ensure that management efforts of Jefferson Range at these facilities is consistent and integrated with as little redundancy as possible.

2.0 GENERAL INFORMATION

2.1 Purpose and Scope

The JR INRMP is the primary guidance document and tool for natural resource management at Jefferson Range that provides for sustainable, healthy ecosystems, complies with applicable environmental laws and regulations and real estate leases and licenses, and provides for "no net loss" in the capability of military installation lands to support the military mission of the installation. The installation Commander can use the JR 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 JR INRMP is consistent with the Sikes Act as required by the DoD, the Air Force and the National Guard Bureau (NGB). It was developed as a result of the presence of federal and state-listed endangered and threatened species, and regulated water resources on Jefferson Range. 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

2.2.2 Ecosystem Management

Natural resources at Jefferson Range are managed with an ecosystem management approach as directed by AFI 32-7064 and DoDI 4715.03. Ecosystem management is defined as the 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 Jefferson Range incorporates the following 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 JR INRMP have been developed to enhance and maintain biological diversity within Jefferson Range ecosystems. Ecosystem management includes biodiversity conservation and invasive species control as integral parts of ecosystem management. Air National Guard (ANG) installations maintain or reestablish 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-related issues 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, where practical and consistent with the military mission
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, when feasible, with adjoining property owners, other DoD components, as well as other federal, state, and local agencies
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

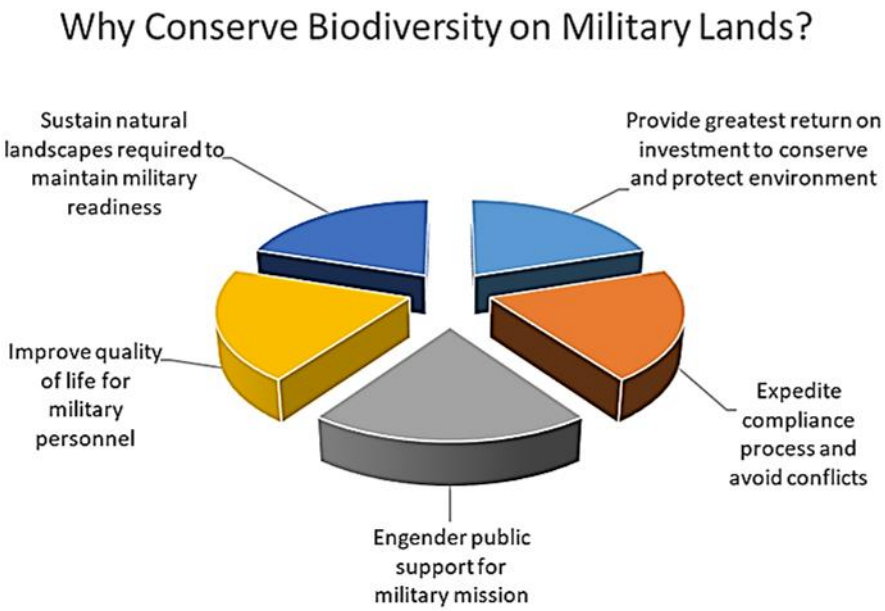

Figure 1. Why conserve biodiversity on Military Lands
*Adapted from Keystone Center, 1996

2.3 Authority

2.3.1 Natural Resources Law, Regulations & Policy

The ANG, USFWS, and IDNR determined an INRMP was required for Jefferson 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 do 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, Jefferson 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, IICEP. 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 JR's first INRMP (March 2013)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. EIAP analysis will continue to be applicable to updated INRMPs and a new NEPA analysis will not be required. The EIAP and decision-making process for the Proposed Action (implementation of the 2013 INANG INRMP) involved an examination of all environmental issues pertinent to the action proposed. Impact evaluations of the first INANG INRMP 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 the INANG and other relevant local, state, and federal agencies. The EIAP for the implementation of the INANG INRMP 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 is not required for this INRMP update.

If a future action or project has the potential to impact the environment, the initial step in compliance with NEPA is to complete USAF Form 813 "*Request for Environmental Impact Analysis*". The form is prepared to aid in the development of the assessment, providing information on the proposed action and its alternatives, purpose, and potential environmental effects. This allows the proponent to identify potential environmental impacts early and facilitates making a determination about whether an EA or an Environmental Impact Statement (EIS) might be required for a specific action. Some sections are prepared by the proponent and other sections are prepared by the Joint Forces Air Component Headquarters Detachment 2, Indiana Air Guard (JFAC-IN-DET2). If the action is not covered by a categorical exclusion, then an EA is prepared to determine if there are potential significant impacts. If potential significant impacts are identified, either while completing USAF Form 813 or during the EA, then an EIS is prepared. The majority of natural resources management actions in this INRMP are covered by categorical exclusions.

2.3.3 Responsibilities

This updated JR INRMP has been organized to ensure the implementation of year-round, cost-effective management activities and projects that meet the requirements of Jefferson Range. Various organizations within the INANG are responsible for implementation of the INRMP and are described in the following subsections.

2.3.3.1 Wing Commander

The Wing Commander oversees the installation and is responsible for ensuring the goals and objectives of this INRMP are implemented to the fullest extent practicable based on funding and manpower availability. The Wing Commander is the official signatory for the JR INRMP.

2.3.3.2 Range Commander—JFAC-IN-DET2/CC

The Range Command at Jefferson Range (JFAC-IN-DET2/CC) includes three primary officers in charge: Range Commander, Range Operations Officer and Range Non-Commissioned Officer-In-Charge (NCOIC). All three have responsibility for the management and daily operations of Jefferson Range including coordination with the 122nd Fighter Wing (122 FW) Safety Officer under the Avian Hazard Advisory System (AHAS) to ensure bird strike hazards will not affect flying operations.

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 JR 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 is responsible for ensuring activities associated with the implementation of the INRMP adhere to applicable federal, state, local, and USAF environmental regulations and policies. The 181 IW/EM currently provides support to Jefferson Range for environmental issues, such as cultural resources management and other environmental requirements. Projects proposed in the INRMP are reviewed by the EM and the ANG NR Program Manager. Persons responsible for implementation of the INRMP are required to attend the Civil Engineer Corps Officers School DoD Natural Resources Compliance course, details and scheduling information available from http://www.netc.navy.mil/centers/csfe/cecos/CourseDetail2.htm#tab25.

2.3.3.5 Base Civil Engineer

The Base Civil Engineer (CE) plans, budgets, approves, and oversees all maintenance and construction activities performed on the installation. The Jefferson Range receives support assistance from 181 IW/CE for new construction, major maintenance and environmental support in support of the INRMP.

2.3.3.6 Legal Office

The Legal Office is responsible for ensuring that the implementation of the management objectives contained within the JR INRMP meet all of the regulatory and statutory requirements that pertain to natural resources management. The Legal Office will review any future natural resources management proposals and alert the JFAC-IN-DET2/CC and 181 IW/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.

2.3.3.7 Flight Safety Officer

The 122 FW/SE works with the Safety Representative at Jefferson Range to ensure AHAS information is shared with the Range. The Safety Office is responsible for addressing any bird/wildlife strikes resulting from aircraft usage of the Range including documentation and reporting such incidents to the EM and the USAF BASH Team. In addition, the Safety Office participates in the BASH Hazard Working Group (BHWG), which conducts meetings to evaluate and refine strategies for the reduction of BASH risk on Jefferson Range. The Safety Office is responsible for coordinating with, and providing required information on BASH activities with the EM. The primary safety concern at Jefferson Range is the abundant Unexploded Ordinance (UXO) present throughout the former Jefferson Proving Grounds (JPG), including Jefferson Range. Managing UXO risk is paramount for all on-the-ground activities.

2.3.3.8 Operation and Management

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

2.3.3.9 Pest Management

Pest Management 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. When required the Installation Pest Management Coordinator (IPMC) will work with the United States Department of Agriculture Wildlife Services (USDA-WS) regarding actions needed to reduce pest populations on the Range.

2.3.3.10 Public Affairs Office

The Public Affairs Office is responsible for the coordination of public access for events at ANG installations. The Public Affairs Office serves as the point-of-contact to interface between the Commander and civilian groups interested in the installations for environmental, educational, or other purposes.

2.3.3.11 US Fish and Wildlife Service

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

In addition to the usual role of the USFWS Field Office and Ecological Services during INRMP development, review, and implementation, the USFWS also plays a significant role in the natural resources management at Jefferson Range due to the nature of the relationship between Big Oaks NWR, Jefferson Range and the US Army. Jefferson Range does not have any natural resources staff on site or available remotely, so the availability of expertise from Big Oaks NWR is essential to natural resources management on Jefferson Range. The Big Oaks NWR Refuge Manager provides natural resources management expertise, particularly wildland fire and vegetation management, to Jefferson Range. The Refuge Manager occasionally provides additional USFWS staff to assist Jefferson Range. Staffing requirements for the management of natural resources when it is not practicable to use DoD personnel is set forth in Section 2.10 of AFI 32-7064.

2.3.3.12 Indiana Department of Natural Resources

The IDNR, Indiana's fish and wildlife is a signatory of the INRMP, and provides input regarding natural resource projects and operational component plans. The IDNR alerts the EM and/or the ANG NR Program Manager whenever new species added to the state threatened and endangered species lists have the potential for inhabiting Jefferson Range. In addition, the IDNR, when feasible, will support Jefferson Range wildlife and vegetation surveys conducted at the Jefferson 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 INRMP plans include the following:

- Comprehensive Range Plan – long-term plan for the military mission at Jefferson Range (INANG 2010).
- Integrated Cultural Resources Management Plan (ICRMP) – plan for management of cultural resources, including consultation and other legal requirements, known cultural resources, processes and responsibilities (INANG 2011b).
- IPM Plan – plan for management of pest species, including nuisance wildlife and invasive species, to minimize impact to mission, natural resources and the environment (INANG 2011a).
- Jefferson Proving Grounds/Jefferson Range and USFWS, Big Oaks NWR-US Army Memorandum of Agreement (JPGFR MOA; 2000).
- United States Avian Hazard Advisory System (US AHAS) – Bird Avoidance Model (BAM) using Geographic Information System (GIS) technology and data to reduce the risk of bird collisions with aircraft. (http://www.usahas.com/index.html)

In addition, the JR INRMP also integrates and coordinates its activities with the following plans from other agencies.

- The Big Oaks NWR Wildland Fire Management Plan (WFMP) provides summary of the wildland fire program, including training, techniques, processes, responsibilities, and cooperators (USFWS 2006).
- Interim Comprehensive Conservation Plan (ICCP) for Big Oaks NWR (2017).
- The Indiana State Wildlife Action Plan (SWAP), which is an update to the Indiana Comprehensive Wildlife Strategy (IN CWS 2006). The Indiana SWAP provides a

summary of the state of wildlife in Indiana, identifies species of greatest conservation need, and provides goals, objectives, and management recommendations (IDNR 2015).

2.4.1 Integration with Big Oaks NWR

As a result of the management responsibilities set forth in the JPR/JR MOA between the US Army, USAF and USFWS, Jefferson Range and Big Oaks NWR have a very unique management situation. The INANG is responsible for some infrastructure maintenance on Big Oaks NWR per the JPR/JR MOA (e.g., perimeter fence, some roads, and historic structures). While the INANG is responsible for natural resources management on Jefferson Range, a significant portion is implemented and overseen by USFWS personnel from Big Oaks NWR. Shared management occurs because Jefferson Range is surrounded by Big Oaks NWR and its safety buffers overly the refuge. As a result, the goals of the Big Oaks NWR have direct bearing on the natural resources management on Jefferson Range.

National Wildlife Refuges develop Comprehensive Conservation Plans (CCPs), which are very similar to INRMPs developed by DoD facilities. As described in the Interim Comprehensive Conservation Plan (CCP) for Big Oaks NWR, the goals of the Big Oaks NWR are:

- To preserve, conserve, and restore fish, wildlife, and plants listed as endangered and threatened and those species of management concern whose populations are declining;
- To preserve, conserve, and restore a natural diversity and abundance of fish, wildlife, and plants by protecting, restoring, and managing large blocks of forest, grassland, and shrubland habitats;
- To provide interpretive, educational, and research opportunities with the emphasis on resource conservation, restoration, and enhancement, and on biodiversity and biological integrity; and
- To provide the public with opportunities for high quality wildlife-oriented recreation to the extent these activities are compatible with the mission of the refuge, public safety and the terms of the Army's real estate permit for use of the property.

Big Oaks NWR has been identified as a Globally Important Bird Area by the American Bird Conservancy due to the large population of Henslow's sparrows within the site's grassland areas. This is indicative of healthy native grasslands, which are relatively uncommon in the region and require an active and extensive prescribed fire and brush management program to maintain. These grasslands are also the preferred habitat for the INANG since they are more suitable for the flying mission than forested areas. The priority of maintaining open grasslands for both rare species and the military mission creates a clear direction for the natural resources management on Jefferson Range.

3.0 INSTALLATION OVERVIEW

3.1 Location and Area

Jefferson Range is in Ripley County in southern Indiana, immediately north of Madison, IN, approximately 30 miles northeast of Louisville, KY, and 60 miles southeast of Indianapolis, IN

(**Figure 2**). Jefferson Range is surrounded by the Big Oaks NWR, both of which are on a portion of the former JPG (**Figure 3 and 4**). The land is still owned by the US Army and the JPR/JR MOA was signed in 2000 by US Army, USAF and USFWS that identifies the responsibilities of each party. While Jefferson Range and Big Oaks NWR are operated by different agencies and have different missions, there is significant overlap in their daily operations and management responsibilities on the combined properties. The presence of over 1.5 million rounds of live UXO has influenced the real estate agreements and land management activities on former JPG land and is the reason US Army retains ownership of the land.

Jefferson Range comprises approximately 1,038 acres and encompasses three parcels. The primary range parcel (also referred to as the conventional bombing range) is 983 acres and includes all the headquarters buildings and range tower. The secondary range is the southern range parcel (also referred to as the laser bombing range), which is 50 acres and located 6 miles south of the primary range, and is a precision guided missile range for inert munitions. The third parcel is the Old Timbers Lodge and the 5 acres associated with its driveway and grounds. The INANG is also responsible for the maintenance of four historic stone arch bridges, one historic schoolhouse, and the boundary fence as well as several roads including the perimeter and those that lead to the primary range and secondary range. An overview of Jefferson Range, facilities, and aerial image is provided in **Figure 5**.

The primary access to the range is through Big Oaks NWR off US Highway 421, which runs along the southeastern border of Big Oaks NWR. There are a limited number of access points through locked gates from Old Michigan Road on the east side of Big Oaks NWR. Access directly into the primary range and headquarters of Jefferson Range is through an additional set of locked gates.

Big Oaks NWR is surrounded by a 55-mile long chain-link fence, which is maintained by Jefferson Range to provide controlled access. There are significant risks for trespassers in the form of UXO, depleted uranium (DU), and active range use. As a result, all interior road barricades to the primary and secondary ranges are closed and all access is tightly controlled. Additionally, there is extensive and regular coordination with the Big Oaks NWR to ensure there are no users at risk. During training events, interior road barricades are closed and locked to prevent inadvertent access. All Big Oaks NWR visitors are given a briefing on safety concerns and access policies.

There is an extensive system of internal roads on Big Oaks NWR and Jefferson Range, primarily remnants of the road network on the former JPG. Jefferson Range is responsible for 20 miles of paved road and 37 miles of gravel road within the fence line, which includes roads on Big Oaks NWR that are essential for range use. These roads also provide firebreaks during wildland fire activities.

Figure 2. Jefferson Range Region

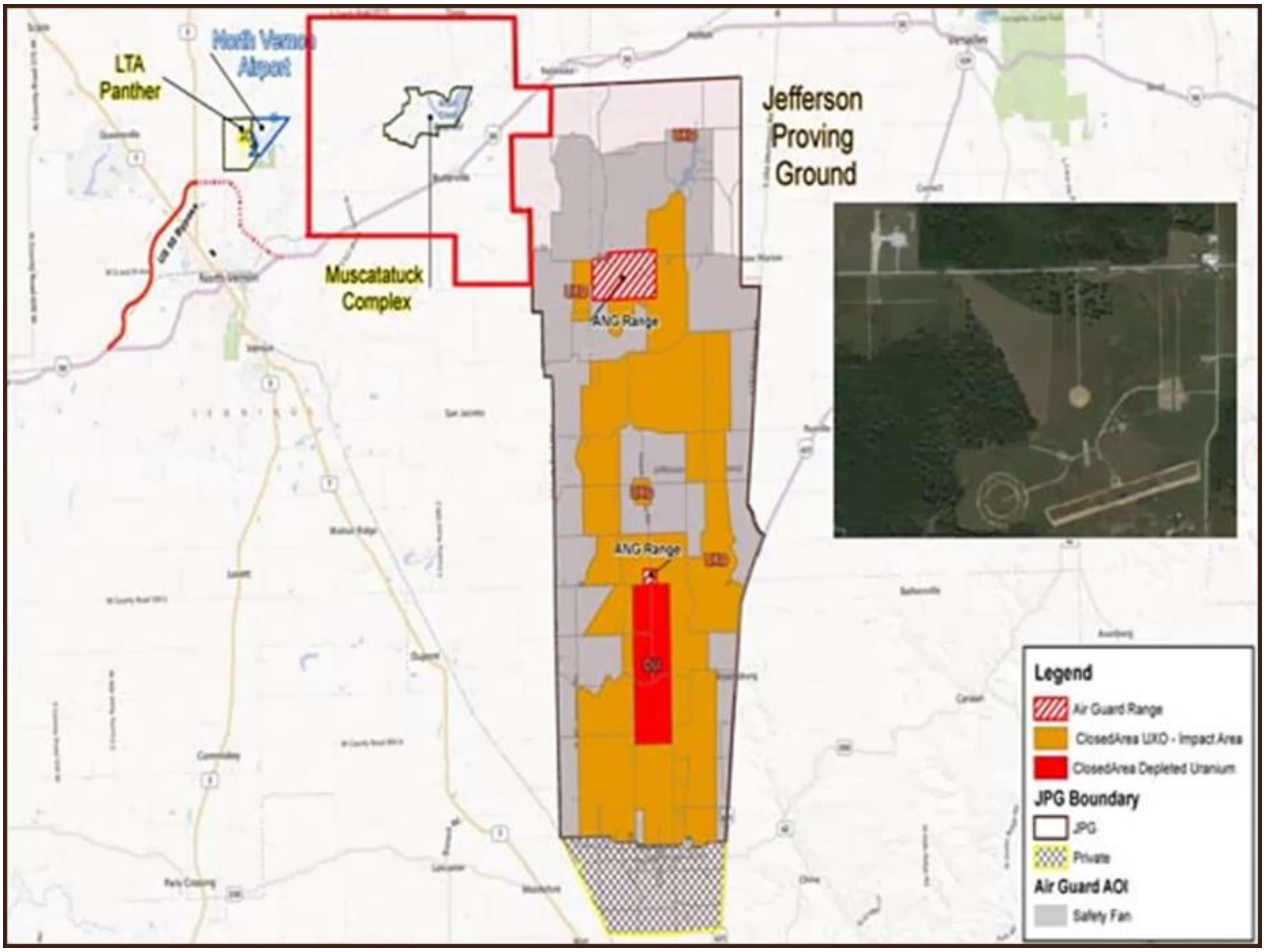

Figure 3. Historic boundaries of Jefferson Proving Ground "Big Oaks NWR" with primary hazards.

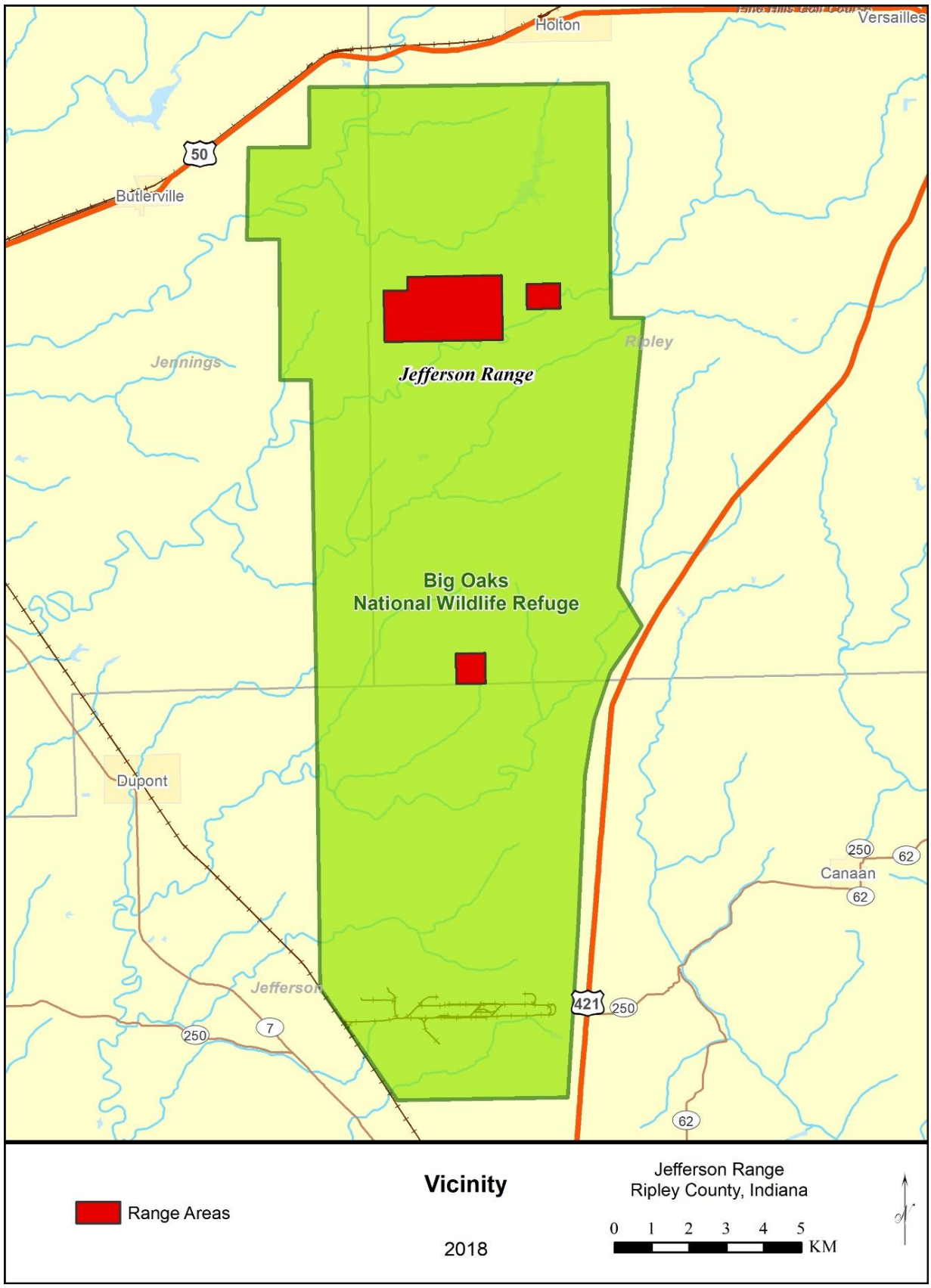

Figure 4. Jefferson Range Vicinity

Figure 5. Facilities on Jefferson Range

3.2 Installation History

Prior to World War II, this area was used for farming and grazing similar to what is found today outside the Big Oaks NWR boundary. On 8 October 1940, the War Department established a 55,264-acre tract of land in southeast Indiana known as JPG. Assigned to the Ordnance Department, Army Service Forces, the installation's principal mission was the production, acceptance, and specification testing of all types of ammunition, projectiles, propellants, cartridge cases, primers, fuses, boosters, bombs, and grenades. The JPG operations began in May 1941. Peak periods of activity occurred during World War II, the Korean War, and the Vietnam War. Maximum production testing of 175,000 rounds per month and the highest employment at 1,774 personnel were reached in support of the Korean War in 1953.

Following each period of conflict, activities at the JPG significantly decreased. After World War II, the JPG became a sub-installation to the Indiana Arsenal and was briefly placed on standby status. From 1958-1961 it was again placed on standby status and partially deactivated, with some facilities leased to the private sector. In the early 1980s, increased emphasis on national defense, readiness capability, and conventional warfare brought about modest increases and diversification in production acceptance testing. Just prior to notification of closure in 1988, the JPG was in the process of increasing its productivity by 25% and planning to modernize its facilities.
In 1976, Jefferson Range was established within JPG for use by the USAF and INANG as overflow from Camp Atterbury. In December 1988, the JPG was included on the Base Realignments and Closure (BRAC) Report of the Defense Secretary's Commission and was identified for closure.

Upon notification of closure in 1989, the JPG employed approximately 450 personnel. The Army mission was terminated in September 1995. For more information on the closure of the former JPG, refer to the Final Environmental Impact Statement (EIS) for the Disposal and Reuse of the JPG (US Army 1995). Between 1995 and 2000, Jefferson Range operated under their existing agreement with the US Army from 1982 and the USFWS began managing natural resources on former JPG land. After decommissioning, the firing range portion of the former JPG (51,000 acres) was included in the JPR/JR MOA between the US Army, USAF, and USFWS in 2000. The JPR/JR MOA allowed for the continuation of Jefferson Range and the creation of Big Oaks NWR, while the US Army continued to own the property due to UXO, DU, and other contamination. The cantonment area of the former JPG was disposed of through a separate process. The continued use of the Jefferson Range includes not only the acreage described earlier for the range itself, but also monitoring for the safety fan areas as well as maintenance activities by Jefferson Range on Big Oaks NWR in support of military training.

For the history of Jefferson Range prior to World War II, see the ICRMP (INANG 2011b) that provides details of historic and pre-historic use and cultural resources present on Jefferson Range. Old Timbers Lodge, a significant cultural resource, and the 5 acres of land associated with the facility are maintained by the INANG through an agreement with the non-profit Big Oaks Conservation Society.

3.3 Military Missions

The JFAC-IN-DET2 of the INANG is responsible for the operation of and activities conducted on Jefferson Range. The INANG's federal mission is to provide combat ready personnel, aircraft, and equipment for worldwide deployment in support of USAF objectives. The INANG's state

mission is to protect life and property, provide disaster relief, and ensure public safety when called upon by the Governor. The current mission of Jefferson Range is to support air-to-ground training by the ANG and USAF and helicopter training by the US Army and Army National Guard (ARNG).

According to the Comprehensive Range Plan (INANG 2010), the vision for Jefferson Range is to offer realistic training to aircrew with a broadening emphasis on joint exercises that includes Muscatatuck Urban Training Center (MUTC), urban warfare, and homeland defense. This will ensure supporting the core competencies of Developing Airmen, Technology to Warfare, and Integrating Operations. This vision encompasses Combat Support, Close Air Support (CAS), unmanned aerial vehicles (UAV), small arms and Conventional as well as Tactical air-to-ground training. Jefferson Range's mission is to provide a facility for aircrews to practice the delivery of air-to-ground ordnance in the safest, most realistic environment possible. The operations at Jefferson Range have transformed to accommodate the DoD need for joint training in an urban setting, particularly in support of joint training efforts at MUTC.

The restricted airspace associated with the former JPG has been transferred to the Military Department of Indiana for use by the INANG. The restricted airspace includes Military Operations Areas (MOAs) to the south and southwest, and Air Traffic Control Association Areas (ATCAAs) to the north and northwest. This airspace includes R3403A/B and the Ripley ATCAA. R3403A is the primary airspace that overlies the actual real estate of the former JPG, with operating limits from surface to 43,000 feet. Daily flying operations normally block airspace from surface to 24,000 feet, which allows the necessary airspace for High Altitude Release Bombs (HARB). Higher altitudes are granted via request. R3403B is limited from 1,200 feet above ground level to 18,000 feet and is used for maneuvering airspace. This airspace is located north and west of 3403A and extends the usable airspace an additional 2 miles on the west and 4 miles on the north (**Figure 6**).

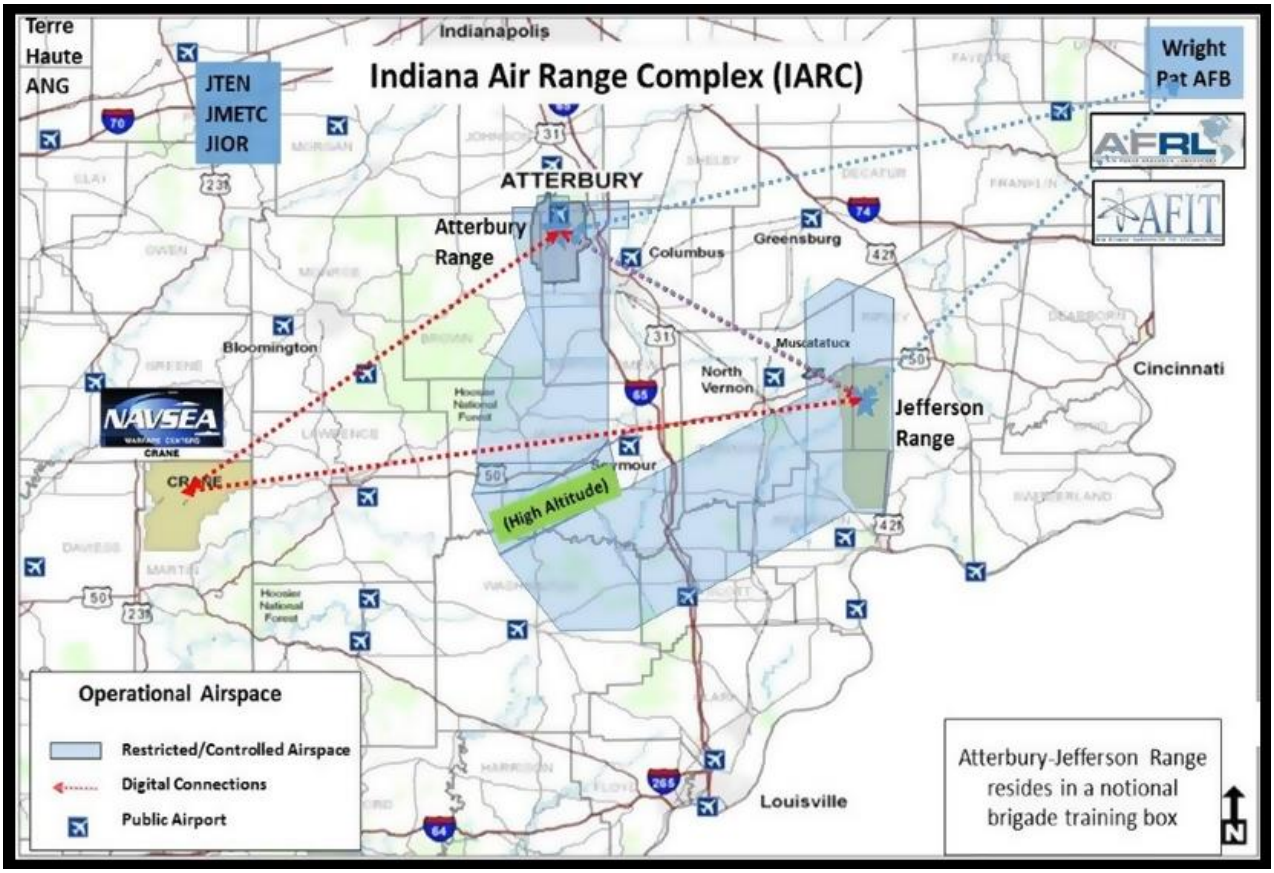

Figure 6. Indiana Air Range Complex (IARC)

The Ripley ATCAA was obtained as maneuvering airspace for high altitude deliveries and is located above 3403B with limits from 18,000 to 24,000 feet. Jefferson Range also uses several MOAs. JPG "A", "B", "C" and the "C" ATCAA lay adjacent and west of the restricted airspace while JPG "D" lies to the north. These MOAs provide for tactical maneuvering and multiple re-attacks. These MOAs also provide crucial airspace for "standoff tactics."

Normal operating hours are Monday through Friday, with one or two weekends per month depending on requests. Monday is designated as a primary maintenance window. Flying periods are either AM, PM or Night operations. Operating hours can be any time of day and any day of the week, depending on the training requirements. Jefferson Range typically receives requests to fly morning, afternoon, and nights for a 16-hour day. However, manpower resources force the schedule to satisfy only two of the requested periods. Jefferson Range currently supports eight ANG units and some regular users from the ARNG, USAF, and US Marine Corps (USMC). Approximately 900 sorties occur per year at Jefferson Range, with increasing ground operations (ANG 2001). **Table 2** lists the primary users of the Jefferson Range.

Table 2. Primary Users of Jefferson Range

Unit	Type	Service	Aircraft	Location
122 FW	Regular	ANG	A-10C	Fort Wayne, IN
180 FW	Regular	ANG	F-16C/D	Toledo, OH
113 ASOS	Regular	ANG	JTAC	Terre Haute, IN
123 STS	Regular	ANG	JTAC	Louisville, KY
160 SOAR	Regular	Army	MH-6/MH-60	Fort Campbell, KY
1/137 AHB	Periodic	Army	UH-60	Shelbyville, IN
1/137 AV RGT	Periodic	Army	UH-60/CH-47	Rickenbacker ANGB, OH
1/230 ACS	Periodic	Army	HH-60/OH-58	Louisville, TN
127 FW	Occasional	ANG	A-10C	Selfridge ANGB, MI
169 ASOS	Occasional	ANG	JTAC	Peoria, IL
19 ASOS	Occasional	USAF	JTAC	Fort Campbell, KY
HSC-26	Occasional	Navy	MH-60	NAS Norfolk, VA
5 SFG	Occasional	Army	Helos	Fort Campbell, KY
8/229 AV RGT	Occasional	Army	AH-64	Fort Knox, KY

Source: ANG 2012

Military Training Facilities and Activities

Jefferson Range consists of approximately 1,038 acres with approximately 1,033 acres designated for air-to-ground training. The remaining 5 acres consist of Old Timbers Lodge property. The safety buffer is primarily located on Big Oaks NWR. There are no croplands or grazing permits on Jefferson Range. Because of the UXO and DU limitations, there is no foot or vehicle training outside the cantonment area or away from established roads.

Jefferson Range facilities include the headquarters building, range tower, storage concrete bunker, equipment maintenance and storage facility, heavy equipment barn, flank tower, office building, overflow housing building, helipad, four storage sheds, and one hazardous waste storage building. The range tower and headquarters building, and potable waterline are all recently built to support range operations (INANG 2010).

The primary training facilities consist of an air-to-ground range located in the primary parcel with the headquarters buildings, range towers, and laser scoring system. The primary bombing range offers a variety of tactical targets in support of aircrew training. Targets are designed and constructed to create scenarios that may be encountered in combat situations. In addition to tactical targets, one conventional bomb circle and conventional strafe pits are maintained. Target scenarios include strafe pits, bunkers, communications stations, a mock convoy of various sized tanks, and mock aircraft. The mock runway is not certified nor maintained for landing any aircraft; it only exists for visual recognition and delineation of the impact area.

Air-to-ground ranges are controlled areas where military aircraft can train in air-to-ground weapons delivery operations. Aircraft approach a designated range, "acquire" (i.e., locate) a practice target on the ground surface, and then fire or release their weapons at the target. Aircraft can engage in bombing runs, missile launches, or strafing runs (air-to-ground gunnery) at targets located within range boundaries. To aid in effective weapons delivery, aircraft are equipped with a variety of targeting systems, including the Low Altitude Navigation and Targeting Infrared for

Night (LANTIRN) and LITENING II Pod. Air-to-ground range training operations are monitored, and results are reviewed with the participants to further enhance targeting proficiency (ANG 2001).

Ordnance is delivered onto targets within the Jefferson Range target impact areas by F-16s, A/OA-10s, and transient aircraft from other installations (i.e., F-15s and F-18s). The only explosives used on the range are spotting charges within the various bomb dummy units (BDUs) delivered on the range (ANG 2001). Spotting charges contain approximately the same amount of powder as a shotgun shell. Fires can result from the heat generated by spotting charges; however most burn themselves out before any response is necessary.

Ordnance authorized for use at the Jefferson Range includes BDU-33 (25 lb.), MK-82/84 (500/2,000 lb.) inert practice bombs, 2.75-inch rockets, and 20- and 30-mm cannon rounds. On an annual basis, approximately 14,500 BDUs and inert bombs are delivered and approximately 100,000 rounds of 20- and 30-mm shells are fired on JPG Range. In addition, 300 electronically-scored events occur per year using the Laser Scoring System located in the Primary Training Range (ANG 2001).

A precision guided munitions (PGM) target is also located in the 50-acre southern parcel, approximately 6 miles south of Jefferson Range's primary air-to- ground range. The PGM target and laser scoring system are used for laser weapons delivery training in support of ANG and USAF units assigned to the PGM mission. All approaches to the PGM target are from north to south between 5,000 feet above ground level and 20,000 feet mean surface level. Up to approximately 170 PGM (inert) deliveries occur per year within this southern parcel (ANG 2001). When UXO from JPG is encountered, UXO removal crews are employed to safely remove and dispose of UXO. The remnants of current munitions are collected annually from each area.

Training Lands

Jefferson Range consists of three non-contiguous parcels totaling approximately 1,038 acres. Developed areas at Jefferson Range include the 5-acre Old Timber Lodge parcel and approximately 5 acres of the primary range parcel, which includes the command and support area (i.e. operational headquarters, main tower and eastern support tower).

The majority of the remaining 1,028 acres of land, which includes the impact areas for both the primary range and southern range parcels, consists of undeveloped grounds. Both areas are dominated by open grasslands as a result of regular wildfires and prescribed fires, as well as forests, shrublands, streams and wetlands.

Although some semi-developed grounds occur within Jefferson Range, they are difficult to quantify because they are interspersed with unimproved grounds. Semi-developed grounds include the areas around targets and the dirt access roads.

In addition to this land, the INANG is responsible, per the JPR/JR MOA, for maintaining the 55 miles of chain-link fence surrounding Big Oaks NWR and 20 miles of paved roads, 37 miles of gravel roads and firebreaks within the refuge. These lands require periodic maintenance, and therefore, would be characterized as semi-improved grounds.

3.4 Surrounding Communities

The immediate area surrounding Jefferson Range is the Big Oaks NWR. Jefferson Range and Big Oaks NWR are generally comprised of forest and native prairie habitats. Big Oaks NWR extends into Jefferson and Jennings Counties as well as Ripley County. The area outside Big Oaks NWR is mainly farmland mixed with woodlands and riparian corridors. The nearest city is Madison, which is located approximately 6 miles south of the main entrance to Big Oaks NWR and near the southern boundary. A few small towns occur along the eastern perimeter of Big Oaks NWR, including Belleview, Bryantsburg, and New Marion. New Marion is the closest town to the Jefferson Range headquarters (i.e., primary parcel). Versailles is located about 10 miles to the northeast, while North Vernon is located about 8 miles to the northwest of the northern boundary of Big Oaks NWR. There are a handful of other small towns around the northern and western boundary of Big Oaks NWR, but they are at least one mile from the boundary. According to the US Census Bureau (2011), the population of Ripley County was 28,818. Current population levels represent an 8.7% increase from 2000. While the local population has grown over the past decade, land use has changed very little in the immediate vicinity of the Jefferson Range and Big Oaks NWR.

Riparian forest on Big Oaks NWR

3.5 Local and Regional Natural Areas

There are several other public lands in the area surrounding Big Oaks NWR, including, Crosley State Fish and Wildlife Area, Selmier State Forest, Clifty Falls State Park, and Versailles State Park. Crosley State Fish and Wildlife Area includes 4,228 acres to the west of Jefferson Range, and is primarily wooded and includes about 7 miles of the Muscatatuck River. Selmier State Forest includes 355 acres to the northwest of Jefferson Range, and is wooded with access to the Muscatatuck River. Fishing, hunting, and other outdoor recreational uses are permitted on State Fish and Wildlife Areas and State Forests, but there are few park amenities. Clifty Falls State Park includes 1,416 acres to the south of Jefferson Range near Madison, and has waterfalls, caves and sinkholes. Versailles State Park includes 5,988 acres to the northeast of Jefferson Range, both state parks have typical park amenities, such as campgrounds, pool and trails, limited hunting or fishing and several organized events. There are also several county parks nearby to the Installation.

4.0 PHYSICAL ENVIRONMENT

4.1 Climate

The climate of Ripley County is characterized by a humid, mid-latitude, predominately continental climate. The warmest month has been July with an average maximum temperature of 88.2 degrees Fahrenheit (°F), while the month of January has been the coldest with an average minimum temperature of 23°F. The annual precipitation is approximately 44.5 inches, ranging from 2.7 to 4.7 inches per month, and is distributed evenly throughout the year. Thisincludes approximately 17 inches of snow per year from November through March(NOAA 2018; Indiana State Climatology Office [ISCO] 2011).

In general, Indiana's climate is expected grow considerably warmer and wetter during this century. The ensemble average of 16 climate change models predict an average 5°F (range: 3° to 7°F) increase in average annual temperature and a 3 inch (range: -11 to 14 inches) increase in annual precipitation by 2050 under a moderate emissions scenario as summarized on The Nature Conservancy's Climate Wizard site (http://www.climatewizard.org).

4.2 Landforms

Jefferson Range lies within the Southern Hills and Lowlands Region of Indiana and the Muscatatuck Plateau Physiographic Division (Gray 2001). In general, the area around the range is a gentle rolling plain and exhibits limited topographic relief and features. Jefferson Range is fairly flat with a few exceptions associated with drainages; elevations range from approximately 240 to 270 meters above mean sea level (**Figure 7**).

4.3 Geology and Soils

Jefferson Range lies on the western limb of the Cincinnati Arch, a plunging anticline, and is underlain by deposits of wind-blown non-stratified silts and clays and glacial till of Illinoian and Wisconsin Age (US Army 1995). In Ripley County, rock types exposed at the bedrock surface are typically poorly producing limestones and dolomites with varying amounts of interbedded shales to poorly producing shales with limestone interbeds. Big Oaks NWR and Jefferson Range are located within one of the two known karst areas in Indiana. Approximately 87%of Jefferson Range soils are characterized as Avonburg and Cobbersfork silt loams. Cobbersfork silt loams are identified as hydric soils in Ripley County (National Resource Conservation Service [NRCS] 2011b). The remaining 13%of Jefferson Range soils are comprised of Cincinnati, Grayford, Holton, Rossmoy, Ryker and Wakeland silt loams, and Eden-rock outcrop complex. Soils types are illustrated on **Figure 8**.

4.4 Hydrology

Jefferson Range is in the Muscatatuck watershed within the Patoka-White River Basin in the Wabash River Subregion of the Ohio River Region. In general, surface water flows northeast to southwest on Jefferson Range with Otter, Graham and Big Creeks all merging into the Muscatatuck River west of Big Oaks NWR. There are a limited number of defined channel drainages on any of the Jefferson Range parcels, although Old Timbers Lodge does border Graham Creek. The drainages present on Jefferson Range parcels include five headwater streams (**Figure 9**). The primary range parcel drains into Otter Creek and Graham Creek. Old Timbers

Lodge is located on and drains into Graham Creek. The southern range parcel drains into Marble Creek and then into Big Creek.

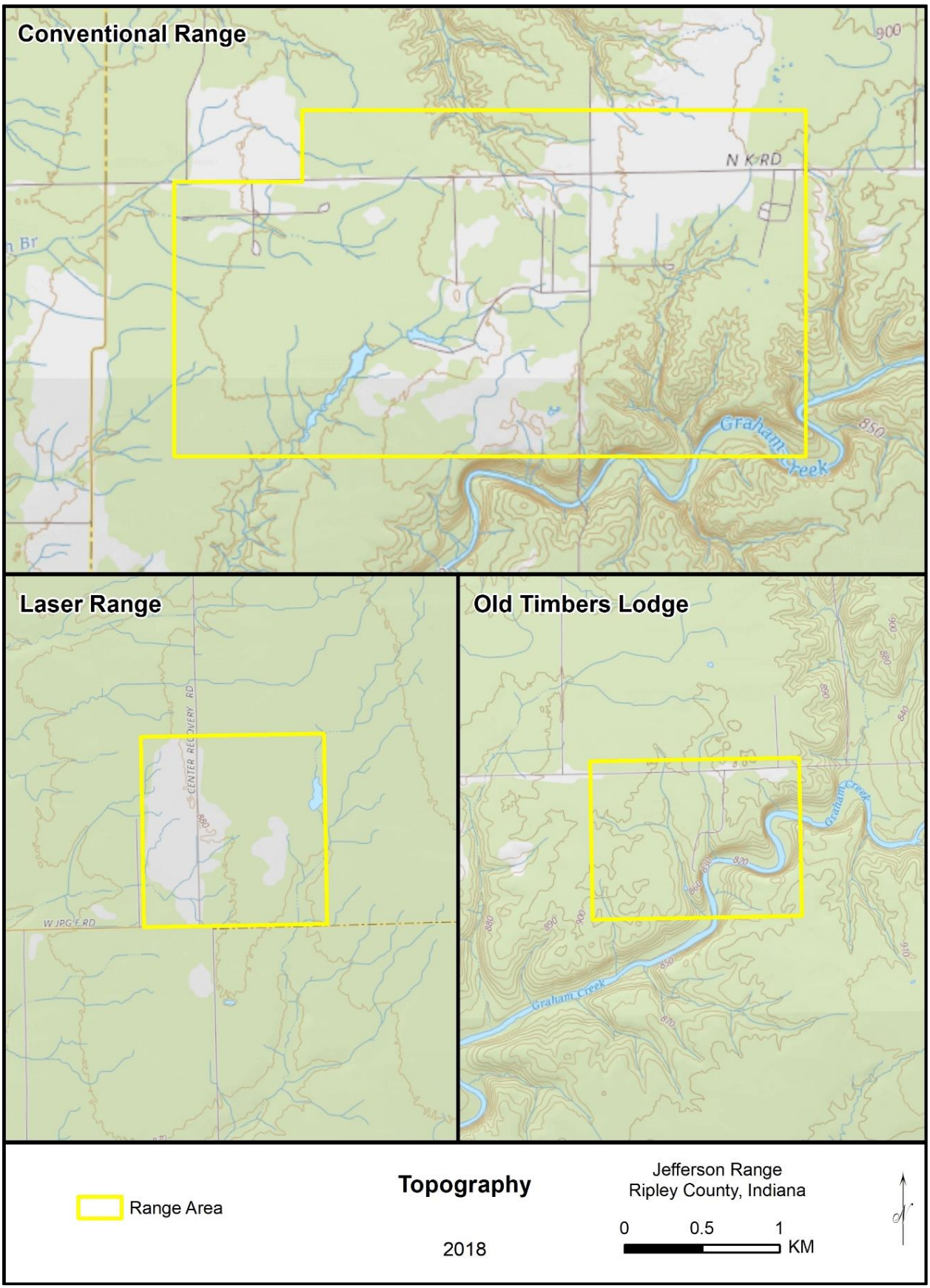

Figure 7. Jefferson Range terrain

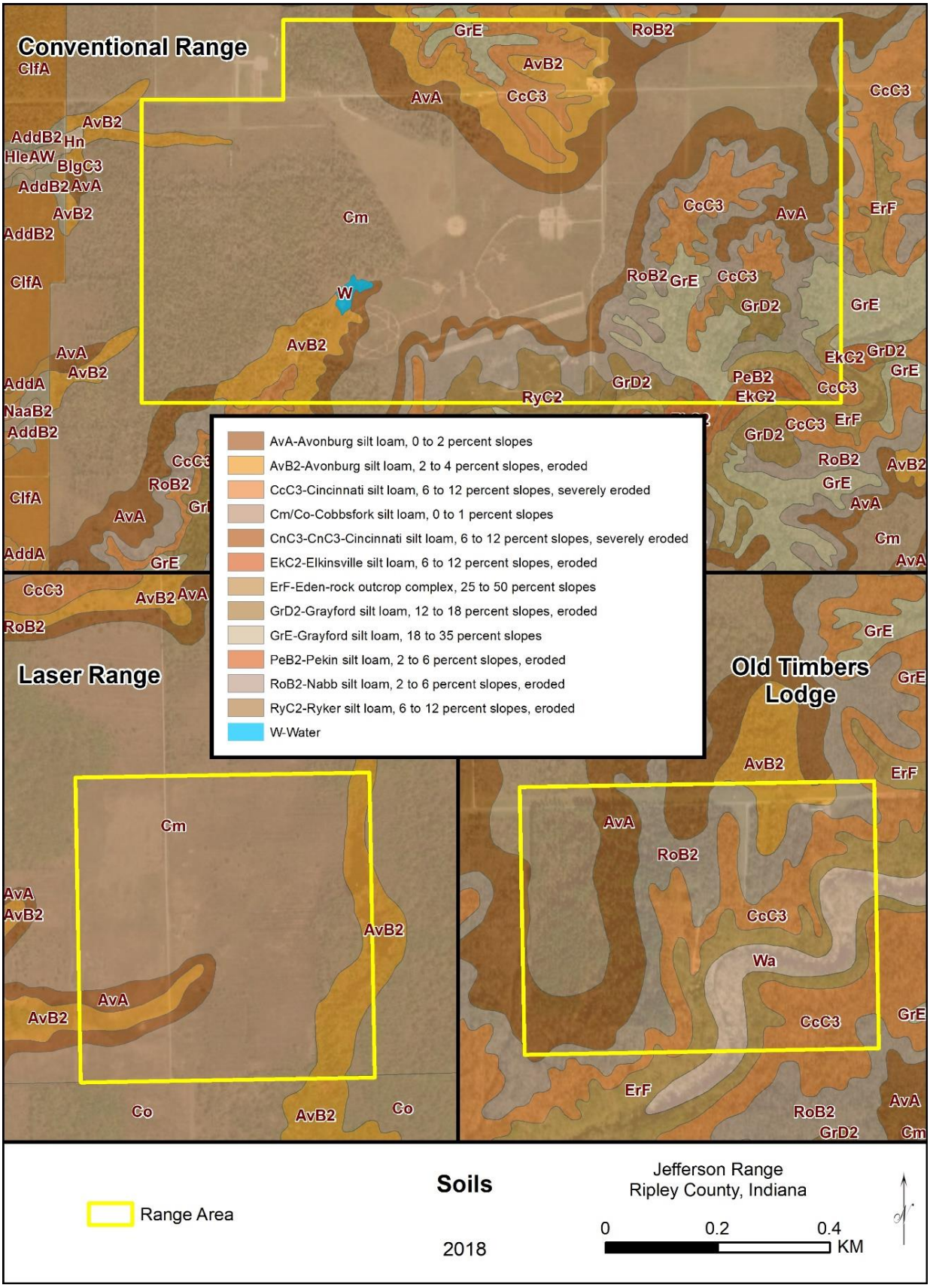

Figure 8. Jefferson Range soils map

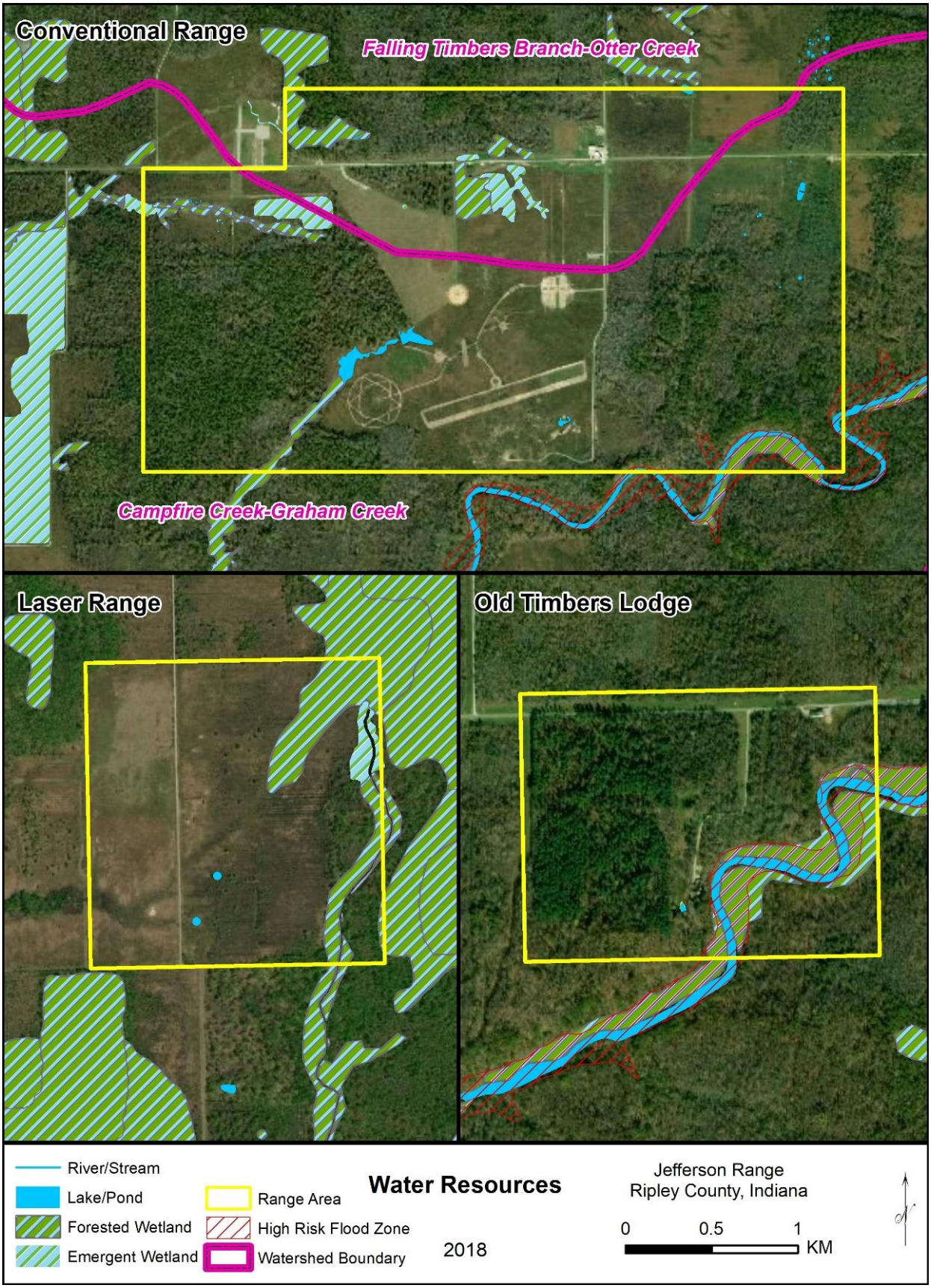

Figure 9. Jefferson Range Water Resources in the Masatatuck watershed.

5.0 ECOSYSTEMS AND THE BIOTIC ENVIRONMENT

5.1 Ecosystem Classification

Jefferson Range is located in Pre-Wisconsinian Drift Plains ecoregion within the Central US Plains in the Eastern Temperate Forest ecoregion (Woods et al. 1999). Based on the ecoregions defined specifically for Indiana, Jefferson Range is located within the Muscatatuck Flats and Canyons Section of the Bluegrass Natural Region (Homoya et al. 1985, Hedge et al. 1993). This area is primarily a rolling till plain with local end moraines with diverse hard forests. Originally, natural tree cover was significant with beech forests common on upland, drier soils, while beech forests and elm-ash swamp forests dominated the lowland, wetter soils.

The forests and grasslands in this ecoregion generally benefit from the presence of wildland fire. Historically, fire was a rare ecological process within the southeastern Indiana area that includes Jefferson Range and Big Oaks NWR. Fire is used as a tool to maintain healthy stands of native grasses and eliminate invasive species. Many species dependent on early successional grasslands, such as deer, bobwhite, and grassland birds, benefit from areas maintained by fire (Winters and Robb 2006). The maintenance of savannas and prairie mosaics requires the regular presence of wildfires or prescribed fire. Burning at Jefferson Range is in accordance with a Fire Management Plan for Big Oaks National Wildlife Refuge (USFWS 2006) provides direction in establishing operational procedures to guide all fire management activities.

5.2 Vegetation

5.2.1 Historic Vegetative Cover

Uplands in Jefferson Range were dominated by oak-hickory (*Quercus-Carya*) forests with chestnut oak (*Q. prinus*) on the most xeric topographic positions. Mesic slopes and ravines are dominated by red oak (*Q. rubra*), American beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), and white ash (*Fraxinus americana*). Common understory species include black huckleberry (*Gaylussacia baccata*), lowbush blueberry (*Vaccinium pallidum*), and greenbrier (*Smilax* spp.) on upper slopes and ridges. Sugar maple frequently dominates the understory of more mesic sites. Herbaceous species richness is generally low on dry ridges where Boott's sedge (*Carex picta*) typically dominates cover and is an indicator species of the landtype. A more diverse array of forest perennials, ferns, and sedges occurs on more mesic sites.

5.2.2 Current Vegetative Cover

Due to the restricted access resulting UXO, there have been no flora surveys or ground-truthed vegetation community delineations. Additionally, due to the restricted access, limited ground disturbance, and regular wildland fire on Jefferson Range, large tracts of native vegetation and open grassland are present and provide habitat for both common and rare plant species. Jefferson Range is comprised of approximately 53% grassland, 19% forest, 13% early successional habitat, 4% wetland, and 4% woodland (Mallarach and Schools 1998). Open grassland habitat is more prevalent on Jefferson Range in comparison to Big Oaks NWR due a greater frequency of wildfire. Listings of vegetation communities on Jefferson range can be found in the Big Oaks ICCP, the Indiana Comprehensive Wildlife Strategy, and the Indiana SWAP.

5.3 Fish and Wildlife

Big Oaks NWR and Jefferson Range provide large areas of unfragmented habitat, including wet woodlands, dry-upland forests, successional shrublands, and grasslands. The diverse habitat types support a high level of biodiversity. Although numerous studies have occurred over the years in the former JPG property and subsequently Big Oaks NWR**,** comprehensive surveys have not been conducted for all fauna and none specifically for Jefferson Range. Based on previous survey data and observations over the years, Big Oaks NWR habitat is known to support a wide variety of wildlife species. To date, approximately 220 species of birds, 37 species of mammals, 40 species of fish, 20 species of reptiles, 25 species of amphibians, 9 species of mussels, and 60 species of butterflies have been documented. A list of potential species, including those documented on Big Oaks NWR, is included in the Big Oaks NWR CCP, the Indiana CWS, and Indiana SWAP.

Upland Forest on Big Oaks NWR

5.4 Threatened and Endangered Species and Species of Concern

Federally-listed species with known occurrence in the region include the endangered Indiana bat (*Myotis sodalis*), the northern long-eared bat (*Myotis sodalis*), and endangered running buffalo clover (*Trifolium stoloniferum*). Neither species have been documented on Jefferson Range to date. The Indiana bat has been documented on Big Oaks NWR and is assumed to occur on Jefferson Range. No critical habitat exists on Jefferson Range. Ten bird species occurring within Big Oaks NWR have also been designated by Region 3 of the USFWS as federal Species of Concern: American woodcock *(Scolopax minor*), bobolink (*Dolichonyx oryzivorus*), dickcissel (*Spiza americana*), Eastern meadowlark (*Sturnella magna*), grasshopper sparrow (*Ammodramus savannarum*), loggerhead shrike (*Lanius ludovicianus*), red-shouldered hawk (*Buteo lineatus*), sedge wren (*Cistothorus platensis*), cerulean warbler (*Dendroica cerulean*), and Henslow's sparrow (*Ammodramus henslowii*). Approximately 162 rare state species are known to occur within Jefferson, Jennings, and Ripley counties. Of these species, 74 species are known to occur within the Big Oaks NWR and 64 species have the potential to occur on the Jefferson Range (IDNR 2015, USFWS 2011b). In particular, the salamander mussel (*Simpsonaias ambigua*), its obligate host the mudpuppy (*Necturus maculosus*), the purple lilliput (*Toxolasma lividum*), and the little spectaclecase (*Villosa lienosa*) are all state species of concern that are very unlikely to occur on the installation but are present regionally. These species are not considered priority species at this time. If any of these species were to be documented on Jefferson Range in the future, they would become a high priority species.

Priority species were identified based on their regulatory status, known occurrence on or near Jefferson Range, or highly likely occurrence on Jefferson Range. Thirteen rare species are considered priority species at Jefferson Range. These species include six birds, four mammals, one amphibian, one reptile, and one plant:

- Federal and state endangered Indiana bat
- Federally threatened and state endangered northern long-eared bat
- Federal and state endangered running buffalo clover

- Federal species of concern dickcissel (*Spiza Americana*)
- Federal species of concern grasshopper sparrow (*Ammodramus savannarum*)
- Federal species of concern and state endangered Henslow's sparrow
- Federal species of concern and state endangered cerulean warbler
- Federal species of concern and state endangered Kirtland's snakes (*Clonophis kirtlandii*)
- State endangered northern crawfish frog (*Rana areolata circulosa*)
- State endangered northern harrier (*Circus hudsonius*)
- State endangered sedge wren (*Cistothorus stellaris*)
- State endangered little brown bat (*Myotis lucifugus*)
- State endangered tri-colored bat (*Perimyotis subflavus*)

5.5 Waters of the US, Wetlands, and Floodplains

There appears to be one pond on the primary parcel but there are no known ponds or other open water on any of the range parcels. There are limited unconsolidated or bedrock aquifers underneath Jefferson Range. There are no 100 or 500-year floodplains identified on Jefferson Range. There have been no surveys to characterize wetlands at Jefferson Range due to the presence of UXO and resulting lack of ground disturbance. Based on National Wetland Inventory (NWI) data, there are four wetlands on the primary range parcel and none on the southern range parcel or near Old Timbers Lodge (USFWS 2003). A summary of wetlands identified in the NWI data on Jefferson Range is presented in **Table 3**.

Table 3. Summary of National Wetlands Inventory Wetlands at Jefferson Range

Cowardin Classification(s)	Description	Acreage	Parcel
PFO1A	Palustrine forested broad leaved deciduous temporarily flooded	9.30	Primary Range
PFO1A		0.46	Primary Range
PUBGH	Palustrine unconsolidated bottom, intermittently exposed, diked/impounded	0.12	Primary Range
PUBGH		0.08	Primary Range

Source: USFWS 2003, Cowardin 1979

5.6 *Other Natural Resource Information*

As directed by EO 11989, Off Road Vehicles on Public Lands, outlines the use of any off-road vehicles (ORV), including mountain bikes, will be allowed only after thoroughly analyzing the impact of such use on soils, archeological sites, wildlife, water quality, and other ecosystem attributes. JRANG will periodically monitor and evaluate for damage any areas designated for ORV use.

6.0 MISSION IMPACTS ON NATURAL RESOURCES

6.1 Natural Resources Needed to Support the Military Mission

The Jefferson Range INANG requires operation areas to support flying operations and training with the surrounding areas providing a buffer to reduce BASH risk and provide support facilities

and functions. 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. The Jefferson Range needs the installation lands and its natural resources to function together in a functioning ecosystem to support the military mission. Management activities in the Jefferson Range INRMP are designed to support the desired habitats and ecosystem functions meet this objective.

6.2 Natural Resources Constraints to Mission and Mission Planning

The most significant constraints on Jefferson Range are related to UXO contamination. Jefferson Range is part of the former JPG, a training and testing facility managed by the US Army that was decommissioned in the mid-1990s (US Army 1995). As a result, there is a large amount of UXO throughout the former JPG which severely limits certain land management activities, such as biological surveys, wetland delineations and vegetation management. All DU contamination is located south of the southern range and does not overlap Jefferson Range. There are no topographic or vegetative features that limit the military mission on Jefferson Range. Although there are no current natural resources constraints associated with threatened and endangered species and/or water resources, listed species and water resources should be reevaluated for potential constraints if new activities or development are planned. General constraints are related to wetlands, water quality protection, maintaining the open grasslands by preventing woody encroachment, and protecting federally and state-listed, threatened and endangered species. Any new activities or infrastructure could be limited in areas where federal or state-listed species are found to be present in the future.

Mosaic grassland with upland forest in the background on primary parcel

<u>Land Use</u>

Operations Planning & Review projects, activities, new development, and mission changes are typically reviewed by multiple entities within the INANG, including the 181 IW/EM. New construction projects are reviewed by the INANG Facility Board. If there is the potential for environmental impacts, the NEPA process is started. If there are additional environmental compliance requirements, the 181 IW/EM facilitates may require consultation or permit applications.

<u>Current Major Impacts</u>

There are three primary areas of potential impacts to natural resources from INANG's military mission:

- The ignition of wildfires
- The ability to manage vegetation: primarily maintaining open grassland areas suitable for military training takes active vegetation and wildland fire management. Military training does cause wildfires; therefore, Jefferson Range must be able to manage fuel loads to reduce the likelihood of uncontrollable wildfires.
- Feasibility to conduct natural resources surveys and assessments that are typical on military installations due to safety concerns from UXO contamination: Because ground truthing is limited, it is difficult to obtain detailed information on site-specific natural resources and their condition for management purposes.

If the mission changes significantly in the future, the sustainability challenges could increase. However, the likelihood of an extensive expansion of on-the-ground activities or infrastructure is low because ground disturbance is limited greatly by the presence of UXO.

Potential Future Impacts

There are no known projected changes in mission or potential impacts. Future development of the Jefferson Range to meet the training needs of the INANG is addressed in the Jefferson Range Comprehensive Range Plan (INANG 2010).

7.0 NATURAL RESOURCES PROGRAM MANAGEMENT

7.1 Natural Resources Program Management

The guiding philosophy of the JR INRMP is to take an ecosystems approach to managing natural resources present on Jefferson Range. Ecosystem management is based on clearly stated goals and objectives, and associated activities and projects. The JR 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 these habitats generally is focused to benefit indigenous species, particularly threatened and endangered species, and game species. The INANG will manage the wildlife and its habitat at Jefferson Range by implementing the strategies listed below.

- Preserve snags and large trees for cavity-nesting species in the safety buffer unless required for safety or mission considerations.
- Protect riparian forest and wetlands as many indigenous and rare species are dependent on them at Big Oaks NWR (e.g. northern river otter [*Lutra canadensis*], crawfish frog, etc.).
- Support prescribed burns implemented by the USFWS in an effort to enhance native prairie grassland habitat.

- Limit the amount of pesticide used for invasive species control by employing IPM practices including but not limited to mechanical methods to control invasive and nuisance species.
- Avoid mowing, plowing, or pesticide use during the nesting season between 1 May and 15 August. Raise the mowing bar to >6 inches to prevent nest and young bird destruction.
- Maintain grass heights between 7-14 inches in the impact area during the growing season to discourage assembly of small, flocking birds.

With Jefferson Range surrounded by Big Oaks NWR, there is sufficient habitat to support a healthy diversity of wildlife. Jefferson Range supports numerous native species and habitats, as well as federally and state-listed threatened and endangered species. There are no noticeable negative impacts from mission activities on wildlife populations on Jefferson Range. Most fish and wildlife management is conducted on Big Oaks NWR by USFWS personnel. The fish and wildlife on Jefferson Range benefit from the management practices employed by the Big Oaks NWR.

A limited hunting program is allowed on Jefferson Range by military persons who hold all required local and state permits. Hunting only occurs during the specified hunting season. Other hunting opportunities occur on the Big Oaks NWR and those hunting opportunities are administered by the USFWS

Grassland on southern range parcel

The focus on maintaining open grasslands to keep tree species out of the range boundaries will benefit many wildlife species that are dependent on early successional habitat, such as white-tailed deer (*Odocoileus virginianus*), bobwhite quail (*Colinus virginianus*), and numerous non-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 (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.

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 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 states that this framework is important to "ensure that pollinator management activities are incorporated where practicable, into JR INRMPs and practices." Conservation of pollinators by USAF alone or in collaboration with groups such as BCI and P2 supports these DoD initiatives.

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.

The USAF Pollinator Conservation Reference Guide provides specific pollinator conservation measures which can be implemented by the USAF. The USAF Pollinator Conservation Reference Guide was finalized March 2018, and is available on USFWS and AFCEC eDASH Natural Resources website. The USAF Pollinator Reference 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 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.

7.2.2 Nuisance Wildlife and Wildlife Disease

Other than those that present a BASH risk, there are few nuisance wildlife species at Jefferson Range. Future nuisance wildlife problems will be evaluated in conjunction with USDA-WS personnel, if appropriate. Any solutions to nuisance wildlife problems will follow the IPM 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, United States Environmental Protection Agency (US EPA), Indiana Department of Environmental Management (IDEM), and IDNR personnel, as appropriate.

7.2.3 Management of Threatened and Endangered Species and Habitats

This section presents information about the management of priority species that are located within or with the potential to occur at Jefferson Range, along with requirements and strategies for their management. While there have been no site-specific surveys due to the presence of UXO on Jefferson Range, there are likely federally and state-listed species present on Jefferson Range based on former JPG and Big Oaks NWR surveys. In general, if a species is documented to occur on Big Oaks NWR, it is assumed to occur on Jefferson Range except for karst species and perennial stream species. Currently, there are 13 priority species. Of these species, 11 are afforded protection under the ESA and/or Indiana law. These species include 6 birds, 4 mammals, 1 plant, 1 amphibian, and 1 reptile. Of these 13, the majority are forest or grassland dwelling species. It is possible other species may be documented or identified as priority species in the future as additional surveys and natural resources management are conducted at Jefferson Range. There is no critical habitat designated by the USFWS exists on Jefferson Range.

7.2.3.1 Federally Special Status Wildlife Species

The INANG is required to manage federally-listed threatened and endangered species. Failure to protect federally-listed species could lead to an ESA violation, which could negatively impact training land availability. The Indiana bat is the only federally-listed species known to occur on Jefferson Range (NGB 2017). Five federally listed species and federal species of concern have been identified as priority management species.

Indiana Bat
Photo courtesy of Adam Mann USFWS

Indiana bat: Indiana bat maternity colonies typically occupy multiple roost trees in riparian, bottomland, and upland forests during the summer. Roost trees generally have exfoliating bark and have a southeast or south-southwest solar exposure and an open canopy. Jefferson Range is likely to contain potential roosting habitat for Indiana bats within the forested portions of the primary range. The Indiana bat was detected acoustically on Jefferson Range (NGB 2017). Since most of Jefferson Range is open grassland, potential habitat is primarily limited to the forested corners of the primary range parcel. The following management strategies for the Indiana bat are recommended:

- Do not remove trees >3-inch diameter at breast height (dbh) while Indiana bats may be present from 1 April through 30 September (i.e., trees may be felled from 1 October through 31 March).
- No tree removal shall occur within 100 feet of a perennial stream or within 50 feet of an intermittent stream.
- Standing snags shall not be removed, except where they pose a serious human safety hazard (a tree with <10% live canopy should be considered a snag). Snags that have no remaining bark and no visible cracks, splits, or hollows may be removed as well as any snags leaning more than 45º from vertical.
- Prescribed burns shall not be conducted from 15 April through 15 September in burn areas containing potential bat roost trees/snags >3‖ dbh as specified by the current USFWS Guidelines (unless dates change in future guidelines or agreements).
- Temporary fire breaks shall be created and/or maintained around any known Indiana bat primary maternal roost trees that fall within a proposed burn area prior to the burn. While this is part of the USFWS Bloomington Field Office (BFO) guidelines, it has limited application on Jefferson Range or Big Oak NWR due to safety issues associated with UXO and DU.

Prior to conducting activities within the forested portions of the Jefferson Range, the INANG will review and implement the appropriate BFO Forest Management Guidelines to ensure no incidental take or adverse effects to Indiana bats occur because of training or land management activities. The USFWS BFO guidelines state that no prescribed fire shall be conducted from 15 April to 15 September. The Big Oaks NWR is currently conducting formal consultation to modify the no prescribed fire period from 30 April to 30 August. The proposed modifications to the prescribed fire dates would provide additional opportunities to achieve refuge habitat management objectives. Big Oaks NWR undertakes vegetation and wildland fire management in conjunction with and on Jefferson Range. Any of these activities led by Big Oaks NWR will be done in compliance with their intra-agency consultation requirements.

Northern Long-eared Bat: The northern long-eared bat is a federally threatened, state endangered species. It is flexible in its roost selection choosing cavities and crevices in both live trees and snags (dead trees), as well as manmade structures such as bridges and abandoned buildings (Kentucky Working Group 2012). This species forages in the open and uncluttered forest understories of woodlands, along woodland edges, and along water, feeding on a variety of insect

prey (Kentucky Bat Working Group 2012). The following management strategies are recommended:

- 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.

Northern Long-eared Bat
Photo courtesy of USFWS

Dickcissel: The dickcissel is known to breed on the Big Oaks NWR and in the grassland areas on Jefferson Range (USFWS 2011b). The primary strategies for managing the dickcissel include maintaining suitable grassland habitat and minimizing woody encroachment (Dechant et al. 2002). The following management strategies for the dickcissel are recommended:

- Minimize disturbance in suitable grassland areas during the breeding season (ranges from late April to late August).
- Conduct mowing after peak breeding season (after mid-August), when possible, but mow early enough to ensure vegetation can recover before the winter or following spring.
- Use prescribed fire on a rotational basis in these areas (3 to 5 year cycle).

Dickcissel
Photo courtesy of USFWS

Grasshopper sparrow: The grasshopper sparrow is known to breed on the Big Oaks NWR and to nest in the grassland areas on Jefferson Range (USFWS 2011b). The primary strategy for managing the grasshopper sparrow is maintaining large areas of contiguous suitable grassland habitat with low shrub density (Dechant et al. 2002). Habitat management for the grasshopper sparrow is similar to the dickcissel and primarily consists of discouraging woody vegetation encroachment in grassland areas through mowing and burning (Dechant et al. 2002).

Grasshopper Sparrow
Photo courtesy of Mike McDowell

Running buffalo clover: All the extant populations in Indiana occur in the southeastern corner. To date, this species has not been observed on the Big Oaks NWR or Jefferson Range, so no management strategies are recommended, but should be revisited if this species is found in the future. Surveys for this species are recommended in conjunction with other spring floristic and vegetation community surveys.

7.2.3.2 State Special Status Species

The IDNR provides for the protection of threatened and endangered species native to Indiana. Eight state-listed species have been identified priority species, three of which are also federal

species of concern. These species are discussed below and include four birds, two mammals, one reptile, and one amphibian.

Henlsow's sparrow: Henslow's sparrows are known to breed on Big Oaks NWR and are likely to occur within the grassland areas on Jefferson Range (USFWS 2011b). Woody invasion and grassland habitat area are limiting factors for the Henslow's sparrow. The primary strategies to managing this species include maintaining large areas of suitable grassland habitat, avoiding habitat disturbances during the breeding season, and controlling woody encroachment. Habitat management recommendations for Henslow's sparrow is similar to the other priority species grassland birds, the federally-protected dickcissel and grasshopper sparrow.

Henslow's Sparrow
Photo courtesy of USFWS

Cerulean warbler: The cerulean warbler is known to breed on the Big Oaks NWR, specifically to the area north of K road (USFWS 2011b). Due to the proximity of the Jefferson Range to K Road, it is possible that warblers are present within the forested areas of Jefferson Range. Loss of habitat is the primary reason for decline of the species, therefore protection and enhancement of large forested areas is the primary management recommendation for the cerulean warbler, particularly mature but unevenly aged forests with canopy gaps or riparian corridors through mature forests (USFWS 2007). Habitat management recommendations for cerulean warbler is similar to the other priority species birds, the federally-protected dickcissel and grasshopper sparrow.

Cerulean Warbler
Photo courtesy of USDA

Sedge Wren: The sedge wren is listed as a state endangered species. The sedge wren is one of the most nomadic birds in North America with breeding widely distributed across the continent (Herkert et al. 2001). Sedge wrens generally have a low site fidelity but are associated with dense tall growths of sedges and grasses in wet meadows, hayfields, retired croplands, and upland margins of ponds and marshes (Herkert et al. 2001). They nest in sedges and grasses in wet meadows, hayfields, and marshes, and winter in grassy marshes and dry grass fields (Cornell Lab of Ornithology 2018). Habitat management recommendations for the sedge wren are similar to other priority grassland birds, the federally-protected dickcissel and grasshopper sparrow.

Sedge Wren
Photo courtesy of Berlin Heck

Northern Harrier: The northern harrier is listed as a state endangered species. A slender, medium sized raptor they rely on hearing as well as vison to capture their prey which are usually small

mammals and birds, but they are also capable of taking bigger prey such as rabbits and ducks (Cornell Lab of Ornithology 2018). Northern harriers build their nests on the ground in open habitats, mostly dense grassy or shrubby vegetation and frequently in wet areas to reduce the risk of predation (Hawk Mountain 2018). Northern harriers appear to be decreasing and most declines are attributed to loss of suitable breeding and feeding habitat due to agricultural and other development (Hawk Mountain 2018). Habitat management recommendations for the northern harrier are similar to other priority grassland birds, the federally-protected dickcissel and grasshopper sparrow.

Northern Harrier
Photo courtesy of Amanda Boyd USFWS

Little Brown Bat: The little brown bat is a widely distributed North American bat species and is state-listed as endangered. They roost in buildings, trees, under rocks, and in piles of wood. In winter hibernaculum sites include mines or caves where temperature is continuously above freezing. The little brown bat primarily inhabits forested lands near water (ADW 2018). Little brown bats are insectivorous bats, typically feeding on swarms of insects and returning to areas where they have had prior feeding success. The primary threat to little brown bats currently comes from the spread of white-nose syndrome (ADW 2018). This species is not currently federally-listed, however if it becomes listed and is documented on site, management strategies should be developed in coordination with the appropriate agencies.

Little Brown Bat
Photo courtesy of USFWS

Tri-colored Bat: The tri-colored bat is a state endangered species, distributed throughout the eastern United States. The tri-colored bat is one of the first bats to enter hibernation and one of the last to emerge in spring (TPWD 2018). They roost in rock crevices, caves buildings, and tree foliage during summer, and in winter utilize caves and mines as hibernacula (TPWD 2018). They can be found in open woods near the edges of water, as well as over water but usually not in open fields or deep forests (ADW 2018). They are insectivorous and generalists, consuming a wide variety of insects (ADW 2018). The primary threat to little brown bats currently comes from the spread of white-nose syndrome (ADW 2018). This species is not currently federally-listed, however if it becomes listed and is documented on site, management strategies should be developed in coordination with the appropriate agencies.

Tri-colored Bat
Photo courtesy of James

Kirtland's Snake: Kirtland's snake is a state endangered species found in open damp areas like marsh edges and wet fields, but can also occur along forested wetlands and floodplains (ADW 2018). They are frequently found in burrows or under leaf litter, logs, boards, rocks or other cover objects within their habitats (MSU 2018). Being a burrowing, nocturnal animal, its diet consists mainly of earthworms and slugs (MSU 2018). This species is not currently federally-listed, however if it becomes listed and is documented on site, management strategies should be developed in coordination with the appropriate agencies.

Kirtland's Snake
Photo courtesy of Andrew Hoffman,

Crawfish Frog: An isolated population occurs in southeastern Indiana within the Big Oaks NWR (USFWS 2011b). Although crawfish frogs are found in a variety of habitats, the northern subspecies found in Indiana seems to prefer tallgrass prairies and other native grassland habitat (IDNR 2011, Engbrecht 2010), as well as low wet areas including moist meadows, prairies, woodlands, and bush fields. They breed in flooded fields, fish-free ponds, and small lakes, and are often found in crawfish holes (IDNR 2018). The crawfish frog is likely to occur on Jefferson Range and the following management strategies are recommended:

- Maintain or enhance potential crawfish frog ponds.
- Avoid disturbance in known breeding areas and suitable habitat (moist prairies and wetland areas) within the Jefferson Range, particularly during March and April.
- Maintain existing grassland tracks where feasible.
- Adjust management as needed and where feasible in response to trends documented in USFWS surveys.

Crawfish Frog
Photo courtesy of IDNR

7.2.3.3 Management Strategies for Special Status Species

The following general guidelines will be followed to facilitate the military mission and natural resources management objectives while minimizing negative impacts on rare species and their habitats.

- Follow the USFWS guidelines for the Indiana bat.
- Continue to maintain existing tracts of forest.
- Continue to maintain existing tracts of grassland.
- Continue prescribed fire program while taking into consideration sensitive populations or time periods for priority listed species.
- Explore additional management strategies should new species be federally-listed and documented on the installation.

7.3 Water and Wetland Resource Protection

In general, water resources will be managed through conservation and impact avoidance. The following guidelines will be implemented to ensure compliance and to protect and enhance water resources at the Jefferson Range.

- Consult with the 181 IW/EM and/or the ANG NR Program Manager prior to initiating projects with the potential to disturb water resources. If necessary, projects should be

referred to the US Army Corps of Engineers (USACE) and IDEM to determine if jurisdictional Waters of the US and/or state, respectively, would be impacted and the appropriate permits. To ensure compliance with Section 401 of the Clean Water Act (CWA), any impact to Waters of the US including wetlands requiring a Section 404 permit will require a water quality certification from the state.

- Plan development to avoid wetland and floodplain impacts to the maximum extent possible and mitigate unavoidable impacts.
- Vehicle movement through streams and other Waters of the US including wetlands should use established crossing areas and follow state erosion and sediment control and/or water quality certification standards.
- Avoid disturbance of wetlands and aquatic habitats where practicable, especially during restrictions for spawning activity.
- Protect the riparian zone and stream banks through good forest, land, and wetland management.
- Work with the IPMC to manage invasive species population and promote use of native plant species.
- Determine if training opportunities will negatively affect floodplain and identify opportunities to employ that will meet the goals and objectives of the project while minimizing impact to the floodplain.
- Include identification of natural resource conditions on site as part of safety training.

7.3.1 Regulatory and Permitting

The USACE regulates the discharge of dredged or fill material into Waters of the US, including wetlands, under Section 404 of the CWA. Even an inadvertent encroachment into Waters of the US resulting in a displacement or movement of soil or fill material has the potential to require a Section 404 permit. Waters of the US 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. Jurisdictional determinations are made by the USACE.

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 USEPA 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 Indiana the authority to regulate federally-permitted activities that may result 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. The IDEM is responsible for issuing Section 401 Water Quality Certification in Indiana.

Permitting

Permitting requirements vary depending on type, location, and extent of disturbance. Prior to initiating projects or activities (e.g. dredging, filling, work in and around a stream) occurring within or with the potential to affect a floodplain, wetland or other water body, the appropriate agencies (e.g. USACE, IDEM, etc.) should be consulted to determine permitting requirements. As discussed above, the USACE, IDEM and IDNR have regulatory authority over jurisdictional Waters of the US, isolated wetlands and floodplains in the state of Indiana. In Indiana, the USACE issues individual permits, nationwide permits (NWPs), and a Regional General Permit (RGP) that covers many routine or minor projects. The IDEM has issued general 401 WQCs to cover many of the NWP and RGP activities, as well as Individual 401 WQCs, Isolated Wetland General Permits and Isolated Wetland Individual Permits. The IDNR issues various waterways permits for work in floodplains in Indiana. In general, individual permits are required for disturbances that exceed thresholds for disturbances covered by general permits. Permitting requirements vary depending on type, location, and extent of disturbance. Prior to initiating projects or activities (e.g., dredging, filling, work in/around a stream) occurring within or with the potential to affect a floodplain, wetland or other water body, the appropriate agencies should be consulted to determine permitting requirements.

To address concerns regarding use of pesticides in, over or near Waters of the US, the US EPA set forth a National Pollutant Discharge Elimination System (NPDES) Pesticide General Permit. This NPDES Pesticide General Permit issued by IDEM, covers the control of invasive or other nuisance weeds in a right-of-way or easement where to target the pests effectively a portion of the pesticide unavoidably will be applied over and deposited to water. The submission of a notice of intent (NOI) and development of a Pesticide Discharge Management Plan under this general permit will only be required for certain persons who have pesticide applications that would exceed a threshold(s) listed in the general permit. The INANG will consult the general permit thresholds and/or contact IDEM when using pesticides for vegetation management along roads, firebreaks and the fence to determine if a NOI or Pesticide Discharge Management Plan is required.

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 in size and function vary depending on the upland land use and the type of water resource being protected and 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 occur during rain events. Maintaining the

forest cover around small water resources is important for preventing sedimentation and impacts to water quality.

Riparian habitat is essential for many species and performs critical water quality functions as well. The management priority for existing, undisturbed riparian areas is to protect and enhance existing habitat quality. Recommended strategies include:

- Allow undisturbed riparian forests to flourish naturally. Intermittent flooding disturbances will naturally enhance these areas.
- Avoid unnecessary removal of trees along the riparian corridor to prevent adverse effects on stream water quality and aquatic organisms from runoff and sedimentation.
- Leave several hollow trees and dead trees per acre to provide habitat for cavity-nesting birds and Indiana bats. Trees with hollows in the trunk or upper limbs provide homes for several species.

7.4 Grounds Maintenance

Given large parts of Jefferson Range are landscaped, the management and design of those areas have significant implications for water quality, BASH risk, and native species. The following recommended landscaping practices should benefit the environment and generate long- term savings in cost and maintenance time. In particular, the use of native plants not only protects biodiversity and provides wildlife habitat, but it can also reduce demands for fertilizer, pesticides, irrigation, and their associated costs. General recommendations to promote environmentally beneficial landscaping include:

- Design landscaping using native plants to be suitable to the specific site and appropriate for the use and operation of the facility.
- Implement water-efficient practices, use efficient irrigation systems and recycled water, and use landscaping to conserve energy.
- Use wood mulch instead of rock mulch when practical.
- Prevent expansion of nonnative plants into native plant areas by using regionally native plants for landscaping where practicable.
- Where feasible reuse landscape trimmings on site as appropriate (e.g. compost, mulch).
- Do not use seed-bearing or fruiting plants that provide food for wildlife and wildlife habitat in areas near airfields.

A major management focus of Big Oaks NWR and Jefferson Range is vegetation management and is the single most time-consuming aspect of the natural resources management program. Existing habitats are managed to provide large contiguous blocks of forest, grassland, and shrub habitat. Adaptive, ecosystem management takes into account that Big Oaks NWR and Jefferson Range are part of a larger landscape and provides the framework for forming management decisions and strategies, while using the most current, scientifically validated, management techniques. Big Oaks NWR promotes habitat continuity and diversity to support healthy populations of wildlife, especially the declining species dependent on forests and grasslands. Population and habitat monitoring are used to periodically by Big Oaks NWR to evaluate and improve management techniques. Cooperative research and monitoring studies are being developed with specialists to increase and improve the knowledge and ability to manage the resources found in the area.

Forests and grasslands are managed to form large contiguous blocks, habitats rare in the present landscape of Indiana. Forested areas are required by 'forest-interior' species. Examples of these species include Indiana bat, cerulean warbler, wood thrush (*Hylocichla mustelina*), worm-eating warbler (*Helmitheros vermivorum*), and wild turkey (*Meleagris gallopavo*). Grasslands are maintained by carrying out an extensive prescribed fire program. On Jefferson Range there are large blocks of grasslands as a result of regular wildfires from military training, which are some of the largest blocks of grasslands within the Big Oaks NWR boundary. Big Oaks NWR has some open, grassland areas but they are scattered and generally impacted by woody encroachment. A key management goal for Big Oaks NWR is to maintain and enhance open grasslands for rare grassland dependent species through the reduction and prevention of woody encroachment.

Open grasslands are the preferred habitat to support the military mission at Jefferson Range. The key for long-term management of open grasslands is to prevent woody species (e.g., sweet gum [*Liquidambar styraciflua*], black locust [*Robina pseudoacacia*], sumac [*Sumac* spp.], etc.) from re-sprouting and becoming established. If these species re-sprout and it becomes significant enough, then intensive brush management, including pesticides, become essential to reduce and prevent further re-sprouting of these woody species. The brush management needs to be coordinated with an active and intensive prescribed fire regime until the re-sprouting species are reduced. Recommended strategies to manage grasslands at Jefferson Range include:

- Maintain open grasslands by preventing any woody encroachment into those areas.
- Transition successional grasslands to open grasslands using a combination of brush management and prescribed fire and limit the use of pesticide to the extent possible. Pesticides will need to be used every 5 to 10 years in conjunction with prescribed fire to maintain open fields.

Vegetation management at Jefferson Range will be coordinated and implemented with Big Oaks NWR.

7.5 Forest Management

Large forested tracts are rare in Indiana. However, the area north of K road on Big Oaks NWR contains one of the largest contiguous blocks (approximately 14,000 acres) of forest in Indiana and provides breeding habitat for a variety of declining populations of neotropical migrant birds (IDNR 2011, USFWS 2011b).

There are limited forests on Jefferson Range compared to Big Oaks NWR, and they do not generally require management actions. The primary management concern with forests on Jefferson Range is to minimize impacts to potential roosting habitat for Indiana bats. Recommended strategies to manage forests at Jefferson Range include:

- Use prescribed fire to manage fuel loads within forests and woodlands, and reduce risk of uncontrollable wildfires from military activities.
- Do not remove large trees and snags suitable for Indiana bat roosting habitat**.**

In addition to the management recommendations above, the impact of the emerald ash borer (*Agrilus planipennis*) will need to be addressed once/if it reaches Ripley County**.**

The Jefferson Range supports the USFWS's Wildland Fire Management Plan (USFWS 2006).

7.6 Soil Conservation and Sediment Management

Two main types of soil erosion exist: wind erosion and water erosion. Several factors affect water erosion. These factors include rainfall, slope steepness and length, soil texture or erodibility, cover protecting the soil, and special practices such as terracing or planting on the contour. Erosion control and soil conservation are not widespread natural resource issues at the Jefferson Range because there is very limited ground disturbance due to the presence of UXO and relatively low relief. However, some erosion concerns do arise during road, trail, firebreak, and fence line maintenance. Erosion has the potential to be severe at Jefferson Range due to the generally low infiltration rate for water, which can result in substantial runoff and increased erosion potential. Opportunities for exposed soil are very limited, thus areas affected by erosion are minimal.

In general, erosion and sedimentation are limited because overall ground disturbance is minimal due to extensive UXO contamination on former JPG land. However, it is recommended that the INANG implement the following strategies, when applicable, to protect water quality and minimize erosion:

- Use BMPs for construction and maintenance activities;
- Minimize the area of impervious surfaces in newly developed areas;
- Limit the use of pesticides to the extent possible to in and around buildings and other developed areas;
- Minimize the use of overall pesticide during vegetation maintenance activities and avoid the use of pesticide in and around surface waters;
- Restrict vehicles from within 30 feet of stream banks or lakes except where established stream crossings exist;
- Improve or develop new stream crossings in areas that are frequently clogged by debris causing water within the stream channel to back up or flood;
- Revegetate barren ground and reforest areas around water resources;
- Prevent surface water pollution by ensuring environmental plans (e.g. SWPPP) are followed; and
- Monitor roads adjacent to wetlands and streams to ensure erosion and sedimentation are not occurring.

Opportunities for erosion and sediment control training are available throughout the state of Indiana. The local Soil and Water Conservation Districts (SWCD) and watershed groups host workshops annually, typically during the winter months, for those interested in learning more about appropriate BMPs for construction and maintenance activities. One of the largest workshops is hosted by the White River Watershed in Noblesville, Indiana.

7.7 Outdoor Recreation, Public Access, and Public Outreach

The INANG is a trustee of public land and has a responsibility to protect and enhance environmental quality, conserve natural resources, and provide opportunities for outdoor recreation. Due to the presence of UXO, there are no outdoor recreation opportunities on Jefferson Range. There are opportunities on Big Oaks NWR but every outdoor recreation user must have a regular safety briefing and can only use a limited number of areas due to the presence of UXO and DU. Availability for outdoor recreation is also limited by the military mission at Jefferson Range. During active military training, the internal portions of Big Oaks NWR are blocked to prevent inadvertent entry into the safety buffers.

7.8 Geographic Information System (GIS)

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 a GIS to watershed, wetlands, wildlife, and various other natural resource management applications. GIS needs and requirements will be addressed through the ANG GeoBase Program.

7.9 Other Plans

7.9.1 Integrated Pest Management Plan

Jefferson Range has an Integrated Pest Management (IPM) Program implemented by the INANG IPM Plan (INANG 2011a). IPM is the use of multiple techniques in a compatible manner to avoid damage and minimize adverse environmental affects while obtaining control of target pests. The goal of IPM is to utilize non-chemical procedures to control pests, including both invasive and exotic plant and animal species. Typically, a combination of the following IPM techniques is required to resolve a problem on a sustained basis:

- Mechanical control, which alters environments in which pests live, traps or removes pests (e.g. glue boards and live-traps) from where they are not wanted, or excludes pests from where they are not wanted (i.e. screening);
- Cultural control, which manipulates environmental conditions to suppress or eliminate pests (e.g. removal of food scraps or spreading manure on fields);
- Biological control, which uses predators, parasites, or disease organisms to control pests (e.g. Gambusia fish to eat mosquitoes or triploid grass carp to remove aquatic weeds); and
- Chemical control, which relies on pesticides to kill pest and/or undesirable species of plants.

The IPM Plan includes pest identification and management requirements, outlines the resources necessary for surveillance and control, and describes the administrative, safety, and environmental requirements of the program. This plan serves as a tool to reduce pesticide use, enhance environmental protection, and maximize the use of IPM techniques. It is the policy of the INANG to minimize the use of all pesticides at the installation.

7.9.2 Invasive Species

There have been no non-native plant surveys on Jefferson Range, but several non-native plants have been identified on Big Oaks NWR and some of them are likely to be present on Jefferson Range. None of these species are on the US Department of Agriculture (USDA) list for noxious weeds or the state noxious weed list (USDA 2011a, b). There was little evidence that non-native species are spreading from invaded sites into adjacent undisturbed areas.

Due to the lack of ground disturbance at Jefferson Range and Big Oaks NWR, invasive species are not common and generally found in association with roads and fences. The invasive species that are present are difficult to eradicate, so the focus is on maintaining healthy native habitats resilient to invasion by non-native species.

Potential and priority invasive species for Jefferson Range are described in **Table 4**. These non-native species were documented on Big Oaks NWR and are likely present on Jefferson Range. There are four invasive species considered high priority for management and two medium priority species at Big Oaks NWR and Jefferson Range.

Table 4. Potential and Priority Invasive Plant and Animal Species at Jefferson Range

Scientific Name	Common Name	Invasive Status	Presence	Priority
Plants				
Acer platanoides	Norway maple	ICAPS		
Ailanthus altissima	Tree of heaven	IDNR, ICAPS	NWR	
Alliaria petiolata	Garlic mustard	ICAPS	NWR	
Bromus inermis	Smooth brome	ICAPS		
Cirsium arvense	Canada thistle	SNW, ICAPS	NWR	
Coronilla varia	Crown vetch	ICAPS	NWR	
Dioscorea oppositifolia	Chinese yam	ICAPS		
Eleaganus umbellata	Autumn olive	IDNR, ICAPS	NWR	High
Euonymus fortunei	Purple winter creeper	ICAPS		
Frangula alnus	Glossy buckthorn	ICAPS		
Glechoma hederacae	Creeping charlie	ICAPS		
Hesperis matronalis	Dame's rocket	ICAPS		
Lespedeza sericea	Sericea lespedeza	ICAPS	NWR	High
Ligustrum vulgare	Common privet	ICAPS	NWR	
Ligustrum obtusifolium	European privet	ICAPS	NWR	
Lolium arundinaceum	Tall fescue	ICAPS	NWR	
Lonicera japonica	Japanese honeysuckle	ICAPS	NWR	Medium
Lonicera maackii	Amur honeysuckle	IDNR, ICAPS	NWR	High
Lonicera x *bella*	Bella honeysuckle	IDNR, ICAPS	NWR	High
Lonicera morrowii	Morrow's honeysuckle	IDNR, ICAPS	NWR	High
Lonicera tatarica	Tartarian honeysuckle	IDNR, ICAPS	NWR	High
Lysimachia nummularia	Moneywort	ICAPS	NWR	
Lythrum salicaria	Purple loosestrife	SNW, IDNR, ICAPS		
Melilotus alba	White sweet clover	ICAPS	NWR	
Melilotus officinalis	Yellow sweet clover	ICAPS	NWR	
Microstegium vimineum	Japanese stiltgrass	IDNR	NWR	Medium
Morus alba	White mulberry	ICAPS		
Ornithogalum umbellatum	Star-of-Bethlehem	ICAPS		
Phalaris arundinacea	Reed canary grass	IDNR, ICAPS	NWR	
Phragmites australis	Giant reed	ICAPS		
Polygonum cuspidatum	Japanese knotweed	ICAPS		
Potamogeton crispus	Curly-leaf pondweed	ICAPS		
Pueraria montana	Kudzu	IDNR, ICAPS		
Rhamnus cathartica	Common buckthorn	ICAPS		
Rosa multiflora	Multiflora rose	SNW, ICAPS	NWR	
Sicyos angulatus	Burcucumber	SNW		
Sorghum almum	Columbus grass	SNW		
Sorghum bicolor	Shattercane	SNW		
Sorghum halepense	Johnson grass	SNW	NWR	
Torilis japonica	Japanese hedge parsley	ICAPS		
Ulmus pumila	Siberian elm	ICAPS		
Vinca minor	Periwinkle	ICAPS	NWR	

Table 4. Potential and Priority Invasive Plant and Animal Species at Jefferson Range

Scientific Name	Common Name	Invasive Status	Presence	Priority
Animals				
Tomicus piniperda	Common pine shoot beetle	ICAPS		
Aphis glycines	Soybean aphid	ICAPS		
Agrilus planipennis	Emerald ash borer			High

FNW = Federal Noxious Weed from APHIS (USDA 2011a) SNW = State Noxious Weed from APHIS (USDA 2011b) IDNR = indicates species on the IDNR list from website
ICAPS = non-native invasive species identified in Ripley County by the Indiana Cooperative Agricultural Pest Survey at Purdue University
* indicates species previously documented on NWR (ANG 2015).

Prescribed burning on and around the Range is implemented and managed by the USFWS and may be applied as an invasive plant management tool

Management Strategies

Invasive, non-native species and noxious weeds have the capability to significantly impact native vegetation and change fuel loads, flammability, and outcompete native species. A key element of INRMP implementation is to ensure no-net loss of military training capability. Management of undesirable species is necessary to maintain military training areas in usable condition. In addition, uncontrolled animal pests can become health hazards, which could threaten the military mission.

The task of controlling invasive and exotic species and noxious weeds is often expensive, lengthy, and risky because total eradication is required to prevent reestablishment. However, in accordance with laws and regulations pertaining to the management of these species, the INANG will work to prevent the introduction of these species and take measures to control them in an economically and environmentally sound manner. General management strategies are as follows:

- Implement BMPs to minimize land disturbances that favor invasion and re-vegetate disturbed areas with native species.
- Native rock material should be used instead of non-indigenous rock, when practical, for maintenance or construction projects.
- Utilize mulches from Jefferson Range or certified-weed free sources to facilitate the establishment of native ground cover on impoverished soils.
- Maintain biodiversity and undisturbed habitat to maximize resilience to and competition with invasive species.
- Control invasive and exotic species and noxious weeds through early detection, isolation of infested areas, and control of individual plants with physical, chemical or mechanical means, depending on the species.
- Favor basal application and spot treatment and avoid aerial or broadcast application of pesticides, to the extent possible, to prevent adverse impacts to native plants and wildlife.
- Avoid pesticides use in and around wetlands and other surface waters.
- Do not use invasive, non-native species in landscaping.

The use of chemicals to control invasive and exotic species can hinder an installation's efforts to reduce usage of pesticides. Therefore, it is important to prevent the initial spread of invasive and exotic species and address the spread of such species as early as possible. Jefferson Range's EM should evaluate the threat of invasive species, environmental impacts, and permitting

requirements of pesticide usage, if applicable, prior to implementing any eradication and/or control program.

One of the most effective ways of preventing new invasive species is to limit all landscaping plants to only native species. There is little landscaping on Jefferson Range, with the majority associated with Old Timbers Lodge. An IPM Plan template will be released to the installations including Jefferson Range in the July/August 2018 timeframe. At that time the IPM Plan will be updated to current information/needs. The update will be shared with the agencies at the annual meeting. It will be shared with installation personnel and it will be incorporated into the next 5-year INRMP update.

7.9.3 Stormwater Management

Stormwater BMPs for Indiana are discussed in the Indiana Storm Water Quality Manual (IDEM 2007). The city of Madison, Indiana has also published a regional manual, Best Management Practices Stormwater Management Manual for Southern Indiana (City of Madison 2008). Additionally, the US EPA published Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices, October 1992, EPA 833-R-92-001 can be used for construction activities. BMPs for water bar installation and maintenance, culvert installation and maintenance and other types of stream crossings and road maintenance are included which Jefferson Range follows through its coordination activities.

In Indiana, when construction or other land-disturbing activities result in 1 acre or more of soil disturbance, a Rule 5 Permit for Storm Water discharge Associated with Construction Activities must be obtained from IDEM per 327 Indiana Administrative Code 15-5 (NPDES Rule Program). When applying for a Rule 5 permit, an Erosion Sediment Control Plan (ESCP) and SWPPP must be submitted to the county and IDEM for approval; these plans should outline the proposed erosion prevention and sediment control BMPs to be implemented during and after land disturbing activities. The 181 IW/ Civil Engineer Office assist Jefferson Range on all of these types of actions, permitting and compliance.

7.9.4 Bird/Wildlife Aircraft Strike Hazard (BASH)

As part of BASH procedures, aircraft are provided with a report from the AHAS, conditions and recent bird observations when they check in with the tower. If risk is considered high, Jefferson Range will occasionally impose adjustments to training to reduce risk. Planes descend occasionally to 500 feet for some training and down to 75 feet for the strafing pit. Helicopters do occasionally land at Jefferson Range.

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 activities and projects to achieve those objectives. Management goals and objectives for the JR INRMP were developed through a thorough evaluation of the natural resources present on Jefferson Range in accordance with AFI 32-7064 and the principles of adaptive ecosystem

management by an interdisciplinary team of biologists, planners, and environmental scientists. Due to the nature and size of Jefferson Range, the INANG supports Big Oaks NWR in its efforts at landscape management. The projects undertaken at Jefferson Range are often at a much smaller scale. Goals, objectives should be revised over time to reflect evolving environmental conditions, adaptive management, and the completion of tasks as the INRMP is implemented.

GOAL – Programmatic 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: Initiate and/or continue programs and projects that enhance training land and opportunities and result in no net loss of training land availability.

OBJECTIVE PM2: Utilize adaptive, ecosystem management as the primary natural resources management paradigm.

OBJECTIVE PM3: Continue safety briefings to include relevant environmental awareness to minimize impacts to natural resources.

OBJECTIVE PM5: Continue to cooperate with Big Oaks NWR and other agencies on public outreach and regional land and natural resources management efforts.

OBJECTIVE PM6: Provide mapping details to the ANG GeoBase office for inclusion into the GIS layer for Jefferson Range.

GOAL – Fish and Wildlife Monitoring (FW): Maintain fish and wildlife populations while minimizing potential impacts to the military mission.

OBJECTIVE FW1: Follow AHAS findings to minimize impact to birds and wildlife.

OBJECTIVE FW2: Maintain populations of wildlife by minimizing impacts and by providing healthy, diverse habitat types and corridors for movement between those habitats.

GOAL – Soil Conservation & Sediment Management (SO): Manage soils to minimize sediment loss and erosion, while protecting water quality.

OBJECTIVE SO1: Manage the maintenance of roads and firebreaks to minimize the potential for erosion and sedimentation and the establishment of invasive species.

OBJECTIVE SO2: Minimize nonpoint source pollution by implementing BMPs and following existing spill prevention and hazardous materials management protocols.

OBJECTIVE SO3: Minimize nutrient and sediment inputs in surface waters to protect water quality.

OBJECTIVE SO4: Maintain vegetation buffers around water resources.

GOAL – Water Resources Management (WA): Maintain water resources so they remain resilient and with no net loss of acreage or functions and values.

OBJECTIVE WA1: Minimize impacts to water resources and comply with all laws and regulations pertaining to wetlands, streams, floodplains, and regulated water bodies.

OBJECTIVE WA2: Maintain or enhance riparian corridors.

OBJECTIVE WA3: Maintain or enhance crawfish frog ponds.

GOAL – Threatened and Endangered Species Management (TE): Manage rare species using an ecosystem approach, while maintaining the military mission at Jefferson Range.

OBJECTIVE TE1: Support populations of Indiana bat, cerulean warbler, and other forest dependent rare species by maintaining existing tracts of forest where feasible.

OBJECTIVE TE2: Maintain populations of dickcissel, grasshopper sparrow, Henslow's sparrow, crawfish frog, and other grassland dependent species by maintaining existing tracts of grassland where feasible.

OBJECTIVE TE3: Maintain diversity of vegetation communities to provide a variety of disturbance regimes and habitat types to support a variety of rare species, in conjunction with Big Oaks NWR.

GOAL – Vegetative Monitoring (VE): Manage vegetation to maintain grasslands, forests and other habitats using cost effective and sustainable methods.

OBJECTIVE VE1: Maintain intact, healthy habitat (e.g. forests and riparian corridors) and enhance or restore degraded habitat, without increasing BASH risk.

OBJECTIVE VE2: Manage for open grasslands by continuing to implement the wildland fire program and minimize woody encroachment, in conjunction with Big Oaks NWR.

OBJECTIVE VE3: Maximize native plants and avoid invasive non-native plants in landscaping around Old Timbers Lodge.

OBJECTIVE VE4: Coordinate with Big Oaks NWR to maintain existing large contiguous blocks of habitat between the two facilities and increase connectivity among the smaller blocks of habitat.

GOAL–Wildland Fire Management (FI): Minimize risk and maximize ecological benefits by continuing the wildland fire program.

OBJECTIVE FI1: Support the USFWS WFMP.

GOAL – Invasive Species & Integrated Pest Management (IN): Minimize impacts of invasive and pest species, while minimizing use of chemicals to manage those species, utilizing an integrated pest management approach.

OBJECTIVE IN1: Control and minimize the impact of invasive plant and animal species.

OBJECTIVE IN2: Protect infrastructure from pest species.

OBJECTIVE IN3: Control potential disease vectors.

OBJECTIVE IN4: Limit connectivity between disturbed sites to minimize spread of invasive species and pests.

9.0 ANNUAL WORK PLANS

The INRMP Annual Work Plans contain projects listed by fiscal year (FY). For each project, a specific timeframe for implementation is provided (as applicable), as well as the office of primary responsibility (OPR), funding source, and priority for implementation (Tables 7-10). 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 Air Force 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 would not contend that the INRMP is not be implemented if not accomplished within 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 5. Work Plan FY 2019			
Projects	**OPR**	**Funding Source**	**Priority Level**
Prepare budget to implement the natural resources management program collaboratively with Big Oaks NWR and modify the existing JPR/JR MOA to include needed technical support for implement.			High
Complete annual review of INRMP.			High
Continue to coordinate with Big Oaks in making Jefferson natural resource management consistent with the Big Oaks ICCP.			High
Provide environmental and natural resources training to Jefferson Range personnel as needed.			High
Continue conducting safety briefings for Jefferson Range users as needed.			High
Continue to implement road and fenceline maintenance activities outlined in the JPR/JR MOA.			High
Evaluate potential roosting habitat findings from Indiana bat surveys.			
Continue efforts to manage for crawfish frogs and implement trends from USFWS surveys.			
Support Big Oaks NWR in supporting management of lands and implementing the WFMP on Jefferson Range through annual funding.			High
Monitor priority invasive and pest species and implement control projects as needed.			High
Contract aerial spray of target areas as needed.			High
Relocate 1.1 miles of HV lines underground.			High
Install emergency backup generator for flank tower.			High
Replace west barricade controls.			High
Construct range residue storage facility.			High
Improve and reestablish infrastructure of Center Recovery Road connecting both targets, including storm water management, erosion, etc.			High

Table 6 Work Plan FY 2020			
Projects	**OPR**	**Funding Source**	**Priority Level**
Prepare budget to implement the natural resources management program collaboratively with Big Oaks NWR and modify the existing JPR/JR MOA to include needed technical support for implementation as needed.			High
Complete annual review of INRMP.			High
Continue to coordinate with Big Oaks in making Jefferson natural resource management consistent with the Big Oaks ICCP.			High
Provide environmental and natural resources training to Jefferson Range personnel as needed.			High
Continue conducting safety briefings for Jefferson Range users as needed.			High
Continue to implement road and fenceline maintenance activities outlined in the JPR/JR MOA.			High
Evaluate potential roosting habitat findings from Indiana bat surveys			
Continue efforts to manage for crawfish frogs and implement trends from USFWS surveys.			
Support Big Oaks NWR in supporting management of lands and implementing the WFMP on Jefferson Range through annual funding.			High
Monitor priority invasive and pest species and implement control projects as needed.			High
Contract aerial spray of target areas as needed.			High
Relocate 1.1 miles of HV lines underground.			High
Install emergency backup generator for flank tower.			High
Replace west barricade controls.			High
Construct range residue storage facility.			High
Improve and reestablish infrastructure of Center Recovery Road connecting both targets, including storm water management, erosion, etc.			High

Table 7 Work Plan FY 2021			
Projects	**OPR**	**Funding Source**	**Priority Level**
Prepare budget to implement the natural resources management program collaboratively with Big Oaks NWR and modify the existing JPR/JR MOA to include needed technical support for implementation as needed.			High
Complete annual review of INRMP.			High
Continue to coordinate with Big Oaks in making Jefferson natural resource management consistent with the Big Oaks ICCP.			High
Provide environmental and natural resources training to Jefferson Range personnel as needed.			High
Continue conducting safety briefings for Jefferson Range users as needed.			High
Continue to implement road and fenceline maintenance activities outlined in the JPR/JR MOA.			High
Evaluate potential roosting habitat findings from Indiana bat surveys.			
Continue efforts to manage for crawfish frogs and implement trends from USFWS surveys.			
Support Big Oaks NWR in supporting management of lands and implementing the WFMP on Jefferson Range through annual funding.			High
Monitor priority invasive and pest species and implement control projects as needed.			High
Contract aerial spray of target areas as needed.			High
Relocate 1.1 miles of HV lines underground.			High
Install emergency backup generator for flank tower.			High
Replace west barricade controls.			High
Construct range residue storage facility.			High
Improve and reestablish infrastructure of Center Recovery Road connecting both targets, including storm water management, erosion, etc.			High

Table 8 Work Plan FY 2022			
Projects	**OPR**	**Funding Source**	**Priority Level**
Prepare budget to implement the natural resources management program collaboratively with Big Oaks NWR and modify the existing JPR/JR MOA to include needed technical support for implementation as needed.			High
Complete annual review of INRMP.			High
Continue to coordinate with Big Oaks in making Jefferson natural resource management consistent with the Big Oaks ICCP.			High
Provide environmental and natural resources training to Jefferson Range personnel as needed.			High
Continue conducting safety briefings for Jefferson Range users as needed.			High
Continue to implement road and fenceline maintenance activities outlined in the JPR/JR MOA.			High
Evaluate potential roosting habitat findings from Indiana bat surveys.			
Continue efforts to manage for crawfish frogs and implement trends from USFWS surveys.			
Support Big Oaks NWR in supporting management of lands and implementing the WFMP on Jefferson Range through annual funding.			High
Monitor priority invasive and pest species and implement control projects as needed.			High
Contract aerial spray of target areas as needed.			High
Relocate 1.1 miles of HV lines underground.			High
Install emergency backup generator for flank tower.			High
Replace west barricade controls.			High
Construct range residue storage facility.			High
Improve and reestablish infrastructure of Center Recovery Road connecting both targets, including storm water management, erosion, etc.			High

10.0 INRMP IMPLEMENTATION, UPDATE, AND REVISION PROCESS

10.1 INRMP Project 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 and activities as defined by Chapter 4 of AFI 32-7001 (Environmental Quality Programming and Budgeting).
- Executes all "must fund" projects and activities 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 five 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, IDNR, and National Oceanic and Atmospheric Administration (NOAA), where applicable
- Ensures the INRMP implements ecosystem management on Air Force installations by setting goals for attaining a desired land condition

Natural resources and land use management issues are not the only factors contributing to the development and implementation of the INRMP. Range management and other seemingly unrelated issues affect implementation. It is important to the implementation of this INRMP that Jefferson Range personnel take ownership of the INRMP by providing the necessary resources (i.e., personnel and equipment) and utilizing the appropriate funding allocated by the ANG NR Program Manager to enact the plan. Continued participation of the INRMP Working Group is also extremely important in the implementation of this INRMP. The INRMP Working Group is made up of Jefferson Range Command personnel and Big Oaks NWR Refuge 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 JR INRMP Implementation Analysis

The JR 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 Jefferson 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; and,
- Feedback from military trainers, the USFWS, the IDNR, and others.

Some of these areas may not be looked at every year due to lack of data or pertinent information. The effectiveness of the INRMP as a mission enabling conservation tool will be decided by mutual agreement of the USFWS, the IDNR, and the INANG 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 implementation of the INRMP.

Current compliance includes projects and activities needed because an installation is currently or will be out of compliance if projects or activities are not implemented in the current program year. Examples 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; and,
- Initial documenting and cataloging of archaeological materials.

Maintenance requirements include those projects and activities needed that are not currently out of compliance but shall be out of compliance if projects or activities are not implemented in time to meet an established deadline beyond the current program year. Examples 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 executive order for no net loss or to achieve enhancement of existing degraded wetlands; and,
- Public education programs that educate the public on the importance of protecting natural resources.

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 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; and
- 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 three main categories by source: federal ANG 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 Jefferson 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).
- Jefferson Range may 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 MOU, 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 Jefferson Range include:

- 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 DoD and USFWS/International Fund for Animal Welfare (IFAW) to promote the conservation of migratory birds (2011).
- MOU between the DoD and USEPA to form a working partnership to promote environmental stewardship by adopting integrated pest management 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).
- Cooperative Agreement between DoD and The Nature Conservancy to work cooperatively in areas of mutual interest (2010).
- 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.

- MOA (2003) between FAA, USAF, US Army, US EPA, USFWS, and USDA to address aircraft-wildlife strikes, available at https://www.faa.gov/airports/environmental/media/wildlife-hazard-mou-2003.pdf.
- JPR/JR MOA (2000) between US Army, USAF, and USFWS that identifies the management responsibilities of each party on the former JPR.

Jefferson Range is contained entirely within the Big Oaks NWR, both of which are on a portion of the former JPG. The land is still owned by the US Army and per the JPR/JR MOA, a portion of the natural resources management on Jefferson Range is conducted by USFWS personnel from Big Oaks NWR, while the INANG is responsible for the management of the refuge fence, some roads, and a few bridges. Both USFWS and USAF use is governed by permits issued under the JPR/JR MOA. INANG also has an agreement with Big Oaks Conservation Society for maintenance and use of Old Timbers Lodge and its grounds. Big Oaks NWR also maintains agreements in support of wildfire responses and Jefferson Range benefits from those agreements.

10.1.5 Consultations Requirements

The Jefferson 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 IDNR, Division of Fish and Wildlife. Actions that fall under the jurisdiction of Section 404 or 401 of the CWA necessitate permitting from IDNR, while Section 404 actions necessitate permitting from the USACE, Louisville District.

10.2 Annual INRMP Review and Coordination Requirements

Per DoD policy, the Jefferson Range will review the INRMP annually in cooperation with the USFWS and INANG. On an annual basis, the Jefferson Range will invite the USFWS Regional Office, the USFWS local field office, the Jefferson Range, 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 local field office and one representative of IDNR are expected to attend. 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, the Jefferson Range will initiate the updates and after agreement of all three parties they will be added to the INRMP. If it is determined that major changes are needed, all three parties will provide input and an INRMP revision will be initiated with Jefferson 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, the Jefferson Range will specifically:

- Invite feedback from USFWS and IDNR on the effectiveness of the INRMP;
- Inform USFWS and IDNR which INRMP projects and activities are required to meet current natural resources compliance needs; and,
- 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 five 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 Jefferson Range. The review will be conducted by the three cooperating parties to include the Commander responsible for the INRMP, the Supervisor of the USFWS Indiana Field Office, and Secretary of the IDNR. 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 field office in Indiana and IDNR Secretary. Once concurrence letters or signatures are received from the Supervisor of the USFWS Indiana Field Office and the IDNR Commissioner, 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 IDNR concurrence on the revised INRMP is received. Jefferson 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 Jefferson Range military mission, USFWS, and IDNR 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 USEPA 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 integrated natural resources management plan through cooperation with the Department of the Interior (through the USFWS), Department of Defense, 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 – Council on Environmental Quality (CEQ) Regulations on Implementing NEPA Procedures

40 CFR 6 – USEPA Regulations on Implementation of NEPA Procedures

40 CFR 162 – USEPA 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

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.

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 Memorandum of Understanding 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 32-7061 – Environmental Impact Analysis Process
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 Deputy Under Secretary of Defense (Environment, Safety and Occupational Health), 20 Sept 11, Subject: Interim Policy on Management of White Nose Syndrome in Bats.

Memorandum, Assistant Deputy Under Secretary of Defense (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 Deputy Under Secretary of Defense (Environment, Safety and Occupational Health), 14 Aug 06, Subject: Integrated Natural Resource Management Plan (INRMP) Template

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

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

Memorandum, Deputy Under Secretary of Defense (Installations and Environment), 10 Oct 02, Subject: Implementation of Sikes Act Improvement Act: Updated Guidance

Memorandum, Assistant Deputy Under Secretary of Defense (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.

State

Title 13 generally is administered by and applies to Indiana Department of Environmental Management. Title 14 generally is administered and applies to Indiana Department of Natural Resources.

Air Pollution Control (Indiana Code 13-17) - maintain the purity of the air resource of Indiana, which shall be consistent with protection of the public health and welfare and the public enjoyment of the air resource, physical property and other resources, flora and fauna, maximum employment, and full industrial development of Indiana. The air pollution control board and IDEM shall safeguard the air resource through the prevention, abatement, and control of air pollution by all practical and economically feasible methods.

Water Pollution Control (Indiana Code 13-18) – provides for the control and prevention of pollution in waters of Indiana with any substance that is deleterious to the public health or the prosecution of any industry or lawful occupation; or by which (A) any fish life or any beneficial animal or vegetable life may be destroyed; or (B) the growth or propagation of fish life or beneficial animal or vegetable life is prevented or injuriously affected. The water pollution control board and IDEM shall safeguard the water resources through the prevention, abatement, and control of water pollution by all practical and economically feasible methods.

State Regulated Wetlands (Indiana Code 13-18-22) – establishes a permitting program for wetland activities in state regulated wetlands is to (1) promote a net gain in high quality isolated wetlands

and (2) assure that compensatory mitigation will offset the loss of isolated wetlands allowed by the permitting program.

Wildlife Regulation (Indiana Code 14-22-10) - set out the definitions related to wildlife and establishes rules and liabilities associated with recreation use of land and wildlife.

Nongame and Endangered Species Conservation (Indiana Code 14-22-34) - set out the definitions related to endangered species and prohibit any form of possession of listed species, including taking, transporting, purchasing or selling except by permit. Listed species may be removed, captured, or destroyed if it is shown by good cause that the species are causing property damage or are a danger to human health.

Forest Firefighting (Indiana Code 14-23-5) – establishes a firefighting organization within the Division of Forestry for the purpose of detecting, preventing, fighting and controlling fires on state forest lands. The code also provides for extending the same fire detection, prevention, fighting and control services thus established to other state lands under its supervision and control, as well as for lands not owned by the state and not lying within the corporate limits of any city or town for the purposes of protecting the forests, fields and grasslands of the state.

Water Rights and Resources (Indiana Code 14-25) – provides for the management of water rights and availability of water (surface and ground water) for multiple uses, including establishing minimum flows. The code also establishes that there will be continuing assessment of the availability of the water resources, an inventory of significant uses of water withdrawn from the surface or ground will be maintained and a plan will be implemented for the development, conservation, and use of the water resource for beneficial uses.

Lakes and Reservoirs (Indiana Code 14-26) – establishes the need to determine suitable locations for water supply reservoirs, regulating flow via reservoirs and includes the Lake Preservation Act (14-26-2) which protects natural lakes and their recreational use.

Levees, Dams, and Drainage (Indiana Code 14-27) – establishes state responsibilities relating to identifying need for, design and maintenance and effect of levees, dams and drainage projects.

Flood Control (Indiana Code 14-28) – establishes state responsibilities relating to managing floodwaters, flood risk and floodplains. The code includes the Flood Control Act (14-28-1) and Flood Plain Management Act (14-28-3).

Rivers, Streams and Waterways (Indiana Code 14-29) – establishes state responsibilities relating to navigable waterways, sand and gravel