Draft-Final

ENVIRONMENTAL ASSESSMENT TO IMPLEMENT THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN WRIGHT-PATTERSON AIR FORCE BASE, OHIO

88th CIVIL ENGINEER GROUP

September 2016

Draft Final
Environmental Assessment to Implement the Integrated Natural Resources Management Plan Wright-Patterson Air Force Base, Ohio

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Submitted to:

Wright-Patterson Air Force Base
88th Civil Engineer Group
Installation Management Division

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FINDING OF NO SIGNIFICANT IMPACT / FINDING OF NO PRACTICABLE ALTERNATIVE TO IMPLEMENT THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN WRIGHT-PATTERSON AIR FORCE BASE, OHIO

September 2016

Pursuant to the Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act (NEPA), 40 Code of Federal Regulations (CFR) 1500 - 1508, Department of Defense Directive (DoDD) 6050.1 and Air Force regulation 32 CFR Part 989, the 88th Civil Engineer Group (CEG), Installation Management Division prepared an Environmental Assessment (EA) to Implement the Integrated Natural Resources Management Plan (INRMP) at Wright-Patterson Air Force Base (WPAFB, the Base), Ohio. This EA is incorporated by reference into this finding per 40 CFR 1508.13.

Purpose and Need

Implementation of the INRMP is needed to comply with the Sikes Act Improvement Act (SAIA) of 1997, as amended (16 United States Code [USC] §§670a-670f), which requires the preparation, implementation, update, and review of an INRMP for military installations in the United States and its territories that contain significant natural resources. The SAIA governs the planning and implementation of conservation programs on military installations. According to the SAIA, the purpose of a military conservation program is conservation and rehabilitation of natural resources; sustainable multipurpose use of those resources; and public access to military lands, subject to safety requirements and military security. The INRMP is a programmatic ("planning-level") document. A programmatic document evaluates effects of broad proposals or planning-level decisions that may include any of or all of the following: a wide range of individual projects; implementation over a long period; and/or implementation across a large geographic area (40 CFR §1502.4). Implementation of the INRMP would allow WPAFB to continue to provide for the management of natural resources (including fish, wildlife, and plants), allow multipurpose use of resources, and to provide public access necessary and appropriate for those uses, without any net loss in the capability of an installation to support its military mission.

The level of detail provided in this INRMP EA is intended to allow informed decision-making among planning-level alternatives. Therefore, this INRMP EA does not evaluate project-level issues such as precise projects or specific design details that are not yet ready for decision at the planning level. Instead, the INRMP EA is a means for examining the interaction among proposed projects or plan elements, and for assessing cumulative effects. A programmatic EA is typically followed by subsequent project-level review for specific components of a proposal. When a project-level environmental review is undertaken for a specific component, the stepwise approach to analyses and decision-making is referred to as "tiering". Tiering encourages elimination of repetitive discussions and a focus on actual issues ready for decisions at each level of environmental review (40 CFR 1502.20). The issues and analyses can simply be referenced from the programmatic document. Tiering also allows environmental analyses for each project to be conducted closer in time to the actual construction phase, or as funds become available for construction.

In addition to implementing the INRMP, the Air Force (AF) proposes to plant native tree species suitable for the Indiana bat, a federal- and state-listed endangered species. The tree planting project is needed to mitigate impacts that resulted from inadvertently clearing trees on Base that were determined to be suitable Indiana bat roosting and foraging habitat. The purpose of the project will be to replace and restore this habitat.

Description of Proposed Action, Alternative A

The Proposed Action involves implementation of the 2016-2020 INRMP (2015 INRMP), which is consistent with the SAIA, as amended. The 2015 INRMP would be revised annually to maximize its usefulness to installation natural resources personnel. The Proposed Action includes continuing WPAFB's existing natural resource management practices along with several new practices and objectives provided in the 2015 INRMP.

All management practices would be integrated and implemented in the context of the installation's mission support needs and regional setting, including integration of INRMP component plans as outlined in Table 1.

Table 1. Description of INRMP Component Plans

Plan	Date	Objectives
Bird/Wildlife Aircraft Strike Hazard (BASH)	July 2013	Provide information on specific bird and other wildlife strike hazards and recommendations for controlling each hazard.
Emerald Ash Borer (EAB) Management	December 2010	Prevent, eliminate, and/or reduce the spread of the EAB by implementing recommended management measures.
Huffman Prairie Management	Addendum February 2011	Provide a schedule of management activities and measurable success criteria with assessment methods and document the effectiveness of seeding, nuisance species control, and controlled burn management practices at Huffman Prairie.
Integrated Pest Management (IPMP)	July 2010	Control pests (may include flora and fauna), prevent disease vectors, and maintain grounds that are appealing to residents/visitors. The Integrated Pest Management Plan (IPMP) presents roles and responsibilities of pest management personnel, IPM program requirements and strategies, environmental and safety concerns, and pesticide acquisition requirements, sale, and distribution.
Invasive Species Management (ISMP)	Areas A & B (July 2010); Area B (March 2010)	Guide the management of invasive, exotic plant species found on portions of WPAFB.
Wetland and Stream Management (WSMP)	July 2010	Protect and enhance wetland and stream resources, and ensure that base activities comply with federal, state, and local wetland and stream regulations and policies.
Wildland Fire Management (WFMP)	October 2014	Ensure the restoration of ecosystems to conserve biological diversity and sustain ecological processes through fire management.

The Proposed Action also includes planting 1,500 native tree species suitable for the Indiana bat. The Indiana bat is a federal and state-listed endangered species. The tree planting provides mitigation and compensates for a tree clearing event that occurred during a fence replacement project in Area A on the Base. This event cleared approximately 188 trees that provided suitable Indiana bat habitat on 2.05 acres in the Mad River floodplain on Base. The Proposed Action involves tree planting on five acres of Base property located in the vicinity of the south end of the primary runway in Area A at WPAFB. The tree planting has been coordinated with and agreed upon by the U.S. Fish and Wildlife Service (USFWS) as an appropriate mitigation for clearing Indiana bat habitat.

No-Action Alternative

Under the No Action Alternative, the management of natural resources would continue as provided in the previous five-year version of the INRMP (2012-2016). The No Action Alternative represents the status quo. All INRMP component plans and activities would maintain baseline activities as described for each program except where mission activity or policy changes have resulted in changes to the baseline, independent of natural resources management. Additionally, under the No Action Alternative, tree planting would not occur on Base and the loss of 2.05 acres of Indiana bat roosting and foraging habitat would not be replaced. By not restoring Indiana bat habitat, the No Action Alternative does not meet a chief goal of the 2015 INRMP, which is to protect federal- and state-listed and candidate species and their habitat on WPAFB.

Alternatives Considered but Eliminated from Further Study

As part of the NEPA process, potential alternatives to the Proposed Action must be evaluated. To be considered reasonable and warrant further detailed analysis, alternatives must be affordable, implementable, and meet the purpose and need for the Proposed Action. One alternative considered involved a compliance-driven approach to natural resources management where only those natural resource components that are required by law would be managed. This alternative would not involve an ecosystem-based approach to natural resources management,

but would manage natural resources only required by a statutory or regulatory rule. While this alternative would likely avoid any notice of violation(s) for noncompliance, this alternative would not comply with the spirit of the SAIA, as amended, for natural resources management, nor would it be consistent with AFI 32-7064. Therefore, this alternative was eliminated from further analysis.

The SAIA requires INRMPs be ecosystem-based and, therefore, often require more than just compliance. According to the SAIA, an installation's INRMP should ensure the sustainability of all ecosystems within and near the installation, and would result in no net loss of installation military mission capabilities. To meet the intent of the SAIA, as amended, the DoD adopted an ecosystem-based management process for managing DoD lands and waters, which applies adaptive management and internal and external party collaboration. Therefore, the compliance-driven management alternative would not meet the purpose and need and was, therefore, eliminated from further analysis.

Identification of Preferred Alternative

The AF has identified the Proposed Action as the preferred alternative. The Proposed Action would implement the 2015 INRMP, which is consistent with the SAIA, as amended. The Proposed Action also includes planting 1,500 native trees suitable for Indiana bat habitat in Area A at WPAFB.

Environmental Consequences

Land Use (EA Section 4.1): No short- or long-term impacts to land use would be expected from the Proposed Action because no changes to land use would occur at or surrounding WPAFB as a result of implementing the INRMP or from planting 1,500 native trees on Base suitable to the endangered Indiana bat. The No Action Alternative would also have no impact over current conditions. Therefore, there would be no significant impacts to land use resources as a result of the Proposed Action or No Action.

Air Quality (EA Section 4.2): Implementation of the 2015 INRMP would result in minor short-term adverse impact from prescribed burns. Prescribed burns would generate emissions of criteria pollutants from the combustion of vegetation. However, the estimated annual air emissions would be below all applicable significance criteria and would be conducted in accordance with the Wildland Fire Management Plan (WFMP); the WFMP would meet the requirements of the U.S. Environmental Protection Agency's (USEPA) Interim Air Quality Policy on Wildland Fire and Prescribed Fires. Impacts would be minor because emissions would be short in duration and are negligible with respect to overall emissions expected for the region. The tree planting project would add an insignificant amount of emissions only during the year that tree planting occurs. The No Action Alternative would result in short-term minor adverse impacts and would be expected as WPAFB would continue to conduct prescribed burns; however, there would be no increase in the emissions over the current conditions. Therefore, there would be no significant impacts to air quality as a result of the Proposed Action or No Action.

Noise (EA Section 4.3): The Proposed Action would have negligible short-term impacts on ambient noise generated from use of hand tools (i.e., chain saws) during clearing and cutting activities as part of the Invasive Species Management Plan (ISMP), Wetland and Stream Management Plan (WSMP), Emerald Ash Borer (EAB) plan, and the WFMP. In addition, short-term negligible impacts on ambient noise generated from use of delivery trucks, backhoes, and drilling equipment would also be expected from planting 1,500 trees in the vicinity of the south end of the primary runway in Area A. Impacts would be temporary in nature and would cease upon completion of planting. Noise generated from dispersal/depredation techniques (firearms, vehicle harassment, pyrotechnics) as part of the BASH plan would be expected. Impacts would be minimized by limiting forestry, firefighting, and dispersal/depredation activities to normal working hours, would be short in duration, and would be performed in remote areas of the Base unlikely to disturb sensitive receptors. The No Action Alternative would have no short-term impacts over current conditions. No adverse long-term impacts are expected from the Proposed Action or No Action Alternative. Therefore, there would be no significant impacts to noise as a result of the Proposed Action or No Action.

Geology and Soils (EA Section 4.4): The Proposed Action would have short-term temporary but minor adverse impacts resulting in soil disturbance by implementing certain projects described in the 2015 INRMP and component plans. Minor adverse effects to soil may be expected due to prescribed burns and to pesticide and herbicide use; however, the impacts would be minimized by implementing Best Management Practices (BMPs) for erosion and sedimentation controls (e.g., hay bales, drainage swales, rock berms). In addition, short-term temporary but minor adverse impacts would also be expected from planting 1,500 trees in the vicinity of the south end of the primary runway. Impacts would be minimized by implementing BMPs for erosion and sedimentation controls. Long-term positive and beneficial impacts to existing soils are expected from implementation of the 2015 INRMP and component plans as soil stabilization would increase. Similar to the Proposed Action, the No Action Alternative would have short-term temporary but minor adverse impacts because similar activities would continue under the previous 2012-2016 INRMP. Impacts would be minimized by BMPs. No long-term impacts are expected from the No Action Alternative. Therefore, there would be no significant impacts to geology and soil resources as a result of the Proposed Action or No Action.

Water Resources (EA Section 4.5): Short-term minor adverse effects to surface waters would be expected as a result of the Proposed Action (implementing the 2015 INRMP) resulting from pesticides/herbicides used for pest management control as indicated in the Integrated Pest Management Plan (IPMP) and minimal increased runoff from the controlled burns at Huffman Prairie as indicated in the WFMP. The BMPs (silt fencing, hay bales, rock berms, seeding, re-vegetation) would be implemented to minimize runoff into surface waters. In addition, short-term temporary minor adverse impacts would also be expected from planting 1,500 trees in the vicinity of the south end of the primary runway. The BMPs would be implemented to minimize runoff into surface waters. The Miami Conservancy District (MCD) was consulted regarding the Proposed Action. The MCD responded indicating the proposed project would not adversely affect the retarding basin. Similar to the Proposed Action, pesticide/herbicide use and prescribed burns at Huffman Prairie would continue under the No Action Alternative as implemented in the previous IPMP and 2012-2016 INRMP; however, impacts would be minimized by implementing BMPs.

There would be no adverse short- or long-term impacts to groundwater as a result of the Proposed Action or the No Action Alternative.

As the INRMP is a programmatic document, the Base Natural Resources Manager is not aware of upcoming new construction activities that would impact floodplains (i.e., draining, dredging, channelizing, filling, diking, impounding, or related activities and any structures or facilities). However, should any INRMP management activities be scheduled in the floodplains in the future, WPAFB would comply with Section 2(b) of Executive Order (EO) 11514, *Floodplain Management* and EO11988 (amended by EO 13690). In addition, the specific project would be reviewed to determine whether additional NEPA analysis or consultation with MCD would be required. Therefore, no short- or long-term impacts to floodplains or wetlands would be expected as a result of implementation of the Proposed Action. Therefore, there would be no significant impacts to water resources as a result of the Proposed Action or No Action.

Biological Resources (EA Section 4.6): Short-term adverse impacts to native vegetation, wildlife, and threatened and endangered species would be expected from the Proposed Action as a result of pest control management practices and prescribed burning at Huffman Prairie as indicated in the WFMP. Long-term positive and beneficial impacts to vegetation and threatened and endangered species would be expected from the Proposed Action due to control of invasive vegetation, native habitat preservation, and restoration practices, which would result in the preservation and stabilization of native habitat and wildlife species. No short-term adverse impact to wetlands would occur as a result of the Proposed Action (implementation of the 2015 INRMP) because any identified sensitive habitat(s) near known wetlands would not involve pesticide/herbicide application. In addition, no long-term adverse impacts to wildlife or wetlands would be expected from the Proposed Action (implementation of the 2015 INRMP). As the INRMP is a programmatic document, the Base Natural Resources Manager is not aware of upcoming new construction activities that would impact wetlands (i.e., draining, dredging, channelizing, filling, diking, impounding, or related activities and any structures or facilities). However, should any wetland management activities be scheduled in the future (i.e., airfield-related

tree pruning), WPAFB would comply with Section 2(b) of EO 11990, AFPD 32-70, Sections 404 and 401 of the Clean Water Act, and applicable sections of the Ohio Administrative Code. Therefore, no short- or long-term impacts to wetlands would be expected as a result of implementation of the Proposed Action or the No Action Alternative.

Correspondence between WPAFB and USFWS resulted in a proposal to plant 1,500 trees as mitigation for the loss of Indiana bat habitat during a fence replacement project. No adverse short-term impacts to vegetation would be expected from planting 1,500 native trees on Base suitable to the Indiana bat. However, positive and beneficial impact to vegetation and threatened and endangered species would result because the trees would provide and encourage roosting and foraging habitat for the endangered Indiana bat. Under the No Action Alternative, 1,500 native trees would not be planted and the loss of 2.05 acres of roosting and foraging Indiana bat habitat would not be replaced, resulting in potential adverse impact to the endangered Indiana bat.

Short-term positive effects to ash trees would be expected as a result of implementing the EAB under the Proposed Action, which would aid in lessening the environmental, safety, and economic impacts that the eventual loss of all ash trees would have on the WPAFB community.

The No Action Alternative would result in short-term impacts similar to the Proposed Action, however no additional areas over the current conditions would be considered for prescribed burns resulting in potentially less vegetation impact. Over the long-term, not implementing the EAB plan would accelerate the loss of all ash trees within the WPAFB community.

The Ohio Department of Natural Resources (ODNR) and the U.S. Fish and Wildlife Service (USFWS) were consulted regarding the Proposed Action. The USFWS indicated that determinations of effect under the Endangered Species Act be made on a project-specific basis and that these determinations include supporting details, such as avoidance and minimization measures to be implemented. Thus, the USFWS did not consult on the INRMP as a whole but will consult for future projects that impact forest habitat suitable for the Indiana bat or wetland habitat suitable for the eastern massasauga rattlesnake. The WPAFB Natural Resources Manager will coordinate with the USFWS on effect determinations at such time proposed actions within and/or adjacent to Indiana bat or eastern massausauga rattlesnake habitat are identified.

The ODNR, Division of Wildlife (DOW), responded with the following wildlife species comments and recommendations:

- Wetlands – avoid impacts and utilize BMPs to minimize erosion and sedimentation.
- Indiana bat – suitable tree habitat should be conserved and/or cutting should occur between October 1 and March 31; conduct net surveys between June 1 and August 15 prior to any suitable habitat tree cutting that must occur in summer months.
- Tongue-tied minnow and Channel darter – no in-water work should occur in perennial stream from April 15 through June 30 to reduce impacts to indigenous aquatic species and their habitat.
- Smooth greensnake, Kirtland's snake, Eastern massasauga rattlesnake – prescribed burning should not conducted when ground/soil surface temperatures have reached 60 degrees Fahrenheit or greater for 4 consecutive days. Burring after April 15 and before October 30 is discouraged in areas where state-listed reptiles are known to occur, or have potential to occur. Burns should not be conducted within 160 ft of known state-listed snake hibernacula.
- Spotted turtle – this species would not likely be impacted if fens, bogs, marshes, wet prairies, meadows, pond edges, wet woods, or shallow sluggish waters of small streams and ditches are not impacted.
- Sandpiper – construction and/or burning should be avoided in dry grassland habitat during the species nesting period of April 15 to July 31. If this type of habitat will not be impacted, this bird species is not likely to be impacted.

- Northern Harrier – construction/burning should be avoided in this habitat (marshes, grasslands) during this bird species' nesting period of May 15 to August 1. This species is not likely to be impacted if this habitat will not be impacted.

Cultural Resources (EA Section 4.7): Implementation of the Proposed Action would have no short- or long-term impacts to the cultural resources at WPAFB. Individual actions would be reviewed through the standard Work Order review process. The view of the State Historic Preservation Office (SHPO) regarding management plans such as the INRMP is that this is an internal management tool for WPAFB; the Advisory Council on Historic Preservation (ACHP) holds the same opinion. This means that the SHPO/ACHP does not recognize the need for Section 106 consultation on these plans. Until an actual project representing an "undertaking" in accordance with the National Historic Preservation Act (NHPA) is proposed, there is no potential to affect historic properties.

Any proposed construction plans or other INRMP project activities will take into account cultural resources, archaeological sites, and historic structures. The proponent will coordinate with the WPAFB Cultural Resources Manager and follow the applicable policies and procedures in the WPAFB Integrated Cultural Resources Management Plan (ICRMP), including subsequent planning and implementation of mitigations if required. Any activities planned in the future should not rely on ICRMP maps for detailed planning activities; ICRMP maps by nature constantly change as new information becomes available. Any future activities within the restricted areas or near the boundaries of these areas will be coordinated with the WPAFB Cultural Resources Manager in the early planning stages of any activity and additional NEPA analysis will be completed as required. For example, as a National Historic Landmark, the Huffman Prairie Flying Field is afforded the greatest level of protection possible. As such, it is critical the Natural Resources Program Manager coordinate with the WPAFB Cultural Resources Manager in the event of activities that may affect the Huffman Prairie Flying Field, including prescribed burns at Huffman Prairie.

The INRMP does have the potential to produce actions on the part of the Base which could have effects on historic properties. However, once activities or projects are proposed due to adherence to the INRMP, those individual actions are reviewed through the standard Work Order review process. At the time a specific INRMP-associated action is proposed, it is assessed for its applicability to NHPA Section 106 review and treated accordingly. The No Action Alternative would have no short- or long-term impacts over current conditions. Therefore, there would be no significant impacts to cultural resources as a result of the Proposed Action or No Action.

Socioeconomics (EA Section 4.8): Implementation of the Proposed Action would have short- and long-term beneficial impacts on the local workforce, as revenue would be generated from improvements and enhancements to the outdoor recreation program. The No Action Alternative would have no short- or long-term impacts over current conditions. Therefore, there would be no significant impacts to socioeconomics as a result of the Proposed Action or No Action.

Health and Safety (EA Section 4.9): The Proposed Action (implementation of the 2015 INRMP) could result in potential minor adverse impacts to workers while conducting wildlife surveys and prescribed burn activities as part of the WFMP. Risks associated with interaction with wildlife and treatment/removal of vegetation would be minimized by hiring trained/certified specialists perceptive to performing activities in a safe manner and risks would be minimized by adherence to applicable safety standards. Prescribed burns as part of the WFMP would be conducted by WPAFB firefighting personnel with activities coordinated to ensure firefighter safety with respect to mission activities. Potential minor impact to birds and wildlife would be expected from the Proposed Action (implementation of the 2015 INRMP) due to control methods (dispersal, depredation) implemented for the airfield. Positive impacts on safety at the airfield would result from the control of birds/wildlife (as indicated in the Bird/Wildlife Aircraft Strike Hazard [BASH] plan). Short-term potential minor adverse impacts to the health and safety of workers would also be expected as a result of planting 1,500 trees on Base. Potential risks associated with operating planting machinery would be minimized by hiring personnel trained/certified in silviculture. No long-term impacts would be expected to health and safety of

workers as a result of the Proposed Action (implementation of the 2015 INRMP or planting native trees). The No Action Alternative would have potential adverse impacts because similar activities would continue as described in the 2012-2016 INRMP. Similar to the Proposed Action, impacts would be minimized by adhering to safety protocols. No adverse long-term impacts are expected to occur from the No Action Alternative. Therefore, there would be no significant impacts to health and safety as a result of the Proposed Action or No Action.

Environmental Restoration Program (ERP) (EA Section 4.10): The Proposed Action could result in short-term minor adverse impacts because activities planned in the 2015 INRMP could potentially involve minimal ground disturbances in or adjacent to any ERP sites. However, Land Use Controls (LUCs) reduce risks to human health and the environment for Basewide ERP sites. Similarly, impacts due to continued activities under the No Action Alternative could be reduced by adhering to the LUC Plan. No short- or long-term impacts to ERP sites would be expected from planting 1,500 native trees on Base as the trees would not be planted within any ERP sites. No adverse long-term impacts are expected from the Proposed Action or No Action Alternative. Therefore, there would be no significant impacts to ERP sites as a result of the Proposed Action or No Action.

Agency Consultation

In accordance with NEPA, 42 U.S.C. §4321 et seq. (1969), informal consultation was solicited with applicable agencies to seek input on the likelihood of environmental or other impacts resulting from the development of the Proposed Action. A summary of the outcome of consultation efforts with pertinent agencies is included as Appendix A of the EA.

Public Notice

A public notice was posted in the *Dayton Daily News* and the *Fairborn Daily Herald* on September 13, 2016. The 30-day comment period was held from September 13, 2016 until October 12, 2016. Comments received during the public comment period will be included in Appendix A of the EA.

Finding of No Significant Impact (FONSI)

The Proposed Action involves implementing the projects and component plans identified in the WPAFB 2015 INRMP. The Proposed Action also involves planting 1,500 native trees suitable to the endangered Indiana bat species. Implementation of the 2015 INRMP would satisfy the SAIA, which requires the preparation, implementation, update, and review of an INRMP at military installations which contain significant natural resources. Under the No Action Alternative, management of natural resources would continue as provided in the previous five-year version of the INRMP (2012-2016). Based upon my review of the facts and analysis contained in the EA, which is hereby incorporated by reference, I conclude that the Proposed Action would not have a significant impact on the natural or human environment. An environmental impact statement is not required for this action. This analysis fulfills the requirements of NEPA, the President's Council on Environmental Quality, and 32 CFR 989.

Finding of No Practicable Alternative (FONPA)

Taking the above information into consideration under authorization delegated by the Secretary of the AF, I find there is no practicable alternative to implementing the 2015 INRMP or planting 1,500 native trees on Base suitable to the Indiana bat endangered species. The Proposed Action includes all practicable measures to minimize harm to the natural environment. This finding fulfills the requirement of the AF EA Process (32 CFR 989.14) for a FONPA.

_____ Date: _____

NAME
TITLE

COVER SHEET

ENVIRONMENTAL ASSESSMENT
TO IMPLEMENT THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Responsible Agencies: U.S. Air Force (AF); Wright-Patterson Air Force Base (WPAFB), Ohio

Affected Location: WPAFB, Ohio

Proposed Action: Implement the Integrated Natural Resources Management Plan (INRMP)

Report Designation: Draft Final Environmental Assessment (EA)

Written comments and inquiries regarding this document should be directed to Mr. John Banford, EIAP Program Manager, 88 CEG/CEIEA, 1450 Littrell Road, WPAFB, Ohio, 45433-5209, 937/257-6482, John.Banford@us.af.mil.

Abstract: The AF is proposing to implement the 2015 INRMP at WPAFB. The INRMP will provide natural resources management strategies for WPAFB. The Proposed Action is to implement the updated natural resources management plans and practices at WPAFB described in the 2015 INRMP consistent with the military-essential use of the installation and its land and the goals and objectives established in the Sikes Act Improvement Act of 1997, as amended. The Proposed Action also includes a specific measure for planting native tree species for Indiana bat habitat. This mitigation measure would be taken to restore 2.05 acres of Indiana bat habitat that was incidentally clear cut during a fence replacement project.

The analysis in the EA considers the Proposed Action and the No Action Alternative. As this INRMP is a programmatic document, future actions involving natural resources at WPAFB would be tiered from this EA and addressed in a project-specific EA. Resources considered in the impact analysis are land use, air quality, noise, geological resources, water resources, biological resources, cultural resources, socioeconomics, health and safety, and Environmental Restoration Program (ERP). Analyses in this document identify minor short-term adverse impacts on air quality, geology/soils, and water resources resulting from INRMP activities and tree planting. This EA was made available to the public on September 13, 2016, for a 30-day review period.

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3D	3D International
ABW	Air Base Wing
ACAM	Air Conformity Applicability Model
ACHP	Advisory Council on Historic Preservation
AFB	Air Force Base
AF	Air Force
AFI	Air Force Instruction
AFMC	Air Force Materiel Command
AFPD	Air Force Policy Directive
AGL	Above Ground Level
AICUZ	Air Installation Compatible Use Zone
AOB	Air Operations Board
APZ	Accident Potential Zone
AQCR	Air Quality Control Region
AW	Airlift Wing
BASH	Bird/Wildlife Aircraft Strike Hazard
BHWG	Bird Hazard Working Group
BLS	U.S. Bureau of Labor Statistics
BMP	Best Management Practice
BMP/LTM	Basewide Monitoring Program/Long Term Monitoring
BS	Burial Site
CAA	Clean Air Act
CEG	Civil Engineer Group
CEIE	Installation Management Division of the Environmental Branch
CEIEC	Compliance Section of the Environmental Branch in the Installation Management Division, Civil Engineer Group
CEIEA	Environmental Assets Section of the Environmental Branch in the Installation Management Division, Civil Engineer Group
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	Methane
CHP	Central Heating Plant
CO	Carbon Monoxide
CO_2e	Carbon Dioxide Equivalents
CCSA	Coal and Chemical Storage Area
CWA	Clean Water Act
CZ	Clear Zone
dB	Decibel
dBA	A-weighted Sound Level Measurement
dbh	diameter breast height
DLSME	Defense Land Systems and Miscellaneous Equipment
DNL	Day-night Average A-weighted Sound Level
DoD	Department of Defense
DOW	Division of Wildlife
EA	Environmental Assessment
EAB	Emerald Ash Borer
EFDZ	Earthfill Disposal Zone
EIAP	Environmental Impact Analysis Process
EIFS	Economic Impact Forecast System
EIS	Environmental Impact Statement
EMR	Eastern massasauga rattlesnake
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ESQD	Explosive Safety Quantity Distance
ESZ	Explosive Safety Zone
°F	Degrees Fahrenheit
F	Facility or Building
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
ft	Feet
FTA	Fire Training Area
FY	Fiscal Year
GHG	Greenhouse Gas
GIS	Geographic Information System
gpm	Gallons Per Minute
GWOU	Groundwater Operable Unit
GWP	Global Warming Potential
HAP	Hazardous Air Pollutant
HC/D	Hazard Class/Division
HEA	Habitat Equivalency Analysis
HUD	U.S. Department of Housing and Urban Development
ICRMP	Integrated Cultural Resources Management Plan
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
INRMP	Integrated Natural Resources Management Plan
IPMP	Integrated Pest Management Plan
IRP	Installation Restoration Program
ISMP	Invasive Species Management Plan
LF	Landfill
LTM	Long-term Monitoring
LUC	Land Use Controls
$\mu g/m^3$	Micrograms Per Cubic Meter
MA	Metropolitan Area
MACT	Maximum Achievable Control Technology
MCD	Miami Conservancy District
mg/m^3	Milligrams Per Cubic Meter
MSL	Mean Sea Level

NAAQS	National Ambient Air Quality Standards
NAAs	Non-attainment Areas
NASIC	National Air and Space Intelligence Center
NAVD	North American Vertical Datum
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFA	No Further Action
NHPA	National Historic Preservation Act
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NO_x	Nitrogen Oxides
NO_2	nitrogen dioxide
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NSR	New Source Review
O_3	Ozone
OAC	Ohio Administrative Code
ODNR	Ohio Department of Natural Resources
OEPA	Ohio Environmental Protection Agency
ORC	Ohio Revised Code
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
Pb	Lead
$PM_{2.5}$	Particulate Matter with an Aerodynamic Particle Size Less than 2.5 Micrometers
PM_{10}	Particulate Matter with an Aerodynamic Particle Size Less than 10 Micrometers
POL	Petroleum, Oil, Lubricants
ppb	Parts Per Billion
ppm	Parts Per Million
PSD	Prevention of Significant Deterioration
RAPCA	Regional Air Pollution Control Agency
ROD	Record of Decision
SAIA	Sikes Act Improvement Act
SARA	Superfund Amendments and Reauthorization Act
SEL	Sound Exposure Level
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SR	State Route
SS	Spill Site
SWMP	Storm Water Management Plan
SWPPP	Storm Water Pollution Prevention Plan
TMDL	Total Maximum Daily Load
TPY	Tons Per Year
U.S.	United States
USAF	United States Air Force
USC	U.S. Code
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish & Wildlife Service
USGS	U.S. Geological Survey
VOC	Volatile Organic Compound
WFMP	Wildland Fire Management Plan
WPAFB	Wright-Patterson Air Force Base
WSMP	Wetland and Stream Management Plan
WTC	Warfighter Training Center

1.0 PURPOSE AND NEED FOR ACTION

This section provides a description of the Proposed Action, a statement of the purpose of and need for the Proposed Action, an overview of the organization of the Environmental Assessment (EA), and a summary of the key environmental compliance requirements.

1.1 Purpose and Need

The purpose of the Proposed Action is to implement the projects and component plans identified in the Wright-Patterson Air Force Base (WPAFB) Integrated Natural Resources Management Plan (INRMP). The INRMP is consistent with the Sikes Act Improvement Act of 1997 (SAIA), as amended (16 United States Code [U.S.C.] §§670a-670f), which requires the preparation, implementation, update, and review of an INRMP for military installations in the United States and its territories that contain significant natural resources. The Proposed Action is needed to comply with the SAIA, which governs the planning and implementation of conservation programs on military installations. According to the SAIA, the purpose of a military conservation program is conservation and rehabilitation of natural resources; sustainable multipurpose use of those resources; and public access to military lands, subject to safety requirements and military security (16 U.S.C. §§670a-670f). Furthermore, the INRMP has been prepared in accordance with Air Force Instruction (AFI) 32-7064 (dated November 18, 2014), which identifies the requirements to manage natural resources on Air Force installations in accordance with applicable federal, state, and local laws and regulations.

The 2016-2020 INRMP (referred hereafter as the 2015 INRMP) was developed in cooperation with the U.S. Fish and Wildlife Service (USFWS) (WPAFB 2015). The 2015 INRMP reflects the mutual agreement of all parties concerning conservation, protection, and management of natural resources on WPAFB. The SAIA requires the INRMP to be reviewed as to operation and effect on a regular basis. In accordance with AFI 32-7064, the INRMP must be reviewed and updated annually by the WPAFB Natural Resources Manager in coordination with the USFWS, Columbus, Ohio Field Office, and the Ohio Department of Natural Resources (ODNR) regarding the status of INRMP projects, and the need for revisions to the document.

The AF also proposes to plant native tree species suitable for the Indiana bat, a federal- and state-listed endangered species. The purpose of tree planting is to mitigate impacts that resulted from incidentally clearing trees during a fence replacement project. These trees were determined to be suitable Indiana bat roosting and foraging habitat.

1.2 Project Description

The U.S. Department of Defense (DoD), with the assistance of the USFWS and the states, is responsible under the SAIA for carrying out programs and implementing management strategies to conserve and protect biological resources on its lands. Because military lands and waters often are protected from

human access and impact, they contain some of the nation's most significant remaining large tracts of land with valuable natural resources. Congress established the Sikes Act in 1960 to manage these lands for wildlife conservation and human access. The Sikes Act was amended in 1997 to develop and implement mutually agreed upon INRMPs through voluntary cooperative agreements between the DoD installation, USFWS, and the respective state fish and wildlife agencies (DoD 2004, DoD 2013).

The INRMP is a planning document that allows DoD installations to implement landscape-level management of their natural resources while coordinating with various stakeholders. The INRMPs are extremely important management tools that ensure military operations and natural resources conservation are integrated and consistent with stewardship and legal requirements (DoD 2004, DoD 2013).

The WPAFB INRMP is based on ecosystem management principles that are prepared and implemented by WPAFB personnel and public agencies. Installation natural resources managers actively involve individuals and organizations that have a vested interest in natural resources management on an installation. An interdisciplinary approach was used to develop the ecosystem management philosophy of the WPAFB INRMP. The management philosophy of the Natural Resources Program at WPAFB promotes environmental stewardship under the principles of multiple use and sustained yield.

The INRMP established the following five goals for managing natural resources on WPAFB (WPAFB 2015).

1. Manage natural resources on WPAFB in accordance with applicable federal and state laws, and AF guidance, in a manner that supports the WPAFB mission and conserves natural habitats and native species on the Base.

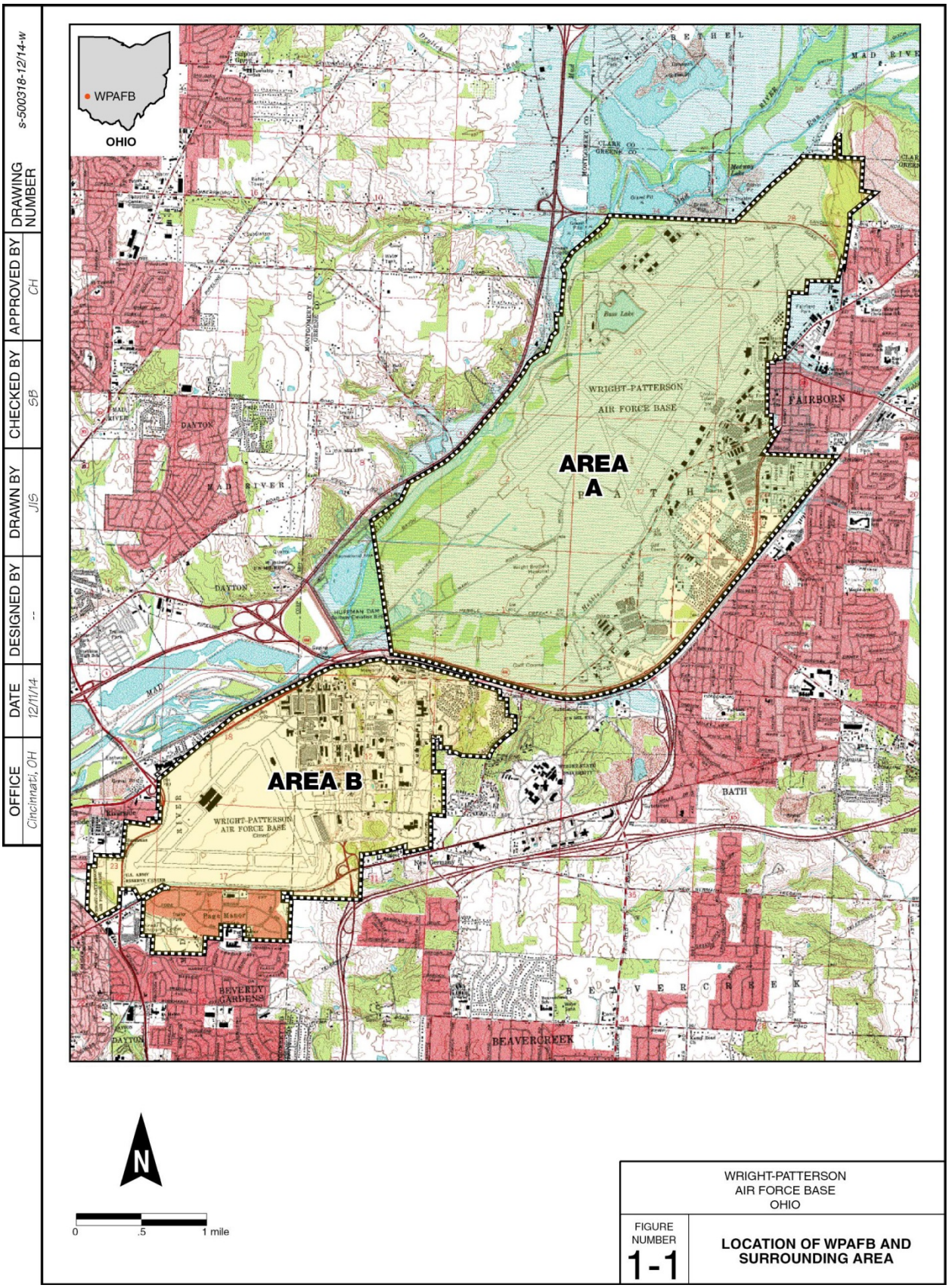
2. Protect federal- and state-listed and candidate species and their habitat on WPAFB.

3. As consistent with the mission, protect and improve water resources and wetland habitats on WPAFB.

4. Fully support the WPAFB Bird/Wildlife Aircraft Strike Hazard (BASH) program.

5. Promote outdoor recreational opportunities on WPAFB.

The Base is located in the southwest portion of the state of Ohio in Greene and Montgomery counties, approximately 10 miles east of the city of Dayton. The Base encompasses 8,145 acres and is classified as non-industrial with mixed development. The Base is subdivided into two areas: Areas A and B. Area A consists primarily of administrative offices and contains an active airfield. Area B is located across State Route (SR) 444 to the southwest of Area A and consists primarily of research and development as well as educational functions. **Figure 1-1** shows the location of WPAFB (Areas A and B) and the surrounding area.


WPAFB
OHIO
AREA A
AREA B
WRIGHT-PATTERSON AIR FORCE BASE
FAIRBORN
DAYTON
BEAVERCREEK
BATH
BEVERLY GARDENS
N
0
.5
1 mile
OFFICE Cincinnati, OH
DATE 12/11/14
DESIGNED BY --
DRAWN BY JJS
CHECKED BY SB
APPROVED BY CH
DRAWING NUMBER s-500318-12/14-w
WRIGHT-PATTERSON AIR FORCE BASE OHIO
FIGURE NUMBER 1-1
LOCATION OF WPAFB AND SURROUNDING AREA

1

This EA presents the United States Air Force (AF) Proposed Action to implement the 2015 INRMP at WPAFB. The No Action Alternative is also analyzed. The analyses presented in the EA indicates that implementation of the Proposed Action would not result in significant environmental impacts; therefore, a Finding of No Significant Impact/Finding of No Practicable Alternative (FONSI/FONPA) has been prepared. A FONSI/FONPA briefly presents reasons why a Proposed Action would not have a significant effect on the human environment and why an environmental impact statement (EIS) is unnecessary.

The AF has prepared this EA in accordance with the National Environmental Policy Act (NEPA) of 1969; 40 Code of Federal Regulations (CFR), Parts 1500-1508, the Council on Environmental Quality (CEQ) regulations implementing NEPA; the AF Environmental Impact Analysis Process (EIAP) [32 CFR Part 989].

1.3 Scope of Environmental Analysis

Consistent with the CEQ regulations, the EA will be organized into the following sections:

- Section 1, Purpose and Need for Action, includes a background description, purpose and need statement, EA organization and scope of environmental analysis, and regulatory framework;
- Section 2, Description of Proposed Action and alternatives, includes a process for alternatives development, alternatives considered but eliminated, and a comparison of impacts;
- Section 3, Affected Environment, includes a description of the natural and man-made environments within and surrounding WPAFB that may be affected by the Proposed Action and alternatives;
- Section 4, Environmental Impacts, includes definitions and discussions of direct and indirect impacts, and mitigation and monitoring. The section also includes an analysis of the potential cumulative impacts on WPAFB, unavoidable adverse impacts, the relationship between short-term use of the human environment and the maintenance and enhancement of long-term productivity, and irreversible and irretrievable commitments of resources;
- Section 5, List of Preparers;
- Section 6, Consultation and Coordination, contains a list of agencies consulted in the preparation of this document;
- Section 7, References, contains references for studies, data, and other resources used in the preparation of the EA; and
- Appendices, as required.

1.3.1 Issues and Concerns Eliminated from Detailed Study

The NEPA, which is implemented through the CEQ regulations, requires federal agencies to consider alternatives to proposed actions and to analyze impacts of those alternatives. Potential impacts of the proposed alternatives described in this document will be assessed in accordance with the AF EIAP, which requires that impacts to resources be analyzed in terms of their context, duration, and intensity. In order to help the public and decision-makers understand the implications of impacts, they will be described in

the short- and long-term, cumulatively, and within context. Environmental issues analyzed in the EA include:

- Land Use;
- Air Quality;
- Noise;
- Geology and Soils;
- Water Resources;
- Biological Resources, including vegetation, wetlands, wildlife, and threatened and endangered species;
- Cultural Resources;
- Socioeconomics;
- Health and Safety; and
- Environmental Restoration Program (ERP) Sites.

The AF initially considered a broad range of potential environmental impacts associated with the implementation of the Proposed Action. The scope of the Proposed Action is limited, however, and does not entail construction, demolition, land use changes, or other activities evaluated in NEPA analysis that routinely lead to environmental impacts. Because of the nature of activities being proposed, the potential for environmental impacts on many of the environmental resource areas normally evaluated in an EA in detail does not exist for this project. In accordance with CEQ guidance, all environmental resources were initially considered, but some were subsequently eliminated from further consideration in the EA if a determination was made that there was no potential for impacts. The Proposed Action involves a combination of various natural resources management action plans consisting of inspections, audits, surveys, and/or investigations, and no ground disturbance would result from these actions. Therefore, the following issues and concerns were determined to have limited potential for environmental impacts and are not being evaluated in this EA:

- *Airspace Management.* Proposed project activities would not result in any obstructions to airspace or hazards to airspace management at WPAFB because the Proposed Action would not result in airfield obstructions. Therefore, there would be no impacts to airspace management.

- *Transportation and Infrastructure.* Proposed project activities would not result in any changes to the existing infrastructure or overburden the existing transportation system at WPAFB because the Proposed Action would not result in any changes to the existing infrastructure or transportation system. Therefore, there would be no impacts to transportation or infrastructure.

- *Visual Resources.* Implementation of the Proposed Action would not adversely change the views of or from WPAFB because the Proposed Action does not involve actions that would alter the existing view shed. Therefore, there would be no impacts to visual resources.

- *Hazardous Materials and Waste.* Although proposed project activities include the use of pesticides and herbicides, they would continue to be handled by certified pest management personnel in accordance with all federal and local laws and regulations including the Resource Conservation Recovery Act; Federal Insecticide, Fungicide, and Rodenticide Act; Toxic

Substances Control Act; and AFI 32-1053, Integrated Pest Management Program. Integrated pest management techniques would continue to be implemented to minimize the use of pesticides at WPAFB. Therefore, there would be no impacts to hazardous materials/wastes.

- *Public Services.* The Proposed Action would not result in changes in the use of or demand for public services (e.g., schools, police, fire department, emergency medical services) on or adjacent to WPAFB. Therefore, there would be no impacts to public services.

- *Environmental Justice and Protection of Children*. Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, requires that all federal agencies address the effects of policies on minorities and low-income populations and communities, and to ensure that there would be no disproportionately high and adverse human health or environmental effects to minority or low-income populations or communities in the area. Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, directs federal agencies to make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children. Federal agencies must also ensure that their policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks. The Proposed Action would not adversely change or impact any minority or low-income communities associated with the Base and would not be expected to create disproportionately high or adverse human health or environmental effects on children. In addition, the nearest off-Base residential areas to the Proposed Action are located at distances greater than 500 feet (ft) in both Areas A and B. The nearest on-Base residential area is greater than 500 ft from the Proposed Action. Therefore, there would be no impacts to environmental justice and protection of children.

1.3.2 Notice of Availability

A Notice of Availability (NOA) for the EA and Draft FONSI/FONPA will be published in the *Dayton Daily News*, the *Fairborn Daily Herald*, and the Base paper, *The Skywrighter*, initiating a 30-day public review period. The Draft-Final EA and Draft-Final FONSI/FONPA will be made available in the Greene County Library, Fairborn Branch. During this time period, public comments may be received. The NOA and comments received will be included in **Appendix A** of the Final EA.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

This section describes a detailed description and criteria used in selecting the Proposed Action; describes the No Action Alternative; identifies alternatives eliminated from further consideration; and compares environmental consequences between the Proposed Action and the No Action.

2.1 Alternatives Selection Criteria

The development of reasonable alternatives involved discussions with the members of the 88 Civil Engineer Group (CEG) Installation Management Division of the Environmental Branch (CEIE) to identify a Proposed Action. Several requirements were identified in order to fulfill the purpose of the Proposed Action at WPAFB. The Proposed Action was screened against the following criteria:

- Compliance with DoD and AF policies: DoD Instruction 4715.03, *Natural Resources Conservation Program*; AF Policy Directive (AFPD) 32-70, *Environmental Quality*; and AFI 32-7064, *Integrated Natural Resources Management*;
- Consistency with WPAFB's military mission;
- Technical and logistical feasibility;
- Minimization of environmental impacts; and
- Full compliance with all federal, state, and local laws and regulations, as well as DoD and Air Force policies, directives, and regulations.

The outcome of the screening analysis led to the development of the Proposed Action, as described in the following paragraphs. Consistent with the intent of NEPA, the screening process focused on identifying a range of reasonable, resource-specific management alternatives and development of a plan that could be implemented for the foreseeable future. This EA formally addresses the Proposed Action (implementation of the 2015 INRMP) and the No Action Alternative.

2.2 Proposed Action

The AF proposes to conduct integrated ecosystem management of natural resources at WPAFB under the 2015 INRMP. The Proposed Action would implement the 2015 INRMP, which is consistent with the SAIA, as amended. The 2015 INRMP would be revised annually to maximize its usefulness to installation natural resources personnel.

The INRMP is a programmatic document and is the principal tool by which the natural resources of WPAFB are managed. It provides an overview of the future direction of natural resources management on WPAFB. A compilation of "component plans" provides site-specific actions and operational details for each natural resources management program component (e.g., Bird/Wildlife Strike Hazard, Emerald Ash Borer, Huffman Prairie, Integrated Pest, Invasive Species, Wetland and Stream, and Wildland Fire) in support of the main INRMP document. The Proposed Action includes continuing WPAFB's existing natural resource management practices as indicated in the 2015 INRMP. The Proposed Action objectives include fish and wildlife management, threatened and endangered species preservation, basewide water

resources protection, wetland protection, grounds maintenance, forest wildfire management, prairie management, pest management, bird/wildlife aircraft strike hazard management, and outdoor recreation program enhancements. All management practices would be integrated and implemented in the context of the installation's mission support needs and regional setting, including integration of INRMP component plans as outlined in **Table 2-1** (component plans are listed in alphabetical order).

Table 2-1. Description of INRMP Component Plans

Plan	Date	Objectives
Bird/Wildlife Aircraft Strike Hazard (BASH)	July 2013b	Provide information on specific bird and other wildlife strike hazards and recommendations for controlling each hazard.
Emerald Ash Borer Management (EAB)	December 2010a	Prevent, eliminate, and/or reduce the spread of the EAB by implementing recommended management measures.
Huffman Prairie Management	Addendum February 2011a	Provide a schedule of management activities and measurable success criteria with assessment methods and document the effectiveness of seeding, nuisance species control, and controlled burn management practices at Huffman Prairie.
Integrated Pest Management (IPMP)	July 2010b	Control pests (may include flora and fauna), prevent disease vectors, and maintain grounds that are appealing to residents/visitors. The Integrated Pest Management Plan (IPMP) presents roles and responsibilities of pest management personnel, IPM program requirements and strategies, environmental and safety concerns, and pesticide acquisition requirements, sale, and distribution.
Invasive Species Management (ISMP)	Areas A & B (July 2010c); Area B (March 2010)	Guide the management of invasive, exotic plant species found on portions of WPAFB.
Wetland and Stream Management (WSMP)	July 2010d	Protect and enhance wetland and stream resources, and ensure that base activities comply with federal, state, and local wetland and stream regulations and policies.
Wildland Fire Management (WFMP)	October 2014	Ensure the restoration of ecosystems to conserve biological diversity and sustain ecological processes through fire management.

In addition to meeting the purpose and need, the Proposed Action would have additional benefits, including:

1. Better integration of the INRMP with its component plans;
2. Improved integration of the natural resources program with other WPAFB activities;
3. Explicit goals and objectives under which ongoing and future natural resources projects would be implemented; and
4. A systematic approach to integrated natural resources management by documenting present and future program implementation.

In addition to the component plans described above, several stand-alone land management plans exist at WPAFB that interface with the natural resources management plans (**Table 2-2**, listed alphabetically).

Table 2-2. Land Management INRMP-Integrated Activities

Plan	Date
88 SFS Operating Instruction 32-7064 Security Forces Fish and Wildlife Protection Program	2013
Air Installation Compatibility Use Zone (AICUZ) Study	1995
Bird/Wildlife Aircraft Strike Hazard (BASH) Plan	2014
Emerald Ash Borer (EAB) Management Plan	2010
Huffman Prairie Management Plan and Addendum	2001
Integrated Cultural Resources Management Plan (ICRMP)	2011
Integrated Lake Management Plan for Gravel and Lower Twin Lakes	2005
Integrated Pest Management Plan (IPMP)	2010
Storm Water Management Plan (SWMP)	2011
Storm Water Pollution Prevention Plan (SWPPP)	2011
Wildland Fire Management Plan (WFMP)	2015
WPAFB Civil Engineering Performance Work Statement for Grounds Maintenance	No Date
WPAFB General Plan	2001
WPAFB Wetland Management Plan	2010

Multiple WPAFB personnel are responsible for oversight and implementation of the INRMP. The INRMP is approved by the Base Natural Resources Manager and the 88th Air Base Wing (ABW) Commander. The regional Director of the USFWS and the Director of the ODNR also sign the INRMP to reflect their mutual agreement with the INRMP. A list of persons involved in implementing the INRMP is included in **Table 2-3**.

Table 2-3. AF Personnel and Public Agencies Responsible for Oversight and Implementation of the INRMP

Group/Agency	Personnel	Responsibilities
AF	Air Force Materiel Command (AFMC) Natural Resources Manager (HQ AFMC/A7AI)	• Ensure Natural Resources Program operations are coordinated and conducted using ecosystem management principles in accordance with all applicable laws and instructions. • Function as the Major Command (MAJCOM) Pest Management Consultant. • Ensure WPAFB reviews, updates, and maintains the INRMP.
	Wing Commander (88 ABW/CC)	• Approve/sign final INRMP. • Certify/delegate to designee the annual review of INRMP as valid and current. • Provide funding and staffing to ensure implementation of INRMP and/or designate a designee to certify the annual review and update in accordance with AFI 32-7064. • Control access and use of installation natural resources.
	Base Natural Resources Program Manager (88 CEG/CEIEA)	• Ensure INRMP policies and programs are implemented at WPAFB. • Facilitate the annual review and update of the INRMP. • Ensure that threatened and endangered plant and animal

Group/Agency	Personnel	Responsibilities
		species are protected. • Ensure that wetlands and other sensitive habitats of plants and animal species are protected.
Public Agencies	USFWS	• The USFWS Ohio Field Office and Region 3 Office will review draft documents. • Region 3 INRMP Coordinator will sign INRMP to signify mutual agreement with the INRMP as it pertains to conservation and management of fish and wildlife resources on WPAFB.
	ODNR	• The ODNR will review draft documents. • The ODNR Office of Real Estate and Land Management will sign, signifying mutual agreement with the INRMP as it pertains to conservation and management of fish and wildlife resources on WPAFB.

The Proposed Action also includes planting 1,500 potted tree native species suitable for Indiana bat roosting and foraging. The Indiana bat is a federal- and state-listed endangered species. The tree planting provides mitigation and compensates for a tree clearing event that occurred as a result of a fence replacement project in Area A of the Base that cleared approximately 188 suitable trees for Indiana bat habitat on 2.05 acres in the Mad River floodplain on Base. The Proposed Action includes restoring habitat by planting trees on 5 acres of Base property located in the vicinity of the south end of the primary runway in Area A at WPAFB. The proposal to plant native trees in this general area has been coordinated with and agreed upon by the USFWS as an appropriate mitigation for clearing Indiana bat habitat.

2.2.1 Goals and Objectives

The INRMP is focused on the achievement of specific goals, objectives, and projects for the protection and improvement of the natural environment. Goals were formulated from a comprehensive analysis of regulatory requirements, condition of the natural resources on WPAFB, and consideration of the resource values to the people who live and work on the installation. Implementation of the 2015 INRMP will ensure that WPAFB continues to support present and future mission requirements while preserving, improving, and enhancing ecosystem integrity. The INRMP establishes the following goals and objectives for managing natural resources on WPAFB (INRMP-specific projects for Fiscal Year (FY) 2016 through FY2020 can be reviewed in Section 10.1 of the 2015 INRMP):

1. Goal: Manage natural resources on WPAFB in accordance with applicable federal and state laws, and AF guidance, in a manner that supports the WPAFB mission and conserves natural habitats and native species on the Base.

   Objectives: Implement the INRMP in accordance with AFI 32-7064; and maintain the Environmental Branch geographic information system (GIS) database to provide accurate and current geospatial data that supports natural resources management and land use planning.

2. Goal: Protect federal and state listed and candidate species and their habitat on WPAFB.

   Objectives: Ensure base-wide awareness of the presence of listed species and the conservation measures in place to avoid impacts to listed species and their habitat on the Base; periodically monitor the presence of threatened and endangered species on WPAFB to improve the understanding of the species' presence and habitat use on Base; enhance habitat for Indiana bat on WPAFB; continue managing Huffman Prairie and selected old fields to enhance habitat for nesting grassland birds, prairie Lepidoptera including blazing star stem borer, eastern massasauga, and smooth green snake. Develop in-house resources to enable WPAFB to perform annual prescribed burns on Huffman Prairie without the need to rely on outside agencies; enhance habitat for the Monarch Butterfly and other pollinators; and protect natural habitat and avoid impacts to listed species during grounds maintenance activities on WPAFB.

3. Goal: As consistent with the mission, protect and improve water resources and wetland habitats on WPAFB.

   Objectives: Prevent pesticide pollution in surface waters; prevent soil erosion into rivers and streams; implement wetland and stream management methods; and maintain compliance with Department of Army 404 and Ohio Environmental Protection Agency (OEPA) 401 permits, including stream and wetland mitigation activities.

4. Goal: Fully support the WPAFB BASH program.

   Objective: Ensure the WPAFB BASH Plan complies with laws and regulations associated with natural resources by participating in Bird Hazard Working Group (BHWG) and/or Air Operations Board (AOB) meetings.

5. Goal: Promote outdoor recreational opportunities on WPAFB.

   Objectives: Continue providing sport fishing and hunting opportunities on areas previously established/identified as approved for hunting and fishing on WPAFB; maintain the population of whitetail deer at a population that is acceptable for safety concerns, carrying capacity of the land and to allow maximum utilization by Base hunters; enhance the natural areas located within the Licensed Shooting Preserve to eliminate/reduce the amount of invasive species and to restore the area so that surviving pheasants and other upland game find the habitat more suitable for habitation; and provide equal access to hunting and fishing areas on WPAFB for disabled persons, provided topographic, vegetative, and water resources allow equal access without substantial modification to the natural environment.

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

2.3 No Action

Under the No Action, management of natural resources would continue as provided in the previous five-

year version of the INRMP (2012-2016) (WPAFB 2011b). The No Action represents status quo. All INRMP component plans and activities would maintain baseline activities as described for each program as detailed in Section 2.2.1 and shown in **Table 2-1**, except in situations where mission activity or policy changes have resulted in changes to the baseline, independent of natural resources management. Although the No Action does not satisfy the purpose and need of implementing an updated INRMP, which emphasizes the management of federal- and state-listed benefit species, it is included in the environmental analysis to provide a baseline for comparison with the Proposed Action and is analyzed in accordance with CEQ regulations for implementing NEPA.

Additionally, under the No Action, tree planting would not occur on Base and the loss of 2.05 acres of Indiana bat roosting and foraging habitat would not be replaced. The No Action does not meet a chief goal of the 2015 INRMP, which is to protect federal- and state-listed and candidate species and their habitat on WPAFB.

2.4 Alternatives Eliminated from Further Study

As part of the NEPA process, potential alternatives to the Proposed Action must be evaluated. For alternatives to be considered reasonable and warrant further detailed analysis they must be affordable, implementable, and meet the purpose and need for the proposal based on the project requirements stated in Section 2.1.

One Alternative considered involved a compliance-driven approach to natural resources management where only those natural resource components that are required by law would be managed. This alternative would not involve an ecosystem-based approach to natural resources management, but would manage natural resources only required by a statutory or regulatory rule (i.e., Clean Water Act [CWA] or Endangered Species Act [ESA]). While this alternative would likely avoid any notice of violation(s) for noncompliance, this alternative would not comply with the spirit of the SAIA, as amended, for natural resources management nor would it be consistent with AFI 32-7064.

2.5 Comparison of Environmental Consequences

The impacts associated with the Proposed Action and the No Action are summarized in **Table 2-4**. The information includes a concise definition of the issues addressed and the environmental impacts associated with each alternative.

1 **Table 2-4. Comparison of Environmental Consequences**

Affected Environment	Proposed Action	No Action
Land Use	Short-Term: No adverse impact. Long-Term: No adverse impact.	Short-Term: No adverse impact. Long-Term: No adverse impact.
Air Quality	Short-Term: Minor, short-term adverse impact from prescribed burns. Prescribed burns would generate emissions of criteria pollutants from the combustion of vegetation. The estimated annual air emissions would be below all applicable significance criteria and would be conducted in accordance with the WFMP; the WFMP would meet the requirements of the U.S. Environmental Protection Agency's (USEPA) Interim Air Quality Policy on Wildland and Prescribed Fires. Impacts would be minor because emissions would be short in duration and are negligible with respect to overall emissions expected for the region. Long-Term: No adverse impact.	Short-Term: Minor adverse impact on air quality would be expected as WPAFB would continue to conduct prescribed burns. No overall increase in emissions over current conditions. Long-Term: No adverse impact.
Noise	Short-Term: Negligible impact would result from the use of hand tools (i.e., chain saws) during clearing and cutting activities as part of EAB, ISMP, WSMP, and WFMP and noise from dispersal/depredation techniques (firearms, vehicle harassment, pyrotechnics) as part of the BASH plan would be expected. Impacts would be minimized through restriction of forestry, firefighting, and dispersal/depredation activities during normal working hours, would be short in duration, and would be performed in remote areas of the Base unlikely to disturb sensitive receptors. Short-term negligible impacts would also be expected from noise associated with planting 1,500 trees in the vicinity of the south end of the primary runway in Area A. Impacts would be temporary in nature and would cease upon completion of plantings. Long-Term: No adverse impact.	Short-Term: Negligible adverse impact would be expected because activities would continue under the previous 2012-2016 INRMP; impacts under the Proposed Action and the No Action would be similar. Long-Term: No adverse impact.
Geology and Soils	Short-Term: Temporary but minor adverse impact resulting in soil disturbance by implementing certain projects described in the INRMP and component plans. Impacts would be minimized by implementing Best Management Practices (BMPs) for erosion and sedimentation controls. Minor adverse effects to soil due to pesticide and herbicide use could occur; however, BMPs (e.g., hay bales, drainage swales, rock berms) would be implemented to minimize impacts to soil resources. Short-term temporary but minor adverse impacts would also be expected from planting 1,500 trees in the vicinity of the south end of the primary runway. Impacts would be minimized by implementing BMPs for erosion and sedimentation controls. Long-Term: Positive impact to existing soils from implementation of the INRMP and component plans as soil stabilization would increase.	Short-Term: Temporary but minor adverse impacts would be expected because activities would continue under the previous 2012-2016 INRMP; impacts under the Proposed Action and the No Action would be similar. Impacts would be minimized by adhering to BMPs. Long-Term: No adverse impact.
Water Resources Groundwater	Short-Term: No adverse impact. Long-Term: No adverse impact.	Short-Term: No adverse impact. Long-Term: No adverse impact.

Affected Environment	Proposed Action	No Action
Water Resources (continued)		
Surface Water	Short-Term: Temporary minor adverse impact resulting from pesticides/herbicides used for pest management control as indicated in the IPMP and minimal increased runoff from the controlled burns at Huffman Prairie as indicated in the WFMP. The BMPs (e.g., silt fencing, hay bales, rock berms, seeding, re-vegetation) would be implemented to minimize runoff into surface waters. Short-term temporary but minor adverse impacts would also be expected from planting 1,500 trees in the vicinity of the south end of the primary runway. The BMPs would be implemented to minimize runoff into surface waters.	Short-Term: Similar to the Proposed Action as pesticides/herbicides use would continue as implemented in the previous IPMP and 2012-2016 INRMP.
	Long-Term: No adverse impact.	Long-Term: No adverse impact.
Floodplains	Short-Term: As the INRMP is a programmatic document, the Base Natural Resources Manager is not aware of upcoming new construction activities that would impact floodplains (i.e., draining, dredging, channelizing, filling, diking, impounding, or related activities and any structures or facilities). However, should any INRMP management activities be scheduled in the future, WPAFB would comply with EO 11988 and EO 13690. Therefore, no impacts to floodplains would result from implementation of the Proposed Action as no new construction activities are planned in flood zones.	Short-Term: No adverse impact.
	Long-Term: Same as short-term.	Long-Term: No adverse impact.
Biological Resources Vegetation	Short-Term: Minor adverse impact from pest management practices and to native vegetation due to prescribed burning at Huffman Prairie. Impacts would be minimized by seeding and re-vegetation of affected areas and use of BMPs. Positive effects to ash trees would be expected as a result of implementing the EAB Plan that would aid in lessening the environmental, safety, and economic impacts that the eventual loss of all ash trees would have on the WPAFB community. The USFWS would be informally consulted regarding tree-cutting activities on a project-specific basis.	Short-Term: Similar to the Proposed Action. Prescribed burns would only be used as a natural resource management tool at the Huffman Prairie as indicated in the WFMP. No additional areas would be considered for prescribed burns resulting in potentially less vegetation and potential habitat impact.
	Long-Term: No adverse impact. Positive and beneficial impact from control of invasive vegetation and preservation of native habitat from implementing the 2015 INRMP. Prescribed burns would be used as annually as a management tool for Huffman Prairie with additional areas proposed for future treatment. In addition, positive and beneficial impact to vegetation would result from planting 1,500 native tree species on Base suitable to the Indiana bat.	Long-Term: Not implementing the EAB Plan would accelerate the loss of all ash trees and increase the environmental, safety, and economic long-term impacts that this loss would have on the WPAFB community.
Wildlife/Threatened and Endangered Species	Short-Term: Negligible impact to wildlife due to prescribed burns and survey activities associated with preserving threatened and endangered species, prairies, and wetlands. The BASH program and nuisance animal control activities would negatively affect select wildlife through displacement or mortality, but would not result in any negative effects at the population level. Impacts would be minimized by using non-lethal techniques to the extent possible.	Short-Term: Similar to the Proposed Action.

Affected Environment	Proposed Action	No Action
Wildlife/Threatened and Endangered Species (continued)	Long-Term: Positive impacts to wildlife would occur as a result of habitat preservation activities and restoration practices would continue to preserve and stabilize native habitat, and habitats for rare, threatened, and endangered plant and animal species. A positive and beneficial impact to Indiana bats would be expected as 1,500 native trees would be planted on Base to encourage roosting and foraging by this endangered species.	Long-Term: Similar to the Proposed Action. In addition, if mitigation measures are not taken to restore Indiana bat habitat lost due to clear-cutting 2.05 acres of suitable trees, potential adverse impact to this endangered species would be expected as potential roosting and foraging habitat would not be replaced.
Wetlands	Short-Term: No adverse impact as sensitive habitat near wetlands would not be impacted. Long-Term: Beneficial impact to wetland ecosystems as wetland-approved herbicides would be utilized to control invasive species.	Short-Term: No adverse impact. Long-Term: No adverse impact.
Cultural Resources	Short-Term: Individual actions would be reviewed through the standard Work Order review process. Section 106 consultation would be initiated, if needed. Long-Term: No adverse impact.	Short-Term: No adverse impact. Long-Term: No adverse impact.
Socioeconomics	Short-Term: Beneficial impact to local economy from revenue generated by improvement and enhancement of outdoor recreation program at WPAFB. Long-Term: Same as short-term.	Short-Term: No impact over current conditions. Long-Term: No adverse impact.
Health and Safety	Short-Term: Potential minor adverse impacts while conducting wildlife surveys and prescribed burn activities. Potential risks associated with interaction with wildlife and treatment/removal of vegetation would be minimized by hiring trained/certified specialists perceptive to performing activities in a safe manner. Prescribed burns would be conducted by WPAFB firefighting personnel with activities coordinated to ensure firefighter safety with respect to mission activities. Potential minor impact to birds and wildlife would result due to wildlife control methods implemented for the airfield. Positive impacts on safety at the airfield would result from the control of birds/wildlife (as indicated in the BASH plan). In addition, short-term potential minor adverse impacts to the health and safety of workers could occur as a result of planting 1,500 trees on Base. Potential risks associated with operation of planting machinery would be minimized by hiring personnel trained/certified in silviculture. Long-Term: No adverse impact.	Short-Term: Potential adverse impacts associated with prescribed burns and bird/wildlife depredation activities as described in the previous 2012-2016 INRMP. Similar the Proposed Action, impacts would be minimized by adhering to standard operating procedures and safety protocols. Long-Term: No adverse impact.
Environmental Restoration Program (ERP)	Short-term: Potential minor adverse impact because activities planned in the INRMP could involve minor ground disturbance in or adjacent to any ERP sites. Land Use Controls (LUCs) prevent and reduce risks to human health and the environment for Basewide ERP sites. The tree planting would have no impact on ERP sites as the proposed project area is not located within an ERP site. Long-term: No adverse impact.	Short-Term: No impact to ERP sites over current conditions. Natural resources management activities may require minimal ground disturbance as implemented in the previous 2012-2016 INRMP; however, adherence to LUCs would prevent and reduce risks to human health and the environment. Long-term: No adverse impact.

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3.0 AFFECTED ENVIRONMENT

This section describes the current environmental and socioeconomic conditions most likely to be affected by the Proposed Action and provides a baseline from which to identify and evaluate environmental and socioeconomic changes likely to result from implementation of the Proposed Action.

In compliance with NEPA, CEQ regulations, and 32 CFR 989, the description of the affected environment focuses on those resources and conditions potentially subject to impacts. These resources and conditions include land use, air quality, noise, geology and soils, water resources, biological resources, cultural resources, socioeconomics, environmental justice, infrastructure, and health and safety. Analysis of potential environmental effects focuses on those resource areas that are appropriate for consideration in light of a proposed action. All resource areas are initially considered, but some may be eliminated from detailed examination because they do not directly apply to a particular proposal. The potentially affected environment is described below.

3.1 Land Use

3.1.1 Definition of the Resource

Land use refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. Natural conditions of property can be described or categorized as unimproved, undeveloped, conservation or preservation area, and natural or scenic area. There is a wide variety of descriptive terms used to categorize land use resulting from human activity including residential, commercial, industrial, agricultural, institutional, and recreational.

Land use planning objectives are two-fold: to ensure orderly growth and ensure compatible uses among adjacent property parcels. Tools supporting land use planning include written master plans/management plans and zoning regulations. In appropriate cases, the locations and extent of proposed actions need to be evaluated for their potential effects on project sites and adjacent land uses. The foremost factor affecting a proposed action in terms of land use is its compliance with any applicable land use or zoning regulations.

To address land use with respect to noise and safety associated with aircraft operations, DoD required military departments to establish an Air Installation Compatible Use Zone (AICUZ) program. The goal of AICUZ is to promote compatible land use around air bases by providing information concerning aircraft operations, noise exposure, and accident potential to local governments (WPAFB 1995a, 2001).

One component of the AICUZ study was the development of noise contours. These contours are produced by the computerized Day-Night Average A-Weighted Sound Level (DNL) metric and the NOISEMAP methodology. In the context of aircraft operations, land use compatibility is also described in the context of noise levels. The AICUZ study included both the conditions that existed at the time the

study was prepared as well as a Maximum Mission Scenario that was based on the noise effects of various potentially feasible mission changes.

The Maximum Mission (also known as Mission Capacity) Scenario was established for WPAFB to provide consistency when zoning and land use policies in the community are established. Local zoning does not need to be adjusted with changes in missions because the noise contours were based on conservative assumptions regarding future missions. Therefore, the noise contours for the Maximum Mission Scenario remain in effect for local community planning purposes. Noise contour analysis is addressed in Section 3.3 of this EA.

The AICUZ program is also intended to reduce the potential for aircraft mishaps in populated areas. As a result of this program, WPAFB has altered basic flight patterns to avoid heavily populated areas. In addition, airfield safety zones were established under AICUZ to minimize the number of people who would be injured or killed if an aircraft crashed. Three safety zones are designated at the end of all active runways: Clear Zone (CZ), Accident Potential Zone (APZ) I, and APZ II.

The CZ represents the most hazardous area. The APZs are outside of the CZs. The APZ I is located immediately beyond the CZ and has a high potential for accidents. The APZ II is immediately beyond APZ I and has measurable potential for accidents. While aircraft accident potential in APZs I and II does not necessarily warrant acquisition by AF, land use planning and controls are strongly encouraged for the protection of the public. Compatible land uses are specified for these zones. According to AFI 32-7063, all new construction is required to comply with the AICUZ.

3.1.2 Existing Conditions

Wright-Patterson Air Force Base comprises 8,145 acres near Dayton, Ohio, and is divided into Area A and Area B. Area A contains administrative activities, airfield operation, maintenance, and civil engineering activities. Area B focuses on acquisition, education, research, and development. Over 2,500 acres of WPAFB remain undeveloped due to various development constraints.

There is a wide variety of land use classifications on WPAFB. Open Space and Outdoor Recreation represent some of the land constrained from development. Over 2,000 acres of this undeveloped land lies within the natural constraints area, which is composed of areas such as floodplains, lakes, wetlands, or areas with unsuitable soil for building. Also located within the natural constraint area is the 109-acre Huffman Prairie Flying Field containing remnant prairie habitat, which includes several rare plant and animal species.

Human-made constraints also restrict development within the WPAFB boundaries. Included in these types of constraints are archaeological sites and historic buildings, which can be identified sites or those that remain undiscovered. Operational restrictions can also impede development. Noise contours from

aircraft operations and explosive safety zones must be considered when looking at developing areas on the Base. Airfield and airspace control surfaces, such as runway approach CZs, are to remain clear of building obstructions. The presence of past waste disposal sites and fire training areas must be considered when siting facilities (WPAFB 1995a).

Land uses around WPAFB vary from heavily urbanized to rural agricultural (**Figure 3-1**). Most of the urbanized areas are west of the Base, with the low-density or agricultural area located east of the Base.

Most of the land surrounding WPAFB that is impacted from Base activities is compatible with Base operations. Progressive land use controls have been the most important factor concerning compatible development within noise and APZs at WPAFB (WPAFB 1995a). There are also natural areas located on or near WPAFB including Mad River, Huffman Prairie, the Licensed Shooting Preserve, and several regional and local parks. Areas of riparian woodland also exist along the Mad River as well as upland prairie that has been restored at Eastman Park.

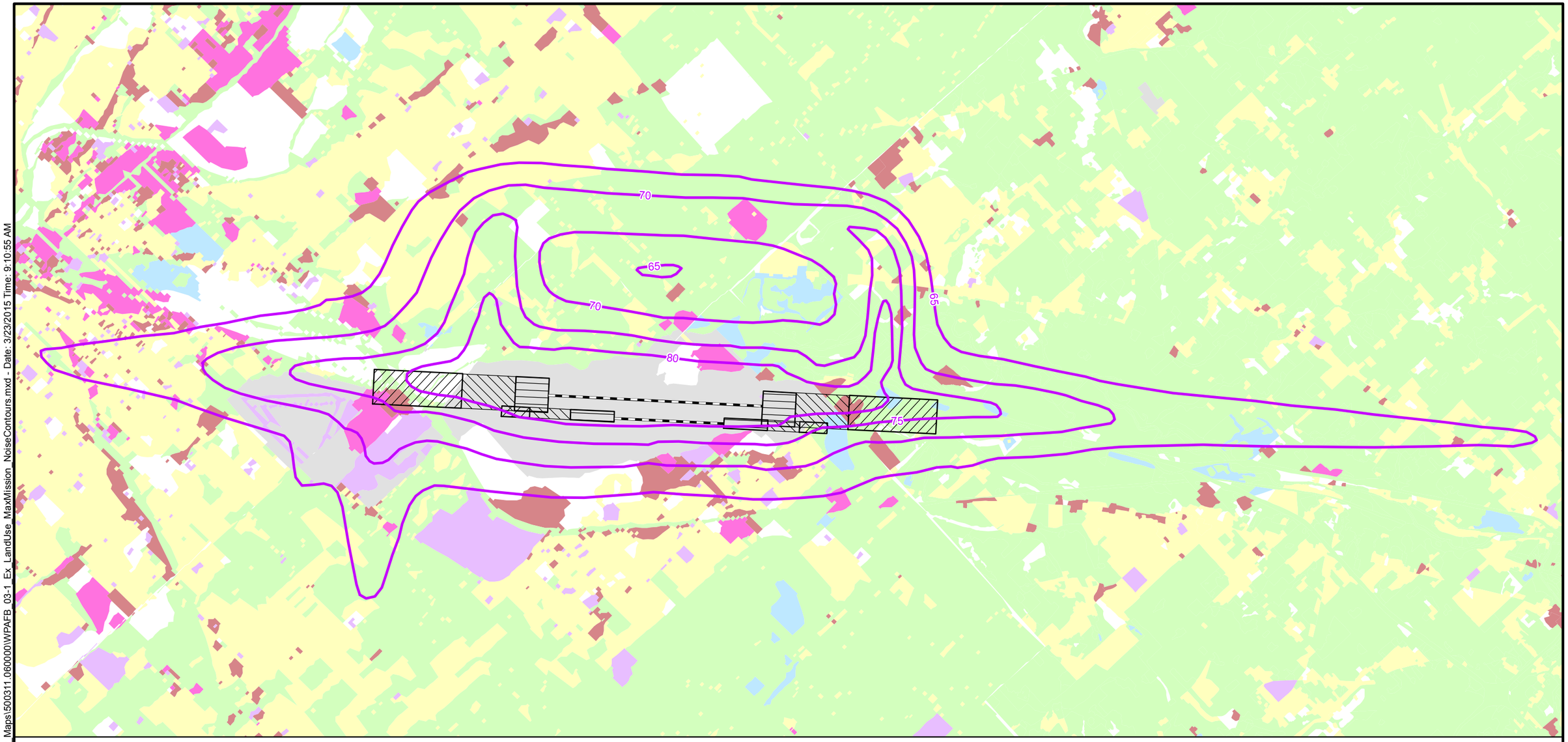
Land use on Base is classified as the following types: residential, commercial, industrial, institutional, open space, vacant/agricultural, and airports (**Figure 3-1**).

3.2 Air Quality

3.2.1 Definition of the Resource

In accordance with federal Clean Air Act (CAA) requirements, the air quality in a given region or area is measured by the concentration of various pollutants in the atmosphere. The measurements of these "criteria pollutants" in ambient air are expressed in units of parts per million (ppm) or in units of micrograms per cubic meter ($\mu g/m^3$). The air quality in a region is a result not only of the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography, the size of the "air basin," and the prevailing meteorological conditions.

The CAA directed the USEPA to develop, implement, and enforce strong environmental regulations that would ensure clean and healthy ambient air quality. To protect public health and welfare, the USEPA developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for pollutants that have been determined to impact human health and the environment. The USEPA established both primary and secondary NAAQS under the provisions of the CAA. The NAAQS are currently established for six criteria air pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (including coarse particulates equal to or less than 10 microns in diameter [PM_{10}] and fine particulates equal to or less than 2.5 microns in diameter [$PM_{2.5}$]), and lead (Pb).



Legend:

- APZ II
- APZ I
- Clear Zones
- Installation Area
- Runways
- Maximum Mission DNL Noise Contours
- Residential
- Commercial
- Industrial
- Institutional
- Open Space
- Vacant and Agricultural
- Extractive (Mining/Quarry)
- Airports

Source: 1995 AICUZ Study Maximum Mission

Source: Land Use - Ohio Department of Natural Resources
Montgomery County Land Use data; Miami County Land Use Data;
Clark County Land Use data; Greene County Land Use data.

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WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Environmental Assessment (EA) Addressing the Implementation of the Integrated Natural Resources Management Plan (INRMP) at WPAFB

FIGURE NUMBER 3-1

Existing Land Use and Maximum Mission Noise Contours at WPAFB

MSN - Path: C:\CAD-GIS\WPAFB\GIS_Documents\Project_Maps\500311.060000\WPAFB_03-1_Ex_LandUse_MaxMission_NoiseContours.mxd - Date: 3/23/2015 Time: 9:10:55 AM

The primary NAAQS represent maximum levels of background air pollution that are considered safe, with an adequate margin of safety to protect public health. Secondary NAAQS represent the maximum pollutant concentration necessary to protect vegetation, crops, and other public resources along with maintaining visibility standards. **Table 3-1** presents the primary and secondary NAAQS.

Table 3-1. National Ambient Air Quality Standards

Pollutant	Standard Value [6]		Standard Type
Carbon Monoxide (CO)			
8-hour average	9 ppm	(10 mg/m^3)	Primary
1-hour average	35 ppm	(40 mg/m^3)	Primary
Nitrogen Dioxide (NO_2)			
Annual arithmetic mean	0.053 ppm	(100 µg/m^3)	Primary and Secondary
1-hour average[1]	0.100 ppm	(188 µg/m^3)	Primary
Ozone (O_3)			
8-hour average[2]	0.070 ppm	(147 µg/m^3)	Primary and Secondary
Lead (Pb)			
3-month average[3]		0.15 µg/m^3	Primary and Secondary
Particulate < 10 micrometers (PM_{10})			
24-hour average[4]		150 µg/m^3	Primary and Secondary
Particulate < 2.5 micrometers ($PM_{2.5}$)			
Annual arithmetic mean[4]		12 µg/m^3	Primary
Annual arithmetic mean[4]		15 µg/m^3	Secondary
24-hour average[4]		35 µg/m^3	Primary and Secondary
Sulfur Dioxide (SO_2)			
1-hour average[5]	0.075 ppm	(196 µg/m^3)	Primary
3-hour average[5]	0.50 ppm	(1,307 µg/m^3)	Secondary

Notes:

1 In February 2010, USEPA established a new 1-hr standard at a level of 0.100 ppm, based on the 3-year average of the 98th percentile of the yearly distribution concentration, to supplement the existing annual standard.

2 In March 2008, the USEPA revised the level of the 8-hour standard to 0.075 ppm based on the 3-year average of the annual fourth-highest daily maximum 8-hour concentration.

3 In November 2008, USEPA revised the primary lead standard to 0.15 µg/m^3. USEPA revised the averaging time to a rolling 3-month average, not to be exceeded.

4 In December 2012, USEPA revised the level of the annual $PM_{2.5}$ primary standards to 12 µg/m^3 and retaining the secondary level of the annual $PM_{2.5}$ standard at 15 µg/m^3 and retaining the level of the 24-hour $PM_{2.5}$. With regard to primary standards for particle generally less than or equal to 10 µm in diameter (PM_{10}), USEPA is retaining the 24-hour standard and revoking the annual PM_{10} standard.

5 In June 2010, USEPA established a new 1-hr SO_2 standard at a level of 75 parts per billion (ppb), based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. The USEPA is also revoking both the existing 24-hour and annual primary SO_2 standards.

6 Parenthetical value is an approximately equivalent concentration for CO, NO_2, O_3 and SO_2.

ppb = parts per billion ; µg/m^3 (micrograms per cubic meter)
ppm = parts per million; mg/m^3 (milligrams per cubic meter)
mg/m^3 = milligrams per cubic meter
µg/m^3 = micrograms per cubic meter

The criteria pollutant O_3 is not usually emitted directly into the air, but is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants or "O_3 precursors." These O_3 precursors consist primarily of nitrogen oxides (NO_x) and volatile organic compounds (VOCs) that are directly emitted from a wide range of emissions sources. For this reason, regulatory agencies attempt to limit atmospheric O_3 concentrations by controlling NO_x and VOC emissions.

The USEPA has recognized that particulate matter emissions can have different health affects depending on particle size and, therefore, developed separate NAAQS for coarse particulate matter PM_{10} and fine particulate matter $PM_{2.5}$. The pollutant $PM_{2.5}$ can be emitted from emission sources directly as very fine dust and/or liquid mist or formed secondarily in the atmosphere as condensable particulate matter typically forming nitrate and sulfate compounds. Precursors of condensable $PM_{2.5}$ can include SO_2, NO_x, VOC, and ammonia. Secondary (indirect) emissions vary by region depending upon the predominant emission sources located within the area. The state air agency considers these sources when determining which precursors are considered significant for $PM_{2.5}$ formation and identified for ultimate control.

The CAA and USEPA delegated responsibility for ensuring compliance with NAAQS to the states and local agencies. As such, each state must develop air pollutant control programs and promulgate regulations and rules that focus on meeting NAAQS and maintaining healthy ambient air quality levels. These programs are detailed in State Implementation Plans (SIPs) that must be developed by each state or local regulatory agency and approved by the USEPA. A SIP is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS. Any changes to the compliance schedule or plan (e.g., new regulations, emissions budgets, controls) must be incorporated into the SIP and approved by the USEPA.

The CAA required that the USEPA draft general conformity regulations. These regulations are designed to ensure that federal actions do not impede local efforts to achieve or maintain attainment with the NAAQS. The General Conformity Rule regulations found in 40 CFR 93 exempt certain federal actions from conformity determinations (e.g., contaminated site cleanup and natural disaster response activities). Other federal actions are assumed to conform if total indirect and direct project emissions are below *de minimis* levels presented in 40 CFR 93.153. The threshold levels (in tons of pollutant per year) depend upon the nonattainment status that USEPA has assigned to a region. Once the net change in nonattainment pollutants is calculated, the federal agency must compare them to the *de minimis* thresholds if a conformity determination is required.

Title V of the CAA Amendments of 1990 requires states and local agencies to implement permitting programs for major stationary sources. A major stationary source is a facility (e.g., plant, base, or activity) that has the potential to emit more than 100 tons annually of any one criteria air pollutant, 10 tons per year (tpy) of a hazardous air pollutant (HAP), or 25 tpy of any combination of hazardous air pollutants. However, lower pollutant-specific "major source" permitting thresholds apply in nonattainment areas. For example, the Title V permitting threshold for an "extreme" O_3 nonattainment area is 10 tpy of potential VOC or NO_x emissions. The USEPA modified the definition of major stationary sources beginning in 2011 to include sources with the potential to emit greenhouse gases (GHG) in excess of 100,000 tpy carbon dioxide equivalents (CO_2e); however, the U.S. Supreme Court vacated GHG applicability under the Title V program on June 23, 2014. The overall purpose of the Title

V permitting rule is to establish regulatory control over large, industrial-type activities and monitor their impact on air quality.

Federal New Source Review (NSR), including Prevention of Significant Deterioration (PSD), is a preconstruction permitting program that requires stringent pollution controls when air emissions increases are "significant" from proposed new major stationary sources or major modifications at existing sources. To be "significant", a proposed project's net emission increase must meet or exceed the rate of emissions listed in 40 CFR 52.21(b)(23)(i) for criteria pollutants; or (1) a proposed project is located within 10 kilometers of any Class I area, and (2) regulated pollutant emissions would cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1 $\mu g/m^3$ or more [40 CFR 52.21(b)(23)(iii)]. The PSD regulations also define ambient air increments, limiting the allowable increases to any area's baseline air contaminant concentrations, based on the area's designation as Class I, II, or III [40 CFR 52.21(c)].

Greenhouse Gases

The GHGs are gases that retain heat in the atmosphere. These emissions are generated by both natural processes and human activities. The accumulation of GHGs in the atmosphere helps regulate the earth's temperature and is believed by USEPA to contribute to global climate change. The GHGs include water vapor, CO_2, methane (CH_4), nitrous oxide, O_3, and several hydrocarbons and chlorofluorocarbons. Each GHG has an estimated global warming potential (GWP), which is a function of its atmospheric lifetime and its ability to absorb and radiate infrared energy emitted from the earth's surface. The GWP of a particular gas provides a relative basis for calculating its CO_2e or the amount of CO_2 equivalent to the emissions of that gas. The CO_2 has a GWP of 1, and is, therefore, the standard by which all other GHGs are measured.

Executive Order (EO) 13514, *Federal Leadership in Environmental, Energy, and Economic Performance* provides strategic guidance to federal agencies in the management of GHG emissions. On February 18, 2010, the CEQ released *Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions*. This guidance advises federal agencies to consider, in scoping their NEPA analysis, whether analysis of the direct and indirect GHG emissions from their proposed actions may provide meaningful information to decision makers and the public.

If a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO_2e GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public. The CEQ does not propose this as an indicator of a threshold of significant effects, but rather as an indicator of a minimum level of GHG emission that may warrant some description in the appropriate NEPA analysis for agency actions involving direct emissions of GHGs. The CEQ also notes this indicator serves as a

minimum standard for reporting emissions under the CAA. Calculated GHG emissions as a result of the Proposed Action are discussed further in Section 4.2.2.

3.2.2 Existing Conditions

Regional Climate

The climate of this region of Ohio is humid and temperate with warm summers and cold winters. Average minimum and maximum temperatures are between 21 and 36 degrees Fahrenheit (°F) in January and 45 and 85 °F in July. The average annual precipitation is 38.43 inches, with June typically being the wettest month and October the driest month. The prevailing winds are from the southwest, with average monthly wind speeds between 3 and 7 knots.

Regional Air Quality

Under the authority of the CAA and subsequent regulations, the USEPA has divided the country into geographical regions known as Air Quality Control Regions (AQCRs) to evaluate compliance with the NAAQS. Through the CAA, Congress has stated that the prevention and control of air pollution belongs at the state and local level, thus the USEPA has delegated enforcement of the NSR/PSD and Title V programs to the OEPA. The OEPA has adopted the NAAQS by reference in the Ohio SIP, thereby requiring the use of the standards within the state of Ohio.

Wright-Patterson AFB

The Base is located in Greene and Montgomery counties, which are located in the Metropolitan Dayton Intrastate AQCR (40 CFR 81.34). Each AQCR is classified as an attainment area or nonattainment area for each of the criteria pollutants depending on whether it meets or fails to meet the NAAQS for the pollutant. Ambient air quality for the Metropolitan Dayton Intrastate AQCR was formerly classified as an attainment/maintenance area for the 8-hour O_3 (USEPA 2012a); attainment for the SO_2 3-hour standard and unclassifiable/attainment for the new 1-hour standard SO_2 established in 2013 (USEPA 2013); and attainment for the Pb and CO standard.

The ambient air quality for $PM_{2.5}$ is classified as attainment for the 24-hour standard and re-designated to attainment/maintenance for the annual standard. For the new annual $PM_{2.5}$ NAAQS, the OEPA submitted a report in December 2013 recommending that Montgomery and Greene Counties be designated as "unclassified/attainment" (OEPA 2013). This designation was approved by USEPA effective April 15, 2015 (USEPA 2015a). The USEPA also approved Ohio SIP revisions implementing the $PM_{2.5}$ NAAQS including Ohio Administrative Code (OAC) Rule 3745-31-01 (WWWW) defining $PM_{2.5}$ precursors to include sulfur dioxide and nitrogen oxides (USEPA 2015b).

Air quality is typically good in the vicinity of WPAFB, and is generally affected only locally by military and civilian vehicle emissions, particulate pollution from vehicle traffic, emissions from wastewater treatment plants, industrial sources, and construction activities. Mobile sources, such as vehicle and

aircraft emissions, are generally not regulated and are not covered under existing stationary source permitting requirements. Stationary emissions sources at WPAFB include natural gas and coal-fired boilers; research and development sources, such as laboratory fume hoods and test cells; paint spray booths; refueling operations; and emergency power generators.

The Base is under the jurisdiction of USEPA Region 5 and the OEPA. The Regional Air Pollution Control Agency (RAPCA), under the jurisdiction of the OEPA, conducts annual compliance inspections at WPAFB. The Base has long had an aggressive program of internal audits and inspections to ensure continual compliance with all applicable air permit terms and conditions. Detailed records are maintained to demonstrate compliance with emission limits, and reports are submitted in a timely manner to the local regulatory agency.

The WPAFB air emissions inventory includes over 1,400 emissions sources. Of these, approximately 1,050 are included in the Base's Title V permit application, which was originally submitted to the OEPA in February 1996 in accordance with CAA requirements. Many of the Title V sources are insignificant, including emergency generators, small boilers, and laboratory fume hoods. There were 29 permitted non-insignificant emissions units identified in the original application, most of which were boilers and paint spray booths. The OEPA finalized the Title V Operating Permit for WPAFB in January 2004 with an effective date of February 17, 2004 (OEPA 2004). A Title V renewal permit application was submitted to the OEPA in May 2008 and is currently under review. The Title V renewal application notified OEPA that the number of permitted non-insignificant emission units was reduced from 29 to 26. A revision to the Title V renewal application was submitted to OEPA on September 11, 2013 to include the coal-gas fuel conversion project at the Base central heating plants.

Area A is primarily administrative offices and includes the headquarters of the AFMC, the National Air and Space Intelligence Center (NASIC), the WPAFB Hospital, and the Patterson Airfield, which is the home of the 445th Airlift Wing. Area B is primarily research and development and includes the Air Force Institute of Technology and the Wright Airfield, which houses the National Museum of the United States Air Force. The Base also contains over 4,000 acres of land and water natural resources subject to Sikes Act management provisions.

The INRMP includes plans for prescribed burns and potential burn areas that may impact local air quality. Prescribed burns are currently being conducted on the Huffman Prairie, which require an open burn permit approved by the OEPA under OAC Rule 3745-19. The OEPA recently proposed revisions to rules 3745-19-03 and 3645-19-04 that are intended to clarify that prairie and grassland management of invasive species are valid reasons for which a permit to perform open burning may be issued under the rules. Prior to these proposed amendments, open burn permits for prairie and grassland management had been granted using Chapter 19 authority for the purposes of "…horticultural, silvicultural, range, or wildlife management practices." In a December 2013 decision on an appeal of a permit, the Environmental

Review Appeals Commission noted that prairie management using open burning to control grassland, shrubs, and invasive species does not meet the textbook definitions of either horticulture or silviculture. Draft amendments to Chapter 19 are anticipated to be published in the fall of 2015.

The Base is not required to quantify air emissions for each prescribed burn conducted. For the purposes of this EA, an Air Conformity Applicability Analysis was prepared for the Proposed Action. The analysis is discussed in Section 4 and provided in **Appendix B**.

3.3 Noise

3.3.1 Definition of the Resource

Noise is defined as an undesirable sound that interferes with communication, is intense enough to damage hearing, or is annoying. Human response to noise varies according to the source type, characteristics of the source, distance between source and receptor, receptor sensitivity, and time of day. Sound is measured with instruments that record instantaneous sound levels in decibels (dB); decibels characterize sound levels sensed by the human ear. "A-weighted" decibels (dBA) incorporate an adjustment of the frequency content of a noise event to represent the way in which the average human ear responds to a noise event. Sound levels analyzed in this EA are A-weighted.

Single-event noise, such as an overflight, is described by the sound exposure level (SEL). Cumulative noise levels, resulting from multiple single-events, are used to characterize community noise effects from aircraft or airfield environment, and are measured in the DNL metric, as described in Section 3.1.1. A general discussion of these metrics is provided below and a detailed explanation is provided in **Appendix C**.

Sound Exposure Level

The SEL measurement describes a noise event, such as an aircraft overflight, comprising a period of time when an aircraft is approaching a receptor and noise levels are increasing, the instant when the aircraft is closest to the receptor and the maximum noise level is experienced, and the period of time when the aircraft moves away from the receptor resulting in decreased noise levels. An SEL accounts for both loudness and duration of a noise event.

The SEL metric is useful when calculating the noise effects of aircraft flyovers. Frequency, magnitude, and duration vary according to aircraft type, engine type, and power setting. Individual aircraft noise data are collected for various types of aircraft and engines at different power settings at various phases of flight. These values form the basis for the individual-event noise descriptors at any location, and are adjusted to the location by applying appropriate corrections for temperature, humidity, altitude, and variations from standard aircraft operating profiles and power settings. **Table 3-2** provides SEL values (averages) at various altitudes for aircraft operating directly overhead at various speeds and power settings depending on aircraft type.

Table 3-2. SEL dB Values for Aircraft Operating in the Vicinity of WPAFB

Altitude (feet AGL)	C-5 [1]	C-17 [1]	KC-135R [1]	F-16C [1]
200	118.5	107.6	102.3	100.9
500	111.7	100.2	95.9	94.4
1,000	105.8	93.4	90.8	89.0
2,000	98.9	85.1	85.1	82.9
3,150	93.4	79.1	80.8	78.4
5,000	86.5	73.0	76.0	73.3

Notes: 1 = Day based on steady, level flight, using Omega 10.9 aircraft profile data from actual overflight noise measurements; Omega 10.9 is a standalone DoD noise-modeling program that allows the user to retrieve data from the NOISEMAP database; AGL = above ground level.

Day-Night Average A-Weighted Sound Level

The DNL noise metric incorporates a "penalty" for nighttime noise events to account for increased annoyance. The DNL is the energy-averaged sound level measured over a 24-hour period, with a 10 dB penalty assigned to noise events occurring between 10:00 p.m. and 7:00 a.m. The DNL values are obtained by averaging aircraft single event SEL values for a given 24-hour period.

The DNL is the preferred noise metric of U.S. Department of Housing and Urban Development (HUD), Federal Aviation Administration (FAA), USEPA, and DoD for modeling aircraft noise in airport environs.

Most people are exposed to sound levels of DNL 50 to 55 dBA or higher on a daily basis. Studies show that about 90 percent of the population is not significantly bothered by outdoor sound levels below DNL of 65 dBA (U.S. Department of Transportation [USDOT] 1980).

Studies of community annoyance in response to numerous types of environmental noise show that DNL correlates well with impact assessments and that there is a consistent relationship between DNL and the level of annoyance. The "Schultz Curve" (discussed in **Appendix C)** shows the relationship between DNL noise levels and the percentage of the population predicted to be highly annoyed.

Noise Criteria and Regulations

Federal and local governments have established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise. Guidelines and regulations that are relevant to the project are described below.

According to AF, FAA, and HUD criteria, residential units and other noise-sensitive land uses are "clearly unacceptable" in areas where the noise exposure exceeds DNL of 75 dBA, "normally unacceptable" in regions exposed to noise between the DNL of 65 to 75 dBA, and "normally acceptable" in areas exposed to noise where the DNL is 65 dBA or less. The Federal Interagency Committee on Noise developed land-use compatibility guidelines for noise in terms of DNL (USDOT 1980). The DNL

is the metric used by the AF in determining noise impacts of military airfield operations for land use planning.

The AF land use compatibility guidelines (relative to DNL values) are documented in the *AICUZ Program Handbook* (USAF 1999). Four noise zones are used in AICUZ studies to identify noise impacts from aircraft operations. These noise zones range from DNL of 65 to 80 dBA and above. For example, it is recommended that no residential uses, such as homes, multifamily dwellings, dormitories, hotels, and mobile home parks, be located where the noise is expected to exceed a DNL of 65 dBA.

If sensitive structures are located in areas within a DNL of 65 to 75 dBA, noise-sensitive structures should be designed to achieve a DNL of 25 to 30 dBA interior noise reduction. Noise-sensitive structures might include schools, concert halls, hospitals, and nursing homes. Elevated noise levels in these structures can interfere with speech, causing annoyance or communication difficulties. Some commercial and industrial uses are considered acceptable where the noise level exceeds DNL of 65 dBA. For outdoor activities, USEPA recommends DNL of 55 dBA as the sound level below which there is no reason to suspect that the general population will be at risk from any of the effects of noise (USEPA 1974).

Response to Noise Events

Noise annoyance is defined by USEPA as any negative subjective reaction to noise by an individual or group. The DNL is an accepted unit for quantifying annoyance to humans by general environmental noise, including aircraft noise. **Table 3-3** describes the percentage of people who were "highly annoyed" when exposed to various levels of noise measured in DNL. The data shown provides a perspective on the level of annoyance that might be anticipated. For example, 15 to 25 percent of persons exposed on a long-term basis to DNL of 65 to 69 dBA are expected to be highly annoyed by noise events.

Table 3-3. Percentage of Population Highly Annoyed by Noise Zones

DNL	Percentage of Persons Highly Annoyed	
	Low	High
65–69 dBA	15	25
70–74 dBA	25	37
75–79 dBA	37	52
80 + dBA	61	61

Source: USAF 2000

Notes: dBA = A-weighted decibel; DNL = Day-Night Average A-Weighted Sound Level

The effects of noise on sleep are of concern, primarily in ensuring suitable residential environments. The DNL incorporates consideration of sleep disturbance by assigning a 10 dBA penalty to nighttime noise events (10:00 p.m. to 7:00 a.m.). More typically, single noise events, not average sound levels, correlate with sleep disturbance. A discussion of the relationships between the occurrence of awakening and SEL is presented in **Appendix C**. Most of these relationships do not reflect habituation and, as such, do not address long-term sleep disturbance effects.

3.3.2 Existing Conditions

Existing noise contours were analyzed using results from DoD-approved noise models in the vicinity of WPAFB. The noise contour analysis for WPAFB is presented in the *1995 AICUZ Study for Wright-Patterson AFB, Ohio* (WPAFB 1995a). Based on reasonable assumptions at the time of the 1995 AICUZ Study, a Maximum Mission/Maximum Capacity Scenario was analyzed and incorporated a potential increase in F-16, F-15, C-141, and C-5 aircraft operations. Although other aircraft have been utilized at WPAFB, the Maximum Mission Model was intended to capture the maximum feasible operational capacity of the airfield and support activities. Within the limits of accuracy of the model itself, it was meant to provide a good-faith "worst-case" baseline for the surrounding communities' zoning and land-use decisions, thus limiting encroachment and preserving the capacity of the Base to host additional flying missions.

The most recent noise study for WPAFB was conducted in 2008 to confirm that C-5 aircraft noise levels were within the Maximum Mission/Maximum Capacity Scenario. This analysis confirmed that noise levels were within the Maximum Mission/Maximum Capacity contours established in 1995 (WPAFB 2011c). Since then, the 445th Airlift Wing (AW) has replaced the C-5 aircraft with the C-17. The conversion of the C-5 to the C-17 occurred throughout FY11 and is now complete. The C-17 is a newer and more flexible airlift aircraft. Due to a quieter engine, the noise levels in the vicinity of WPAFB have been reduced and are also within the Maximum Mission/Maximum Capacity Scenario. Because the Maximum Mission Scenario noise contours have been, and are currently, used for noise compatibility planning around the Base, these contours are used as the baseline for the noise analysis in this EA. **Figure 3-1** depicts the baseline noise contours presented in the 1995 AICUZ Study (WPAFB 1995a).

No noise-sensitive receptors were identified in the AICUZ. There have been no recent complaints regarding aircraft noise.

3.4 Geology and Soils

3.4.1 Definition of the Resource

Geological resources consist of the earth's surface and subsurface materials. Topography pertains to the general shape and arrangement of a land surface, including its height and the position of its natural and human-made features.

Geology is the study of the earth's composition and provides information on the structure and configuration of surface and subsurface features. Hydrogeology extends the study of the subsurface to water-bearing structures. Hydrogeological information helps in the assessment of groundwater quality and quantity and its movement.

Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil

types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses.

3.4.2 Existing Conditions

Topography and Geology

The highest elevations on the Base are in Area B and occur along a bedrock ridge that extends from the southeast corner of Area B to the Wright Memorial. The ridge was formed by Silurian Age Brassfield limestone stratigraphically overlying Ordovician Richmond shale at elevations above 906 ft above mean sea level (MSL). The majority of the Base is on the broad alluvial plain of the Mad River Valley, which overlies Ordovician-age Richmond shale and limestone bedrock (WPAFB 2001). The land surface elevation on Base ranges from approximately 760 to 980 ft above MSL (WPAFB 2001).

The Base is within the glaciated till plain region of southwestern Ohio, an area within the Central Lowlands Physiographic Province. The Central Lowlands province is characterized by low rolling hills, level plains, and flat alluvial valleys (WPAFB 2015).

Natural Hazards

The state of Ohio is characterized by a low level of seismic activity (U.S. Geological Survey [USGS] 2015). The Dayton, Ohio, area does not typically experience earthquakes because of its location in relation to fault zones (Hansen 2002). Auglaize and Shelby counties located in northwest Ohio (approximately 45 miles from Greene County) had a series of historic earthquakes in the late 1800s to mid-1900s (Hansen 2002), with the greatest instrumented magnitude recorded between 5.0 and 5.4 (USGS 2015). On July 23, 2010, a 5.0 magnitude earthquake originating along the Quebec-Ontario border was felt in Dayton and surrounding areas.

Soils

Surface soil at WPAFB formed on unconsolidated deposits, primarily alluvium, glacial outwash, glacial till, and loess (WPAFB 2015). Development and substantial earthmoving activities have altered the natural soil characteristics at WPAFB, making precise classifications difficult. The U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) mapped most of WPAFB as urban land complexes. Major soil complexes represented at WPAFB include Warsaw-Fill, Sloan-Fill, Miamian-Urban, Fox-Urban, Linwood Muck, Westland-Urban, and Warsaw-Urban. The soil types most common to WPAFB are described below.

Forty soil mapping units occur on WPAFB. Warsaw-Fill land complex is the most common soil unit on Base and occurs on 1,326 acres. This soil is found in the northeast portions of the Base. The second most common soil occurring on the Base is the Sloan-Fill land complex. This soil is found in the northern portions of the Base and covers approximately 1,232 acres.

Approximately one-half of the soils on Base have a moderate to high potential for erosions. The potential for erosion varies with topographic conditions and includes both disturbed urban land complex soils and natural loams. Bare soil leads to erosion, creation of gullies and rills, and increased sediment load in streams. Erosion can render land unsuitable for training and impassable by vehicles. Sediment in streams may affect water flow and the survival of aquatic organisms.

Sixteen of the soil units on WPAFB are designated as prime farmland soils. Most of these soils are loams located in the northeastern and southwestern portions of the Base, and in areas near SR 444. Specific soil units on Base include:

Area A

- Sloan-Fill Land Complex
- Warsaw-Fill Land Complex
- Warsaw-Urban Land Complex
- Miamian-Urban Land Complex
- Milton Silt Loam

Area B

- Miamian-Urban Land Complex
- Raub Silt Loam
- Ockley-Urban Land Complex

Sloan-Fill Land Complex soils are described as poorly drained soils that formed in alluvium and are made up of nearly level soil on floodplains where as much as 50 percent of the original soil has been covered by fill. The Sloan-Fill Land Complex soils are found at WPAFB specifically in the area of runways, taxiways, and land adjacent to these uses. The fill areas have 3 to 5 ft of fill material and are generally mineral soil, organic material, and other organic or inorganic debris from various sources. Available water capacity is high and permeability is moderate; runoff is slow. Sloan soils have a high water table for prolonged periods and are generally saturated in winter and spring (USDA 1978).

Warsaw-Fill/Warsaw-Urban Land Complex soils are described as well-drained soils that formed in loam glacial outwash over sand and gravel at a depth of 24 to 40 inches. Permeability is moderate in upper portions and high in the underlying sand and gravel. Between 25 and 50 percent of the original Warsaw soil has been covered by 2 to 5 ft of fill material. The fill material is loamy and clayey subsoil. These soils are suitable for buildings that require high bearing strength (USDA 1978).

Miamian-Urban Land Complex soils are described as well drained, nearly level to steeply sloped (6 to 12 percent) soils originally formed in glacial till that have been disturbed by earthmoving and grading operations. The steep slope and moderately low permeability result in rapid runoff. The hazard of erosion is severe in areas of bare vegetation. The Miami-Urban Land Complex soils are suitable for buildings that require high bearing strength (USDA 1978).

Milton Silt Loam soils are described as well drained, moderately deep soils that formed in glacial till and have moderate available water capacity and moderate permeability in the subsoil. Milton Loams are found on low knolls and ridges at the heads of drainageways (USDA 1978).

Raub Silt Loam soils are described as being on uplands, commonly below wet-weather seep zones. Bedrock is within 8 to 10 ft of the surface. The Raub Loam has a moderate hazard of erosion as well as seasonal high water table (USDA 1978).

Ockely-Urban Land Complex soils formed in a thin loess mantle and loamy glacial outwash underlain by sand and gravel. Most areas have been disturbed by earthmoving and grading operations. These soils provide stable sites for buildings. The potential for erosion is severe in areas bare of vegetation. The permeability of underlying sand and gravel is a hazard of erosion for sewage lagoons and trench type sanitary landfills (USDA 1978).

3.5 Water Resources

3.5.1 Definition of the Resource

Water resources include groundwater, surface water, and floodplains. Evaluation of water resources examines the quantity and quality of the resource and its demand for various purposes.

Groundwater

Groundwater consists of the subsurface hydrologic resources and is an essential resource often used for potable water consumption, agricultural irrigation, and industrial applications. Groundwater can be described in terms of its depth from the surface, aquifer or well capacity, water quality, surrounding geologic composition, and recharge rate.

Surface Water

Surface water resources consist of lakes, rivers, and streams. Storm water is an important component of surface water systems because of its potential to introduce sediments and other contaminants that could degrade lakes, rivers, and streams. Storm water flows, which may be exacerbated by high proportions of impervious surfaces associated with buildings, roads, parking lots, and airfields are important to the management of surface water. Storm water systems convey precipitation away from developed sites to appropriate receiving surface waters. Higher densities of development, such as those found in Area B, require greater degrees of storm water management because of the higher proportions of impervious surfaces that occur from buildings, parking lots, and roadways.

Floodplains

Floodplains are areas of low-level ground present along rivers, stream channels, or coastal waters and might be subject to periodic or infrequent inundation due to rain or melting snow. Flood potential is evaluated by the Federal Emergency Management Agency (FEMA), which defines the Area A 100-year

floodplain for the Mad River as 813.4 ft above MSL. The 100-year floodplain is the area that has a 1 percent chance of inundation by a flood event in a given year. Portions of Area A are located within the 100-year floodplain of the Mad River; however, Area B is not within the 100-year floodplain.

Executive Order 11988 (May 1977), *Floodplain Management*, requires federal agencies to determine whether a proposed action would occur within a floodplain and typically involves consultation of appropriate FEMA Flood Insurance Rate Maps. Executive Order 11988 directs federal agencies to avoid floodplains unless the agency determines that there is no practicable alternative. Where the only practicable alternative is to site in a floodplain, a specific step-by-step process must be followed to comply with EO 11988 outlined in the FEMA document *Further Advice on EO 11988 Floodplain Management*.

Executive Order 13690 (January 2015), *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*, amends EO 11988 and provides three approaches that federal agencies can use to establish flood elevation and hazard area for consideration in their decision-making: climate-informed science approach, adding 2-3 ft of elevation to the 100-year floodplain, and using the 500-year floodplain. The intent of EO 13690 is to reduce the risk and cost of future flood disasters by ensuring that federal investments in and affecting floodplains are constructed to better withstand the impacts of flooding (FEMA 2015a). Implementation of EO 13690 has not been addressed in the 2015 INRMP nor has the AF developed procedures for providing an integrated process for involving the public, government officials, private parties, or other interested stakeholders in the floodplain management decision-making process.

3.5.2 Existing Conditions

Groundwater

The Base is located in the Great Miami River Valley, which is filled with glacial deposits of sand and gravel. The glacial outwash deposits are very permeable and exhibit high transmissivity and hydraulic conductivity. The resulting aquifer system, called the Miami Valley Buried Aquifer, is a highly productive source of water for the millions of people in southwest Ohio. The USEPA designated the Miami Valley Buried Aquifer system as a sole-source aquifer in 1988, requiring USEPA Region 5 approval on all new projects to ensure continued use as a drinking water supply (53 Federal Register 15876). The buried aquifer system provides drinking water for more than 1.6 million people in southwest Ohio (Debrewer 2000).

Groundwater can also be found in large volumes in the Silurian-age (415 to 465 million years ago) limestone and dolomite bedrock underneath the buried valley aquifer system. Private wells and smaller public systems typically use this bedrock aquifer because, though not as productive as the buried aquifer, it is adequate for such uses (Miami Conservancy District [MCD] 2002). Underneath the limestone and dolomite bedrock is Ordovician-age (465 to 510 million year ago) bedrock shales and limestones of the

Richmond Group. The lower bedrock aquifer system generally produces less than 5 gallons per minute (gpm) and is only productive enough for livestock use.

The buried valley aquifers coincide with the present Great Miami River and its tributaries. Groundwater generally follows the same flows as surface waters with upland areas serving as recharge areas and groundwater divides (MCD 2002). At WPAFB, the Mad River follows the course of the Mad River Buried Aquifer, part of the Miami Valley Buried Aquifer system. South of Huffman Dam (a flood control dam that is managed by the MCD), a till zone divides the Mad River Buried Aquifer into an upper water table unit and a lower confined unit. However, north of the dam and in other parts of the buried valley aquifer, till zones occur less frequently as discontinuous, less-permeable zones within the more permeable outwash deposits (WPAFB 1995b).

Most of the water production wells in the outwash deposits yield between 750 and 1,500 gpm, but can vary from less than 200 to more than 4,000 gpm (WPAFB 1995b). The City of Dayton groundwater production wells at Huffman Dam are screened at depths of over 100 ft below ground surface. Portions of the Base lie within the City of Dayton Wellhead Protection Area. The City of Dayton recently approved changes to the ordinances that govern the program including the boundaries of the zoning district that limit storage and use of chemicals in order to protect the City of Dayton Wellhead Protection Area. The City of Dayton is in the process of developing a final map showing the boundaries of the Wellhead Protection Area.

Groundwater is recharged through infiltration of precipitation, groundwater flow into the area, and to a limited extent the infiltration of surface water. Seasonal high water table elevations generally occur in the spring with the lows occurring in late autumn and winter.

Area A Environmental Setting

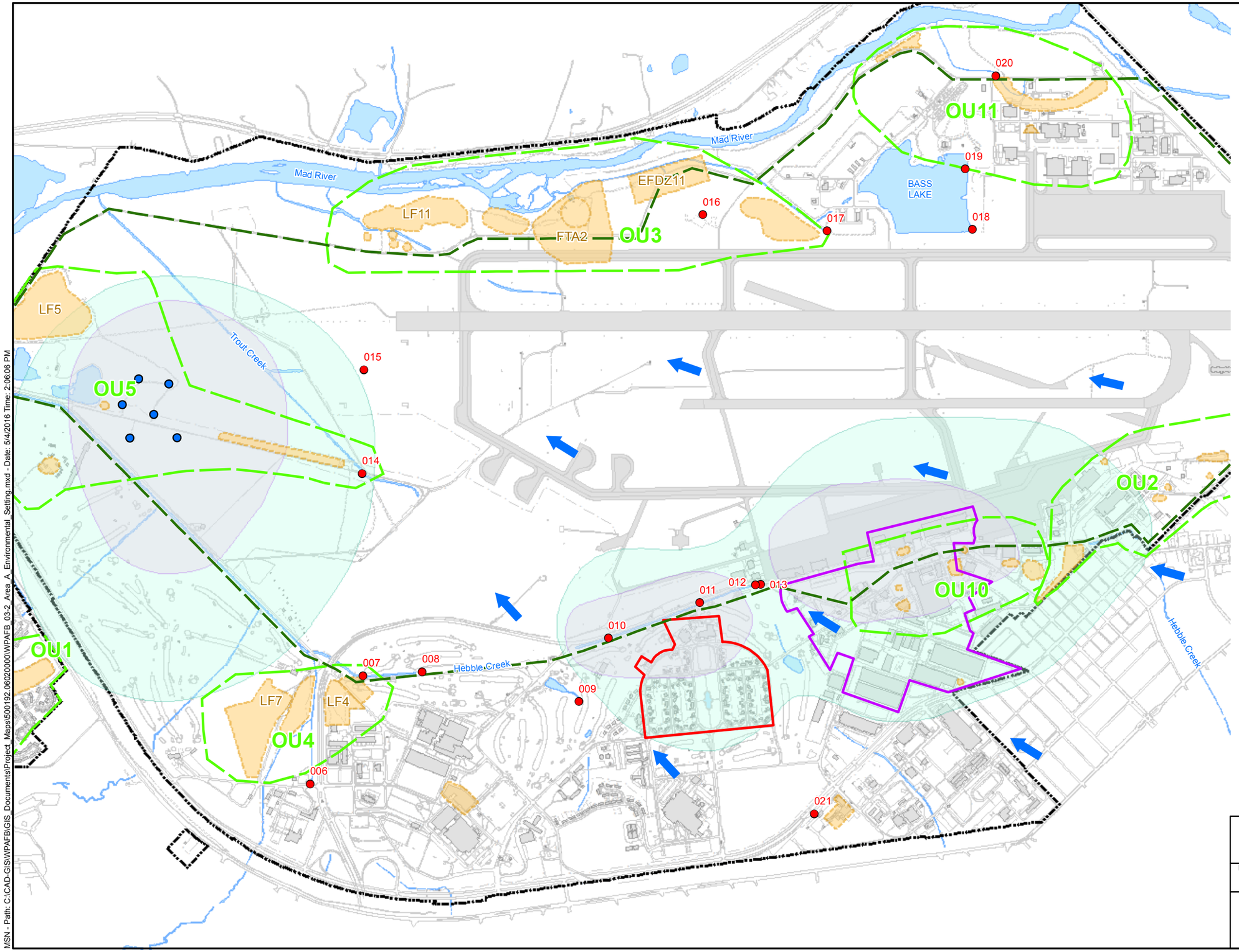
The environmental setting of Area A is presented on **Figure 3-2**. Groundwater in Area A is monitored under the Groundwater Operable Unit (GWOU) (WPAFB 1999) and the Long-term Groundwater Monitoring (LTM) Program (CBI 2015).

Area B Environmental Setting

The environmental setting of Area B is presented on **Figure 3-3**. Groundwater in Area B is monitored under the GWOU and the LTM.

Surface Water

The Base is in the Mad River Valley. The Mad River originates approximately 40 miles north of Springfield, Ohio, flows south and southwest past WPAFB to its confluence with the Great Miami River in Dayton, Ohio, and flows into the Ohio River near Cincinnati, Ohio. Sustained flow of the Mad River originates from groundwater discharge of glacial deposits upstream of Huffman Dam. The Mad River



Legend

- Storm Water NPDES Outfall
- Water Well
- Groundwater Flow (Tetra Tech, 2007)
- Installation Area
- Operable Units
- ERP Sites (Locations Approximate)
- Boundary of Fairfield Air Depot Historic District
- Boundary of Brick Quarters Historic District
- No Waterfowl Zone

Well Field Source Water Aquifer Recharge

- 1 Year Travel Time
- 5 Year Travel Time

Source: Drinking Water Source Protection Plan (Tetra Tech, 2007)

Notes:

B89CSP	Coal Storage (Bldg 89)
BS	Burial Site
CCSA	Coal and Chemical Storage Area
CDA	Chemical Disposal Area
CHP	Central Heating Plant
EFDZ	Earthfill Disposal Zone
ERTR	East Ramp UST
FTA	Fire Training Area
LF	Land Fill
SS	Spill Site
TCSP	Temp Coal Storage Pile
UST	Underground Storage Tank

N

0 750 1,500 3,000

Feet

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FIGURE NUMBER 3-2

Area A Environmental Setting

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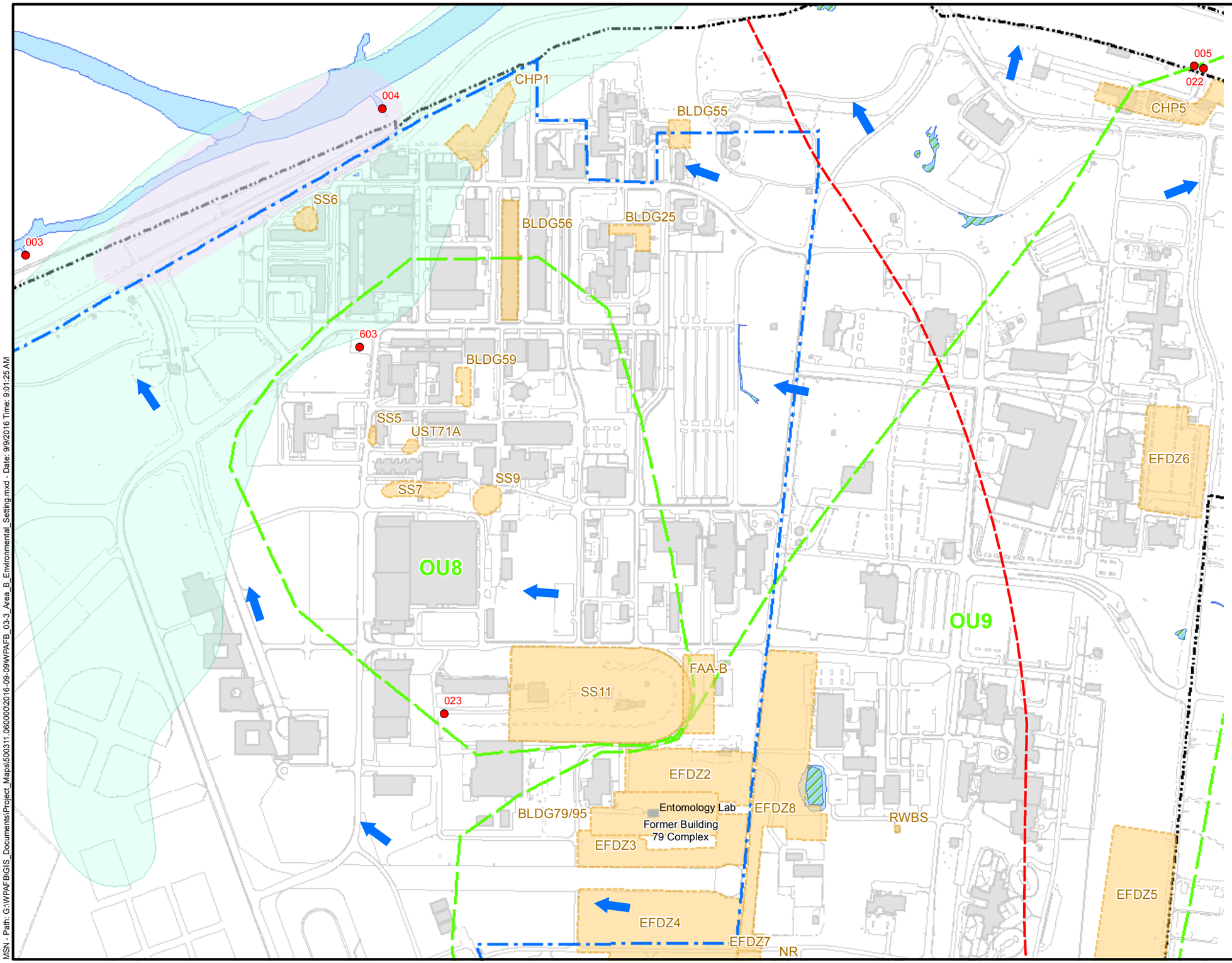

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Legend

- Storm Water NPDES Outfall
- Groundwater Flow (Tetra Tech, 2007)
- Installation Area
- Operable Units
- Wright Field Historic District
- ERP Sites (Locations Approximate)
- Wetlands
- Bedrock Ridge Groundwater Divide

Well Field Source Water Aquifer Recharge

- 1 Year Travel Time
- 5 Year Travel Time

Source: Drinking Water Source Protection Plan (Tetra Tech, 2007)

Notes:

CHP	Central Heating Plant
EFDZ	Earthfill Disposal Area
FAA-B	Further Action Area-B
RWBS	Radioactive Waste Burial Site
SS	Spill Site
UST	Underground Storage Tank

N

Feet

0 300 600 1,200

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FIGURE NUMBER 3-3

Area B Environmental Setting

approaches WPAFB from the north and flows along the western border of Area A. The OEPA has divided the Mad River watershed into five areas:

1. Headwaters
2. Mad River between Kings Creek and Chapman Creek
3. Buck Creek
4. Mad River from Chapman Creek to Mud Creek
5. Lower Mad River (Mud Creek to Great Miami River)

Mud Creek enters the Mad River 2,000 ft north of the SR 235 bridge, near the northwest corner of Area A. The Base lies adjacent to the northernmost portion of the lower Mad River segment. The OEPA has identified the lower segment of the Mad River, which flows through WPAFB, as an impaired water under Section 303(d) of the CWA for not meeting aquatic life and recreational use standards (OEPA 2010).

The USEPA has established the total maximum daily load of effluent (TMDL) for the Mad River in the *Mad River Total Maximum Daily Loads for Sediment and Turbidity* (USEPA 2007). A TMDL specifies the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and allocates pollutant loadings among point and nonpoint pollutant sources. The TMDL for the Mad River watershed has been set at 120 percent of natural sediment loading. According to the report, the natural sediment loading in the basin is approximately 894 tons/square mile/year based on an annual average.

The WPAFB Storm Water Management Plan (SWMP) and the Storm Water Pollution Prevention Plan (SWPPP) (prepared to comply with the CWA and the Ohio Water Pollution Control Act) provide descriptions of storm drainage areas and their associated outfalls, potential storm water pollution sources, and material management approaches to reduce potential storm water contamination (WPAFB 2011d, 2011e). The SWPPP was last updated in September 2011 while the SWMP was last updated in April 2011. An OEPA industrial permit (National Pollutant Discharge Elimination System [NPDES] 1IO00001) and a municipal NPDES General permit (OHQ000002) cover the WPAFB storm water program (WPAFB 2011e).

The SWPPP and SWMP provide specific BMPs to prevent surface water contamination from activities such as construction, storing and transferring of fuels, storage of coal, use of deicing fluids, storage and use of lubrication oils and maintenance fluids, solid and hazardous waste management, and use of deicing chemicals.

There are 20 defined drainage or "Outfall Areas" on Base (WPAFB 2011e). There are 24 NPDES discharge monitoring points on Base that are addressed under the NPDES permit (**Figure 3-4**). All storm water from WPAFB flows into the Mad River.

Legend

- Installation Boundary
- 001 ● NPDES Discharge Point and Outfall Number
- NA# NPDES Area
- NPDES National Pollution Discharge Elimination System

AREA A

AREA B

NA1 NA2 NA3 NA4 NA5 NA6 NA7 NA8 NA9 NA10 NA11 NA12 NA13 NA14 NA15 NA16 NA17 NA18 NA19 NA20

001 002 003 004 005 006 007 008 009 010 011 012 013 014 015 016 017 018 019 020 021 022 023 603

MAD RIVER
TROUT CREEK
HEBBLE CREEK
LILLY CREEK
Huffman Dam Lake
TWIN LAKES
GRAVEL LAKE
BASS LAKE
East Ramp
445th Airlift Wing

N

0 1,000 2,000 4,000
Feet

0 0.25 0.5 1
Miles

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FIGURE NUMBER 3-4

Stormwater Outfall Areas and Surface Water Features

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Regionally, the Mad River is located adjacent to the northwestern boundary of Area A and flows northeast to southwest (**Figure 3-4**). Surface water in the WPAFB area includes the Mad River, Trout Creek, Hebble Creek, Twin Lakes, Gravel Lake, and wetland areas. These surface water features are recharged by both precipitation and groundwater. Trout Creek and Hebble Creek provide drainage of surface water runoff at WPAFB.

Trout Creek is located in the western portion of Area A and discharges to the Mad River north of Huffman Dam. Hebble Creek passes through the southwestern portion of Area A and discharges to the Mad River several hundred feet north of Huffman Dam. Gravel Lake, Twin Lake East, and Twin Lake West are located in the southwest portion of Area A in Operable Unit (OU) 5. These lakes were created as a result of gravel quarrying activities at WPAFB. Currently, the lakes are maintained as recreational areas for Base personnel and their families.

The surface water features within Area B consist of man-made ditches and ponds, and concrete-lines channels. Storm drainage exits Area B by several paths through a combination of surface drainage and storm drains that ultimately drain to the Mad River.

Floodplains

Floodplain management on WPAFB includes floodplain protection (EO 11988, EO 13690), floodplain boundary determination, and assessment of proposed actions within floodplains. Floodplain protection and assessment of proposed actions is the responsibility of the 88 CEG EIAP. Federal actions occurring within flood zones require a finding of no practical alternative (FONPA). Floodplain boundary maps are housed in the WPAFB GIS database.

A large portion of WPAFB and most of Area A lies within the Mad River floodplain. The 10-year floodplain is at 804.7 ft above MSL, and the 100-year floodplain is at 813.4 ft above MSL (North American Vertical Datum [NAVD] 1988). Area B is classified as Zone X by FEMA, which is an area outside the 100-year floodplain with less than a 0.2 percent chance of an annual flood.

The FEMA indicates that a 10-year flood zone will always flood before a 50-year zone before a 100-year zone before a 500-year zone (FEMA 2015b). The WPAFB has mapped the most conservative flood zone (10-year) in addition to the 100-year flood zone for both areas of the Base (presented in Figures 3-5 and 3-6). The 10-year flood zone represents elevations that could be used to identify areas of greater risk than 100-year zone. Neither the Proposed Action nor the No Action involves construction activities that, if implemented, would alter the retarding basin or the floodplain elevation.

The MCD was contacted regarding the Proposed Action to implement the 2015 INRMP and to plant 1,650 potted trees. The MCD responded indicating that the project would not adversely affect the retarding basin. Correspondence with the MCD is included in **Appendix A**.

3.6 Biological Resources

3.6.1 Definition of the Resource

Biological resources include native or naturalized plants and animals, and the habitats, such as wetlands, forests, and grasslands, in which they exist. Sensitive and protected biological resources include plant and animal species listed as threatened or endangered by the USFWS or the state.

Wetlands are an important natural system and habitat because of the diverse biologic and hydrologic functions they perform. These functions include water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, wildlife habitat detention, and erosion protection. Wetlands are protected as a subset of the "the waters of the United States" under Section 404 of the CWA. The term "waters of the United States" has a broad meaning under the CWA and besides navigable water, incorporates deep-water aquatic habitats and wetlands.

The USACE defines wetlands as "those areas that are inundated or saturated with ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 CFR Part 328).

Under the ESA (16 USC 1536), an "endangered species" is defined as any species in danger of extinction throughout all or a large portion of its range. A "threatened species" is defined as any species likely to become an endangered species in the foreseeable future. The USFWS also maintains a list of species considered to be candidates for possible listing under the ESA. Although candidate species receive no statutory protection under the ESA, the USFWS has attempted to advise government agencies, industry, and the public that these species are at risk and might warrant protection under the Act.

The ODNR, Division of Wildlife (DOW) may restrict the taking or possession of native wildlife threatened with statewide extirpation and maintains a list of endangered species (Ohio Revised Code [ORC] 1531.25). Additionally, ODNR maintains a list of plant species native to the state and in danger of extirpation or are threatened with becoming endangered. These plants are protected pursuant to ORC Chapter 1518.

3.6.2 Existing Conditions

Vegetation

The Base contains four general types of natural vegetative communities including forest, old fields, prairie, and wetlands. Areas that may be impacted by the Proposed Action include maintained areas that are frequently mowed such as right-of-ways, lawns, and recreational areas, and have been designated by the Base as turf and landscaped areas. Areas that may also be impacted by the Proposed Action include sensitive habitats such as Huffman Prairie, wetlands, and natural areas inhabited by threatened and endangered species.

The Base has been awarded the Arbor Day Foundation's Tree City USA designation for 14 years (WPAFB 2012a). The Tree City USA award originates from the National Arbor Day Foundation, an organization founded in 1976 dedicated to tree plantings, conservation, and promotion of community forestry. Benefits of being a Tree City designee include creating a framework for action, education, a positive public image, and citizen pride.

The Asia-native invasive insect, EAB, was first discovered at WPAFB in July 2010. The EAB Plan implements mitigation disruption of WPAFB urban trees caused by the infestation of the EAB and estimates 5 percent of all trees on Base are ash trees and susceptible to EAB infestation (WPAFB 2010a). Currently, chemicals are used to delay the impacts of the EAB with the assumption that the life of ash trees can be extended through the use of chemical treatment (e.g., soil drench/injection, basal bark injection, foliar application).

Fence Relocation Project

A forestry mower was used to clear cut 2.05 acres of forest adjacent to the Mad River floodplain during the summer of 2015 as part of a Base fence replacement project. The 2.05-acre tree cleared area was known as an area that provided suitable foraging habitat for an Indiana bat maternity colony. Approximately 188 trees greater than 8 inches diameter breast height (dbh) were cleared as part of the fence relocation project. Because the USFWS was not provided the opportunity to review or comment on the project (fence replacement) prior to implementation (tree clearing), the USFWS requested that WPAFB provide mitigation for the loss of bat habitat. Correspondence between WPAFB and the USFWS is presented in **Appendix A**. This correspondence describes the Base's commitment to implement mitigation as an approved and appropriate compensation measure for the tree clearing project. The mitigation to plant trees on Base is described in greater detail in Section 4.6.2.

The USFWS generally recommends that tree clearing occur after September 30 and before April 1, where Indiana bats are hibernating in caves or mines, and thus would not be exposed to potential mortality from cutting of roost trees when bats are using this habitat. Tree clearing for the fence relocation project occurred on or just before July 1, 2015, which was during a period of time when female bats would have just given birth to offspring (pups). Pups are dependent on females for nourishment and are not yet able to fly, thus, if pups were roosting in any of the trees that were cleared, it is likely that the pups were injured or killed when the trees were cleared. Likewise, though adult female Indiana bats can fly, they can be injured or killed by felling of trees, depending on the particular location they are roosting in and how the tree falls relative to that location. Furthermore, activities that force a bat to flee a roost location are also considered to be harassment. Mortality, injury, harassment, and habitat loss that cause bats to alter breeding, feeding, or sheltering patterns are considered "take" under the ESA. Take is prohibited under Section 9 of the ESA unless an incidental take statement or incidental take permit has been issued by the USFWS.

The USFWS provided their written comments in September 2015 and indicated the tree clearing project was within the range of the federally endangered Indiana bat, which had been documented within forested areas of the Mad River floodplain during multiple summer bat surveys conducted at WPAFB from 1993 through 2012. The presence of female and juvenile bats during summer months in the former tree cleared area indicated a maternity colony (reproductive unit consisting of adult females and their offspring) of Indiana bats were using this habitat for roosting and foraging. The USFWS stated suitable summer Indiana bat habitat includes forests and woodlots containing potential roosts (i.e., live trees and/or snags greater than or equal to 3 inches dbh that have any exfoliating bark, cracks, crevices, hollows and/or cavities), as well as linear features such as fencerows, riparian forests, and other wooded corridors. The USFWS concluded that the 2.05-acre area where tree clearing occurred did provide high quality roosting and foraging habitat for a documented Indiana bat maternity colony. This area is targeted for habitat management in the INRMP.

Wildlife

The Base is home to a variety of wildlife. Previously conducted surveys documented the presence of 23 mammals, 118 birds, 8 reptiles, and 6 amphibians on the Base (3D International [3D] 1998). The majority of the project areas are located within disturbed areas on the Base and those species occurring in such areas are common species to the Base and surrounding area.

Because birds as well as mammals pose a hazard to airfield and aircraft operations, the Air Force has established bird air strike hazard and wildlife management plans. The Base implements a comprehensive BASH plan that involves prevention, monitoring, and reduction of bird/wildlife hazards (WPAFB 2015, 2013b). The no waterfowl zone located in Area A (**Figure 3-2**) is the area where large waterfowl (ducks and geese three pounds or more in weight) require immediate dispersal and/or lethal control (WPAFB 2013b).

Threatened and Endangered Species

Endangered and threatened species on the Base are protected under the ESA. In addition, AFPD 32-70 and AFI 32-7064 require all Air Force installations to protect species classified as federally or state endangered or threatened. State and federally-listed species recorded at WPAFB are indicated in **Table 3-4**.

Table 3-4. State and Federal Listed Species Recorded at WPAFB

Common Name	Scientific Name	Status	
		Federal[1]	State[1]
Mammals			
Indiana Bat	*Myotis sodalis*	E	E
Northern long-eared bat**	*Myotis septentrionalis*	T	SC
Bog brown bat	*Eptesicus fucus*	-	SC

Common Name	Scientific Name	Status	
		Federal[1]	State[1]
Little brown bat	*Myotis lucifugus*	-	SC
Tri-colored bat	*Perimyotis subflavus*	-	SC
Red bat	*Lasiurus borealis*	-	SC
Hoary bat	*Lasiurus cinereus*	-	SC
Birds			
Blackburnian warbler	*Setophaga fusca*	-	SI
Bobolink	*Dolichonyx oryzivorus*	-	SC
Brown creeper	*Certhia americana*	-	SI
Canada warbler	*Cardellina canadensis*	BCC	SI
Cerulean warbler	*Setophaga cerulea*	BCC	SC
King Rail	*Rallus elegans*	-	E
Magnolia warbler	*Setophaga magnolia*	-	SI
Prothonotary warbler	*Protonotaria citrea*	-	SC
Black-throated blue warbler	*Setophaga caerulescens*	-	SI
Mourning warbler	*Geothlypis philadelphia*	-	SI
Purple finch	*Haemorhous purpureus*	-	SI
Common tern	*Sterna hirundo*	BCC	E
Red-breasted nuthatch	*Sitta canadensis*	-	SI
Bald eagle	*Haliaeetus leucocephalus*	SC, BCC	-
Sharp-shinned hawk	*Accipiter striatus*	-	SC
Upland sandpiper	*Bartramia longicauda*	BCC	E
Sedge wren	*Cistothorus platensis*	-	SC
Henslow's sparrow	*Ammodramus henslowii*	BCC	SC
Least flycatcher	*Empidonax minimus*	-	SI
Golden-crowned kinglet	*Regulus satrapa*	-	SI
Yellow-bellied sapsucker	*Sphyrapicus varius*	-	SC
Northern bobwhite	*Colinus virginianus*	-	SC
Reptiles			
Eastern massasauga rattlesnake	*Sistrurus catenatus catenatus*	T(p)	E
Eastern box turtle	*Terrapane carolina*	-	SC
Smooth green snake	*Opheodrys vernalis*	-	E
Mussels			
Clubshell (subfossil)	*Pleurobema clava*	E	E
Arthropods			
Blazing star stem borer (Beer's noctuid; moth)	*Papaipema beeriana*	-	E
Moth	*Tarachidia binocula*	-	SI
Plants			
Fringe-tree*	*Chinanthus virginicus*	-	T

Common Name	Scientific Name	Status	
		Federal[1]	State[1]
Ear-leaf foxglove	*Agalinis auriculata*	-	E
Tall larkspur*	*Delphinium exaltatum*	-	PT
Silverbell*	*Halesia carolina*	-	EXTRP
Butternut	*Juglans cinerea*	-	PT
Tamarack*	*Larix laricina*	-	PT
Whorled water-milfoil	*Myriophyllum verticillatum*	-	E
Royal catchfly*	*Silene regia*	-	PT
Great Plains ladies'-tresses	*Spiranthes magnicamporum*	-	PT
Northern white cedar*	*Thuja occidentalis*	-	PT
Pigeon grape	*Vitis cinerea*	-	PT

Source: WPAFB 2015, ODNR 2015, USFWS 2013; * = Planted; ** = Not documented on WPAFB to date, but may be documented in future surveys; 1. E = Endangered; T = Threatened; T(p) = Proposed Threatened; SC = Species of Concern; SI = Special Interest; C = Candidate; PT = Potentially Threatened; EXTRP = Extirpated; BCC = Birds of Conservation Concern.

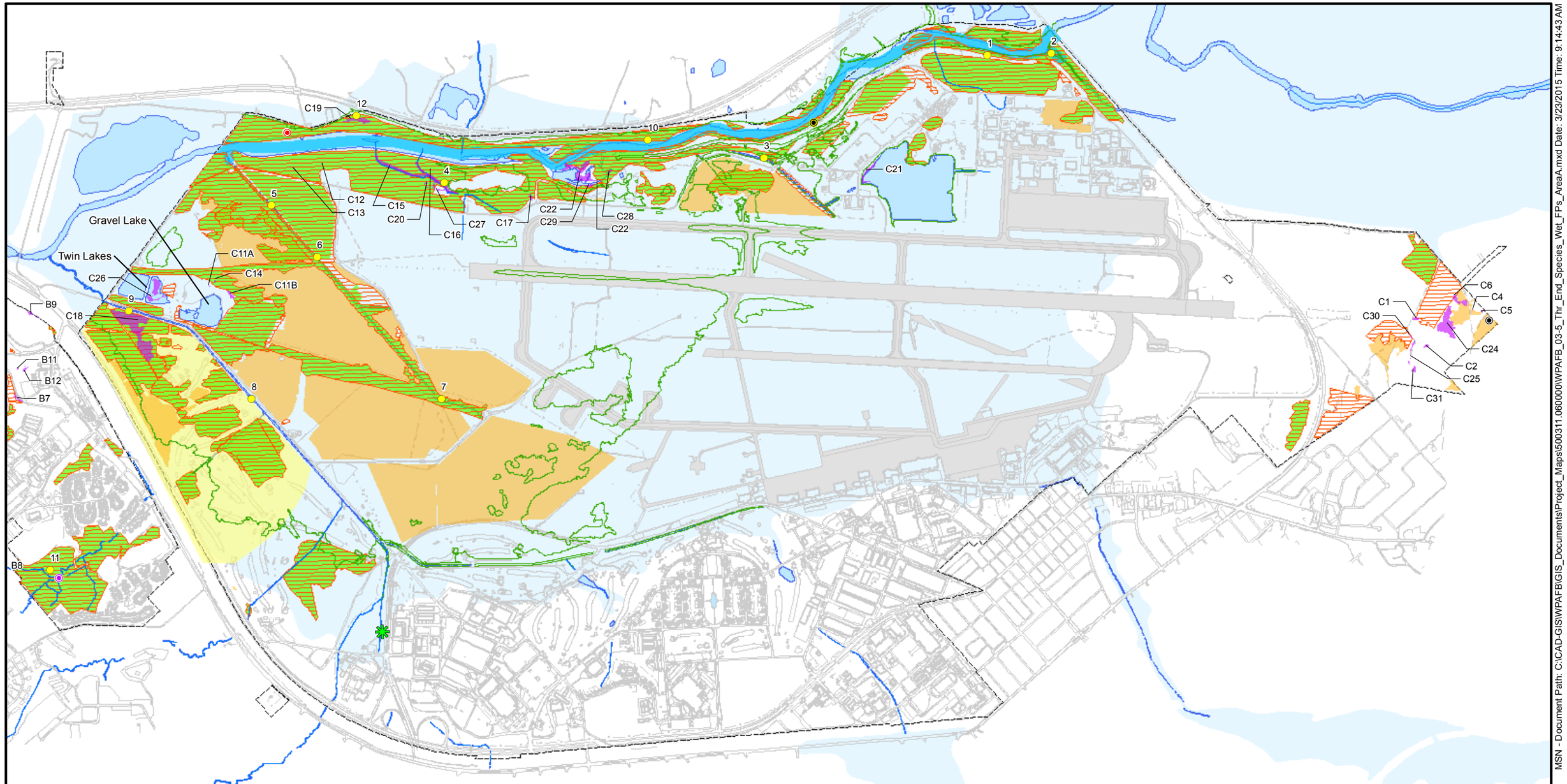
Locations of threatened and/or endangered species known to occur at WPAFB and potential habitats in Areas A and B are presented on **Figures 3-5** and **3-6**, respectively.

The WPAFB actively manages for two federally-listed species, one proposed threatened species, and four species listed as endangered by the state of Ohio. Since the primary goal of the INRMP is to avoid or minimize adverse effects to federally-listed species and minimize conflicts between listed species and the military mission, the 2015 INRMP emphasizes species-specific management strategies for those species actively managed on Base. A brief summary of the status, natural history, and conservation management practices indicated in the INRMP for federal and state-listed endangered and threatened species actively managed at WPAFB are presented below.

Indiana bat. The Indiana bat was first listed by the USFWS as endangered in 1967. Indiana bats are only known to occur on WPAFB during summer maternity season (approximately April 1 through September 30) as the Base provides summer roosting and foraging habitat. The Base does not contain suitable winter habitat (hibernacula) and no critical habitat has been designated at WPAFB. The nearest hibernaculum to WPAFB is the Lewisburg Limestone Mine in Preble County, Ohio, approximately 20 miles west of the Base (WPAFB 2015).

The following mist net surveys have been conducted on WPAFB:

- 1993 – one adult female was captured on Trout Creek in Area A.
- 2000 – two females (juvenile and adult) were captured during a base-wide survey. Radio tracking confirmed the presence of a maternity colony in a dead elm on the campus of Wright State University.



Legend

- Whorled Water Milfoil
- Great Plains Ladies Tresses
- Butternut
- Radiate Sedge
- Pigeon Grape
- Mist Net Sites
- Indiana Bat Potential Summer Roost Tree
- Installation Area
- Streams
- 10 Year Flood Zone
- 100 Year Flood Zone
- C21 - Wetland Areas
- Indiana Bat Potential Habitat
- Clubshell Potential Habitat
- Bald Eagle Potential Habitat
- Blazing Star Stem Borer Potential Habitat
- Eastern Massasauga Snake Potential Habitat

Source: Integrated Natural Resources Management Plan (2012-2016)

N

0 1,000 2,000 4,000

Feet

WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Environmental Assessment (EA) Addressing the Implementation of the Integrated Natural Resources Management Plan (INRMP) at WPAFB

FIGURE NUMBER 3-5

Threatened and Endangered Species, Wetlands, and Floodplains in Area A at WPAFB

MSN - Document Path: C:\CAD-GIS\WPAFB\GIS_Documents\Project_Maps\t500311.060000\WPAFB_03-5_Thr_End_Species_Wet_FPs_AreaA.mxd Date: 3/23/2015 Time: 9:14:43 AM

Legend

- Whorled Water Milfoil
- Great Plains Ladies Tresses
- Butternut
- Radiate Sedge
- Pigeon Grape
- Mist Net Sites
- Indiana Bat Potential Summer Roost Tree
- Installation Area
- Wetland Area
- Streams
- 10 Year Flood Zone
- 100 Year Flood Zone
- Indiana Bat Potential Habitat
- Clubshell Potential Habitat
- Bald Eagle Potential Habitat
- Blazing Star Stem Borer Potential Habitat
- Eastern Massasauga Snake Potential Habitat

Source: Integrated Natural Resources Management Plan (2012-2016)

Area B

MAD RIVER

LILLY CREEK

HEBBLE CREEK

7 8 9 11

B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13 B14 B15 B16 B17

N

0 750 1,500 3,000

Feet

WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Environmental Assessment (EA) Addressing the Implementation of the Integrated Natural Resources Management Plan (INRMP) at WPAFB

FIGURE NUMBER 3-6

Threatened and Endangered Species, Wetlands, and Floodplains in Area B at WPAFB

MSN - Document Path: C:\CAD-GIS\WPAFB\GIS_Documents\Project_Maps\500311.060000\WPAFB_03-6_Thr_End_Species_Wet_FPs_AreaB.mxd Date: 3/23/2015 Time: 9:15:28 AM

- 2007 – four lactating females were captured (no radio tracking was conducted).

- 2012 – three adult lactating females were tracked to document their day roosting locations. Two day roosts were recorded, one in Clark County north of the Base and a second in Greene County southeast of the Base. All three bats tracked were detected using the Mad River to move between their day roosts and foraging grounds.

Indiana bats captured on WPAFB likely were foraging or travelling between roost sites and foraging areas. Although no roost trees have been identified on Base, all of the forested areas and woodlots on the Base are considered potentially suitable habitat. Indiana bats may forage anywhere throughout the Base as the species typically forages near tree canopies in riparian and upland forest, along forest edges, and over fields or pastures (WPAFB 2015).

Management and protection of resources used by Indiana bats at WPAFB are primarily accomplished through restriction of activities conducted on the Base. Existing WPAFB management guidelines for Indiana bat summer habitat protect forested areas and provide roost trees and forest cover. The WPAFB restricts ground-disturbing activities and allows natural forest regeneration to occur along the Mad River and Trout Creek. The Base allows riparian forest to develop on each side of the river in most areas. Noxious or exotic vegetation that suppresses forest regeneration is being controlled in selected areas on WPAFB including within forest along the Mad River. The Base conserves bat habitat by:

- Prohibiting timber harvest and retaining all snags/cavity trees unless they pose a safety hazard or compromise the military mission.
- Requiring coordination with the WPAFB Natural Resources Manager for activities or projects that require tree removal in forested areas or small woodlots.
- Prohibiting in-stream gravel operations in the Mad River.
- Conducting periodic restoration projects along riparian corridors and tree-lined roadways that may serve as roosting and foraging habitat for Indiana bats.
- When planting trees in natural areas, uses to the maximum extent practicable the tree species included on the list of "Suggested Native Tree Species for Indiana Bat Habitat" provided by the USFWS.
- Restricting the use of aerial application or fogging with pesticides.
- Avoiding removal of suitable roost trees encountered to the maximum extent practicable and prohibiting cutting between April 1 and October 1 to avoid incidental take of roosting bats.

Northern long-eared Bat. The northern long-eared was listed by the USFWS as threatened in 2015. No critical habitat has been proposed at this time. Northern long-eared bats have not been detected at WPAFB to date (WPAFB 2015).

Bald eagle. The bald eagle was listed by the USFWS as endangered in 1978. In recent years, bald eagle populations have increased and are progressing toward species recovery. The USFWS changed the status from endangered to threatened in the lower 48 states in 1995 and removed it from the state of Ohio list of endangered, threatened, special concern, and special interest species. The bald eagle remains a federal

Species of Concern and is protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. Bald eagles only occur on WPAFB as rare winter visitors with most previous sightings having been along the Mad River. The Base routinely performs bird surveys as part of the BASH program in and around the flight line.

Two mature bald eagles were observed flying over the WPAFB airfield in March 2011 and in April 2011, a juvenile was observed perched in a tree along the Mad River near the family campground. Although no records of bald eagles nesting on WPAFB have been recorded, potential nesting habitat exists within a wooded area on Base approximately 0.5 miles from the Mad River, around Bass Lake, Gravel Lake, and Twin Lakes (WPAFB 2015).

To provide habitat for bald eagles the Base:

- Conserves riparian habitat along the Mad River and its tributaries, and the Area A lakes by prohibiting development in these areas.
- Prohibits instream gravel operations in the Mad River.
- Prohibits removal of existing tall, large-diameter trees.
- Conducts periodic forest restoration along riparian zones to promote natural forest regeneration and growth of larger trees.

Clubshell. The clubshell is listed as endangered by the USFWS and the state of Ohio. Clubshell fossil remains (shells were greatly weathered but not fossilized, indicating the mussels had been dead for a long period of time) were documented on WPAFB in the Mad River during two surveys conducted in 1998 and 1999. A freshwater mussel survey was conducted on Base in 2014, but did not detect any federally-listed mussel species. Potential habitat for the clubshell exists throughout the Mad River on WPAFB although the species had apparently been extirpated from the Mad River (WPAFB 2015).

While clubshell mussel subfossil shells have been found in the Mad River adjacent to WPAFB, rayed bean and snuffbox mussels are known to occur in the Great Miami River watershed, but have not been detected at WPAFB to date. Although WPAFB does not implement specific conservation measures for these mussels, measures in place to protect water quality in the Mad River and its tributaries are designed to maintain aquatic habitat suitable for aquatic organisms, including freshwater mussels. Prohibitions on gravel removal also help protect mussel habitat. The Base will continue to survey the Mad River every ten years in order to determine the presence/absence of the clubshell, rayed bean, and snuffbox mussel species.

Eastern massasauga rattlesnake. The USFWS added the eastern massasauga rattlesnake (EMR) to the federal candidate species list in 1999 and in 2015 proposed this species as threatened. The EMR is also endangered in the state of Ohio. The population of EMR has not been determined to date. Occasional sightings of the EMR occur near the Warfighter Training Center (WTC) and Twin Base Golf Course in Area A. Four EMRs (two males and two pregnant females) were captured in and around the WTC during

a 1993 survey. The females were released after giving birth to a total of 18 young in August of 1993; all were released back in the WTC. Surveys were conducted of the same areas in 1999 but no EMRs were observed. The latest surveys conducted from 2009 to 2013 also did not observe any EMRs (WPAFB 2015).

It is possible that EMR have been extirpated from WPAFB, although suitable habitat still exists in and around the WTC, Twin Base Golf Course, and potentially, other wetland and old field areas. The 2015 INRMP indicates that the Base proposes to conduct periodic surveys every four years to continue evaluating the status of the EMR.

Smooth green snake. The smooth green snake is listed as endangered by the state of Ohio. A base-wide survey was conducted between 2010 and 2014 by a herpetologist in cooperation with the ODNR and USFWS. During the five year survey, 123 sightings of smooth green snake were recorded. All records were within the Huffman Prairie and a prairie remnant west of Huffman Prairie (WPAFB 2015).

The 2015 INRMP indicates that the Base proposes to conduct periodic surveys every four years to continue evaluating the status of the smooth green snake.

Upland sandpiper. The upland sandpiper is listed as endangered by the state of Ohio and is on the USFWS Birds of Conservation Concern list. Bird breeding censuses were completed within the Huffman Prairie from 1991 to 1993 and after many years of intensive management again in 2014. While upland sandpipers were not detected breeding within Huffman Prairie, multiple observations of individual birds were made throughout the breeding season during 2014 (WPAFB 2015).

The 2015 INRMP indicates that audio/visual bird surveys should occur in the Huffman Prairie every four years during breeding season (April through July).

King rail. The king rail is listed as endangered by the state of Ohio and typically occurs in marshes and forages for insects among aquatic vegetation. King rails were detected during the summer of 1998 and 1999 and during the fall of 2006-2007, indicating this species is likely breeding on the Base (WPAFB 2015). The 2015 INRMP indicates bird surveys should occur in the Huffman Prairie every four years during the breeding season (May through June).

Common tern. The common tern is listed as endangered by the state of Ohio and has only been detected during spring surveys, thus likely being a migrant passing through the area. The Base does not support breeding habitat (shores of lakes or oceans and forages for fish) for this species.

Blazing star stem borer. The blazing star stem borer is listed as endangered by the state of Ohio. Three of these arthropod species were captured at the Huffman Prairie in 1992. Based on past surveys, potential

suitable habitat exists in the Huffman Prairie as well as old fields on Base. The 2015 INRMP indicates old fields will be surveyed during the summer to identify *Liatris* (food plant for stem borer) growing outside Huffman Prairie. If *Liatris* are found in old fields, plans for maintenance will be reviewed to minimize risk to blazing star stem borers that may be present. During annual seed collecting at Huffman Prairie, *Liatris* seeds will be collected and re-seeded in Huffman Prairie the following year (WPAFB 2015).

Henslow's sparrow, bobolink, and sedge wren. Henslow's sparrow, bobolink, and sedge wren are species of concern by the state of Ohio. Henslow's sparrow is also on the USFWS Birds of Conservation Concern list. All of these species have been documented breeding within Huffman Prairie. Breeding bird censuses were completed within Huffman Prairie from 1991 to 1993, 2006 to 2007, and 2014. Two Henslow's sparrow breeding territories were detected in 1991 and 12 were detected in 1992, but no breeding territories were identified in 1990, 1993, or 2014. Henslow's sparrows were detected in 2006, indicating they were probably nesting during this year. Bobolink territories were detected during all years of surveys, and ranged from 9 to 31 territories, but declined significantly between the 1990's and 2014. Sedge wrens were documented nesting in 1992 and 2014, but are known to be transitory nesters, thus absence in various years is not uncommon (WPAFB 2015).

As part of this EA, consultation with the ODNR was conducted by requesting Ohio Natural Heritage Program information for state- and federal-listed threatened and endangered plants and animals on Base. The ODNR completed a review of the Draft INRMP EA and provided comments in a letter dated October 5, 2015. The ODNR reported the Natural Heritage Database has the following data at or within a one-mile radius of the INRMP project area:

- Great Plains ladies'-tresses, state potentially threatened
- Ear-leaved-foxglove, state endangered, federal species of concern
- Midland sedge, state threatened
- Eastern massasauga, state endangered, federal candidate species
- Upland sandpiper, state endangered
- Sedge wren, state species of concern
- Indiana bat, state endangered, federal endangered
- Tonguetied minnow, state threatened
- Badger, state species of concern
- Beer's noctuid, state endangered
- Huffman Metro Park, Five Rivers Metro Parks
- Dayton Aviation Heritage Park, National Park Services
- Cemex Reserve, Greene County Park District

In addition to the Natural Heritage Database results, the ODNR DOW had the following comments regarding fish and wildlife, as presented in **Table 3-5**. Correspondence with the ODNR is presented in **Appendix A**.

The USFWS was also contacted as part of this EA to request known presence or absence of federal- and state-listed species that may be located on Base. The USFWS responded in an email dated August 26, 2015 indicating they would not consult on the INRMP management plan as a whole because some projects addressed under the INRMP (i.e., tree clearing) would result in potential impacts to suitable habitat; therefore, a "no effect" determination would not be an appropriate determination for the INRMP as a whole. The USFWS indicated they would consult, as needed, on a project-by-project basis for projects that potentially impact forest habitat suitable for Indiana bats or wetland habitat suitable for the massasauga rattlesnake. Correspondence with the USFWS is presented in **Appendix A**.

Similarly, the MCD was consulted regarding the Proposed Action. The MCD indicated that the Proposed Action of implementing the 2015 INRMP and planting 1,650 potted trees would not adversely affect the retarding basin (**Appendix A**).

Wetlands/Jurisdictional Waters

Executive Order 11990, *Protection of Wetlands*, May 24, 1977, directs federal agencies to consider alternatives to avoid adverse effects on and incompatible development in wetlands. Federal agencies are directed to avoid new construction in wetlands, unless the agency finds there is no practicable alternative to construction in the wetland, and the proposed construction incorporates all possible measures to limit harm to the wetland.

The CWA sets the basic structure for regulating discharges of pollutants to U.S. waters. Section 404 of the CWA establishes a federal program to regulate the discharge of dredge and fill material into waters of the United States, including wetlands. The National Wetlands Inventory (a department within USFWS), USEPA, and the NRCS help in identifying wetlands.

Forty wetlands covering approximately 19.8 acres were identified within the limits of WPAFB in 2009 (WPAFB 2015). Twenty-three wetlands were identified in Area A and 17 wetlands in Area B (**Figure 3-5** and **Figure 3-6**).

The total jurisdictional stream length reported on Base in 2010 was 61,358 linear feet and included 13 jurisdictional streams in Area A (6 perennial, 6 intermittent, 1 intermittent/perennial) and 13 jurisdictional streams in Area B (1 perennial, 2 intermittent/perennial, 5 intermittent, 1 ephemeral/intermittent, 4 ephemeral) (WPAFB 2015). Mapping of streams on WPAFB occurred during 2015, and any new information will be added to the INRMP during annual updates. Planned impacts to jurisdictional streams would require a 401/404 permit from the USACE and the OEPA.

Table 3-5. ODNR, Division of Wildlife Species Comments

Fish / Wildlife Species	Status*	Comment	Recommendation
Wetlands and other Water Resources	N/A		Avoid impacts and minimized to fullest extent possible, and utilize BMPs to minimize erosion and sedimentation.
Indiana bat	E, FE	If suitable tree habitat occurs within the project area, trees should be conserved.	If suitable trees must be cut, cutting should occur between October 1 and March 31. If suitable trees must be cut in summer months, net survey should be conducted between June 1 and August 15, prior to cutting.
Clubshell Rayed Bean Snuffbox Fawnsfoot	E, FE E, FE E, FE T	If no in-water work is proposed in a perennial stream, these mussel species would not likely to be impacted.	
Tongue-tied Minnow Channel Darter	T T	If no in-water is proposed in perennial streams, these fish species would not likely to be impacted.	No in-water work in perennial streams from April 15 through June 30 to reduce impacts to indigenous aquatic species and their habitat.
Smooth Greensnake	E		Prescribed burning should not be conducted when ground/soil surface temperatures have reached 60 degrees Fahrenheit or greater for 4 consecutive days. Burning after April 15 and before October 30 is discouraged in areas where state-listed reptiles are known to occur, or have the potential to occur. Burns should not be conducted within 50 meters (approximately 160 ft) of known state-listed snake hibernacula. In addition, the DOW recommends the smooth greensnake be included in the INRMP.
Spotted Turtle	T	This species would not likely be impacted if fens, bogs, marshes, wet prairies, meadows, pond edges, wet woods, or shallow sluggish waters of small streams and ditches are not impacted.	
Kirtland's Snake	T		Prescribed burning should not be conducted when ground/soil surface temperatures have reached 60 degrees Fahrenheit or greater for 4 consecutive days. Burning after April 15 and before October 30 is discouraged in areas where state-listed reptiles are known to occur, or have the potential to occur. Burns should not be conducted within 50 meters (approximately 160 ft) of known state-listed snake hibernacula.
Eastern Massasauga	E, FC		Prescribed burning should not be conducted when ground/soil surface temperatures have reached

Fish / Wildlife Species	Status*	Comment	Recommendation
			60 degrees Fahrenheit or greater for 4 consecutive days. Burning after April 15 and before October 30 is discouraged in areas where state-listed reptiles are known to occur, or have the potential to occur. Burns should not be conducted within 50 meters (approximately 160 ft) of known state-listed snake hibernacula. Any prescribed burning proposed outside of the Huffman Prairie should be coordinated with the DOW and USFWS.
Sandpiper	E		Construction and/or burning should be avoided in dry grassland habitat during the species nesting period of April 15 to July 31. If this type of habitat will not be impacted, this bird species is not likely to be impacted.
Northern Harrier	E		Construction/burning should be avoided in this habitat (marshes, grasslands) during this bird species' nesting period of May 15 to August 1. This species is not likely to be impacted if this habitat will not be impacted.

*E = State Endangered; T = State Threatened; P = State Potentially Threatened; SC = State Species of Concern; SI = State Special Interest; FE = Federal Endangered; FT = Federal Threatened; FCS = Federal Species of Concern; FC = Federal Candidate Species.

3.7 Cultural Resources

3.7.1 Definition of the Resource

Attention to cultural resources is important to WPAFB for its required efforts to comply with a host of federal laws, regulations, and executive orders. The DoD Instruction 4715.3, *Environmental Conservation Program*, and AFI 32-7065, *Cultural Resources Management*, outline and specify procedures for Air Force cultural resource management programs. The WPAFB *Integrated Cultural Resources Management Plan* (ICRMP) specifies WPAFB-specific policies and procedures regarding the treatment of cultural resources (WPAFB 2011f). Under the National Historic Preservation Act (NHPA), the Air Force is required to consider the effects of its undertakings on historic properties listed or eligible for listing in the National Register of Historic Places (NRHP) and consult with interested parties regarding potential impacts. The NRHP is the nation's formal listing of cultural resources considered worthy of preservation.

As defined by 36 CFR 800.16, historic property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion, the NRHP maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to a Native American tribe or Native Hawaiian organization and that meet the NRHP criteria. Several federal laws and regulations govern protection of cultural resources, including the NHPA (1966), the Archaeological

and Historic Preservation Act (1974), the American Indian Religious Freedom Act (1978), the Archaeological Resources Protection Act (1979), and the Native American Graves Protection and Repatriation Act (1990).

Native American tribes define cultural resources very broadly as the resources necessary for the survival and maintenance of their way of life. Ethnographic resources include plants and animals, ceremonial sites, tribal historic sites, and areas of sacred geography possessing mythic/spiritual significance.

Typically, cultural resources are subdivided into archeological resources (prehistoric or historic sites where human activity has left physical evidence of that activity but no structures remain standing) or architectural resources (buildings or other structures or groups of structures, or designed landscapes that are of historic or aesthetic significance). Archaeological resources comprise areas where human activity has measurably altered the earth or deposits of physical remains are found (e.g., arrowheads and bottles).

Architectural resources include standing buildings, bridges, dams, and other structures of historic or aesthetic significance. Generally, architectural resources must be more than 50 years old to be considered for the NRHP. More recent structures might warrant protection if they have potential as Cold War-era resources. Structures less than 50 years in age, and particularly DoD structures in the category of Cold War-era, are evaluated under explicit guidance of the National Park Service Bulletin 22.

In accordance with Section 106 of the NHPA, determinations regarding the potential effects of an undertaking on historic properties are presented to the State Historic Preservation Office (SHPO).

3.7.2 Existing Conditions

The AF proposed an undertaking to implement the 2015 INRMP. The view of the SHPO regarding management plans such as the ICRMP or the INRMP is that these are internal management tools for the Base. The Advisory Council on Historic Preservation (ACHP) holds the same opinion. This means that the SHPO/ACHP does not recognize the need for Section 106 consultation on these plans since plans change, and until an actual project representing an "undertaking" in accordance with the NHPA is proposed, there is no potential to affect historic properties. These management plans do have the potential to produce actions on the part of the Base which could have effects on historic properties. However, once activities or projects are proposed due to adherence to either management plan, those individual actions are reviewed through the standard Work Order review process. At that time a specific INRMP-associated action is proposed, it is assessed for its applicability to NHPA Section 106 review and treated accordingly.

According to the WPAFB Cultural Resources Manager, the Native American Tribes that would typically be consulted regarding EAs include the Keweenaw Bay Indian Community, Sac and Fox of the Mississippi in Iowa, United Keetoowah Band of Cherokee Indians in Oklahoma, and the Saginaw

Chippewa Indian Tribe. These tribes have indicated that they only want to be notified when the action involves new constriction and/or ground disturbance. In addition, the INRMP is a programmatic document and, as such, no consultation with Native American Tribes is warranted until an action is planned.

3.8 Socioeconomics

3.8.1 Definition of the Resource

Socioeconomics is the relationship between economics and social elements such as population levels and economic activity. Factors that describe the socioeconomic environment represent a composite of several interrelated and nonrelated attributes. There are several factors that can be used as indicators of economic conditions for a geographic area, such as demographics, median household income, unemployment rates, percentage of families living below the poverty level, employment, and housing data. Data on employment identify gross numbers of employees, employment by industry or trade, and unemployment trends. Data on industrial, commercial, and other sectors of the economy provide baseline information about the economic health of a region.

3.8.2 Existing Conditions

Demographics. Metropolitan statistical areas are geographic entities defined by the Office of Management and Budget for use by federal statistical agencies in collecting, tabulating, and publishing federal statistics. A metro area contains a core urban area of 50,000 or more population. Each metro area consists of one or more counties and includes the counties containing the core urban area, as well as any adjacent counties that have a high degree of social and economic integration (as measured by commuting to work) with the urban core (Census 2012).

The Base is located 10 miles outside of Dayton, Ohio. According to the 2010 Census data, the city of Fairborn had a population of 32,352; the city of Dayton had a population of 141,527; and the Dayton Metropolitan Area (MA) (consisting of Clarke, Greene, Miami, Montgomery, and Preble counties) had a population of 979,835 residents. Based on the 2010 Census data, the Dayton MA was the fourth largest metropolitan area in Ohio.

Employment Characteristics. The Base provides a major source of employment in the five-county area. In addition, WPAFB awards numerous contracts every year to local businesses. For FY 13 (October 1, 2012 through September 30, 2013), the total number of jobs provided by WPAFB was 26,270. This number includes military active duty, trainees and reservists, DoD civilians, and other civilians, such as contractors. This number of indirect jobs supported by the Base, such as restaurants, dry cleaners, and others is estimated at 32,384. The total economic impact to the Dayton MA was $4.0 billion (WPAFB 2013a). A large portion of residents in the Dayton MA are employed in education, health and social services; a lower percentage of residents are employed in retail trade, finance, insurance, real estate, and rental and leasing.

The 2010 unemployment rate for the Dayton MA was 10.7 percent, almost double than the statewide average of 5.6 percent (U.S. Bureau of Labor Statistics [BLS] 2011, Census 2010). The 2010 unemployment rate in the city of Riverside, the city of Fairborn, around WPAFB and within Greene County was 8.0, 8.8, and 6.2 percent, respectively, which was slightly higher than the state average of 5.6 percent. Recent unemployment rates indicate the unemployment rate for the Dayton MA was 8.7 percent in January 2013, which was reported to be slightly higher than the U.S. average of 8.5 percent (BLS 2013).

Environmental Justice and Protection of Children. The first step is to identify minority and low-income populations that might be affected by implementation of the Proposed Action, alternatives, or the No Action Alternative. It is the critical step in addressing environmental justice. The Proposed Action for this EA would not impact any low income or minority populations as the action involves on-Base property. Therefore, Environmental Justice is not an issue and will not be discussed further in this EA.

3.9 Health and Safety

3.9.1 Definition of the Resource

A safe environment is one in which there is no, or an optimally reduced, potential for death, serious bodily injury or illness, or property damage. Safety and accident hazards can often be identified and reduced or eliminated. Necessary elements for an accident-prone situation or environment include the presence of the hazard itself together with the exposed (and possibly susceptible) population. The degree of exposure depends primarily on the proximity of the hazard to the population. Activities that can be hazardous include transportation, maintenance and repair activities, and the creation of highly noisy environs. The proper operation, maintenance, and repair of vehicles and equipment carry important safety implications. Any facility or human-use area with potential explosive or other rapid oxidation processes creates unsafe environments for nearby populations. Extremely noisy environments can also mask verbal or mechanical warning signals such as sirens, bells, or horns.

Munitions and Explosive Safety

Explosives are classified based on their reactions to specific influences. The explosives hazard class is further subdivided into "division", based on the character and predominance of the associated hazards and their potential for causing personnel casualties or property damage. Explosives Hazard Class/Division 1.4 designates a moderate fire with no significant blast or fragment hazard (Sandia 2010).

Explosive safety zones (ESZs) are required for areas where ordnance are stored or handled. The ESZs are typically determined based upon the net explosive weight of the ordnance to be stored or handled and the blast resistance properties of the magazine. Explosive Safety Quantity Distance (ESQD) arcs that delineate the extents of each ESZ are constructed. The ESZ and ESQD requirements are specified in Air Force Manual (AFMAN) 91-201, *Explosive Safety Standards*.

Contractor Safety

Safety is largely adherence to regulatory requirements imposed for the benefit of employees and implementation of operational practices that reduce risks of illness, injury, death, and property damage. The health and safety of onsite military and civilian workers are safeguarded by DoD and AF regulations designed to comply with standards issued by Occupational Safety and Health Administration (OSHA) and USEPA. These standards specify the amount and type of training required for industrial workers, the use of protective equipment and clothing, engineering controls, and maximum exposure limits for workplace stressors.

3.9.2 Existing Conditions

Munitions and Explosives Safety

There are several areas that are constrained by ESQD CZ in the Patterson Field area. These areas would be identified prior to performing natural resources management activities in the vicinity of the airfield. The Weapons Safety Manager would be consulted, as necessary.

In addition, QD CZs are required for two events that are held annually at WPAFB in Area B: the AFMC Freedom Call Tattoo event and the Air Force Marathon. The AFMC Freedom Call Tattoo is held each summer to recognize the contributions of military veterans, their families, and all Americans who support them and includes a spectacular presentation of flyovers, music, narration, and fireworks (WPAFB 2012b). The Air Force Marathon is conducted annually on the third Saturday of September in celebration of the AF. The marathon course is a 26.2-mile run that traverses historical places throughout the Base (WPAFB 2012c). To begin the race, a detonation cord (high-speed fuse) signals the start of the race. Two QD CZs are required around the detonation cord.

Contactor Safety

All contractors performing INRMP-related activities are responsible for following ground safety regulations and worker compensation programs, and are required to conduct activities in a manner that does not pose any risk to workers or personnel. Industrial hygiene programs address exposure to hazardous materials, use of personal protective equipment, and availability of Material Safety Data Sheets for chemicals such as pesticides. Industrial hygiene is the responsibility of contractors, as applicable. Contractor responsibilities are to review potentially hazardous workplace operations; to monitor exposure to workplace chemical, physical, and biological agents; to recommend and evaluate controls (e.g., ventilation, respirators) to ensure personnel are properly protected or unexposed; and to ensure a medical surveillance program is in place to perform occupational health physicals for those workers subject to any accidental chemical exposures.

3.10 Environmental Restoration Program

3.10.1 Definition of the Resource

Through its ERP, the DoD evaluates and cleans up sites where hazardous wastes have been spilled or

released to the environment. The ERP provides a uniform, thorough methodology to evaluate past disposal sites, to control the mitigation of contaminants, to minimize potential hazards to human health and the environment, and to clean up contamination. Knowledge of past ERP activities provides a useful gauge of the condition of soil, water resources, and other resources that might be affected by contaminants. It also aids in identification of properties and their usefulness for given purposes (e.g., activities dependent on groundwater usage might be foreclosed where a groundwater contaminant plume remains to complete remediation).

3.10.2 Existing Conditions

The ERP is a subcomponent of the Defense Environmental Restoration Program that became law under the Superfund Amendments and Reauthorization Act (SARA) (formerly the Installation Restoration Program [IRP]). The ERP requires each DoD installation to identify, investigate, and clean up hazardous waste disposal or release sites. The Base began its IRP in 1981 with the investigation of possible locations of hazardous waste contamination. In 1988, WPAFB entered into an Ohio Consent Order with the OEPA. In October 1989, WPAFB was placed on the USEPA's National Priorities List, a list of sites that are considered to be of special interest and require immediate attention (WPAFB 2001).

The Base currently has identified 67 ERP sites, two regional groundwater sites, and several areas of concern per the Air Force Restoration Information Management System. The Base has grouped the majority of confirmed or suspected sites requiring investigation and characterization in 11 geographically-based OUs, designated as OUs 1 through 11 (IT 1999). In addition to the 11 OUs, WPAFB addressed basewide issues of groundwater and surface water contamination under the Basewide Monitoring Program and Long-Term Groundwater Monitoring Program (BMP/LTM). Principal groundwater contaminants beneath WPAFB include benzene, toluene, ethylbenzene, xylene, trichloroethene, and tetrachloroethene (WPAFB 2007).

Remedies for the ERP sites are documented in six Record of Decision (ROD) documents:

1. *Record of Decision, Source Control Operable Unit, Landfills 8 and 10*, (WPAFB 1993)
2. *Record of Decision, Off-Source Operable Unit and Final Remedial Action, Landfills 8 and 10*, (WPAFB 1994)
3. *Record of Decision for 21 No Action Sites*, (WPAFB 1996)
4. *Record of Decision for Spill Sites 2, 3, and 10 (Operable Unit 2)*, (WPAFB 1997)
5. *Record of Decision for 41 No Action Sites at Wright-Patterson Air Force Base*, (WPAFB 1998)
6. *Record of Decision for the Groundwater Operable Unit 2*, (WPAFB 1999)

The current and future land uses as agreed upon in these RODs between the federal and state EPA and WPAFB identify the land use controls (LUCs) necessary to support the remedial action or No Further Action (NFA) decisions for industrial/recreational sites (WPAFB 2012d). A list of Basewide ERP sites at WPAFB in Areas A and B is presented in **Table 3-6**. The current land use and allowable land use for

each ERP site are also provided.

The LUCs are commonly used when contamination is present and not yet addressed, when remediation is in progress, or when residual contamination is present in amounts that do not allow for unrestricted use of the site. Controls include any type of physical, legal, or administrative mechanism that restricts the use of, or limits access to real property to prevent or reduce risks to human health and the environment, as indicated above in **Table 3-6** footnotes (WPAFB 2012d).

Table 3-6. Basewide ERP Sites

Area	Operable Unit	ERP Sites	Current Land Use	Allowable Land Use[i]
A	OU2	Long-Term Coal Storage Area (LTCSA)	Industrial	3
		Temporary Coal Storage Pile (TCSP)	Industrial	3
		Coal and Chemical Storage Area (CCSA)	Industrial	3
		Building 89 Coal Storage Pile (B89CSP)	Industrial/Commercial	3
		Spill Sites 2 (SS2)	Industrial – Petroleum, Oil, Lubricants (POL) Farm	3
		SS3	Industrial POL Farm	3
		SS10	Industrial POL Farm and Flightline	3
	OU3	Fire Training Areas 2 (FTA2)	Industrial	3
		FTA3	Industrial	3
		FTA 4	Industrial	3
		FTA5	Industrial – Training	3
		Landfill 11 (LF11)	Recreational – Hunting	2
		LF12	Recreational – Hunting/Camping and Light Industrial	3
		LF14	Recreational – Hunting	3
		Earthfill Disposal Zone 11 (EFDZ11)	Recreational	3
		EFDZ12	Recreational	3
		SS1	Light Industrial	3
	OU4	LF3	Recreational – Golf	1
		LF4	Industrial	1
		LF6	Recreational – Equestrian	1
		LF 7	Recreational – Equestrian	1
	OU5	LF5	Recreational – Hunting	1
		FTA1	Industrial – Training Area	3
		Burial Site 4 (BS4)	Recreational	3
		Gravel Lake Tank Site (GLTS)	Recreational – Fishing	3
	OU7	LF9	Recreational – Hunting	2
	OU10	LF13	Industrial/Commercial	2
		Central Heating Plant 3 (CHP3)	Industrial	3
		Tank Farm 49A (TF49A)	Industrial	3
		UST119	Industrial	3
		SS4	Industrial	3

Area	Operable Unit	ERP Sites	Current Land Use	Allowable Land Use[i]
	OU11	BS2	Commercial	3
		Chemical Disposal Area (CDA)	Industrial	3
		UST34020	Industrial	3
B	OU1	LF8	Industrial Adjoins Residential & Wooded Area	1
		LF10	Industrial Adjoins Residential & Wooded Area	2
	OU6	LF1	Recreational	2
		LF2	Recreational – Hunting	1
		EFDZ1	Industrial/Recreational	3
	OU8	SS5	Industrial	3
		SS6	Industrial	3
		SS7	Industrial	3
		SS9	Industrial	3
		SS11	Industrial – Aircraft Survivability Research Facility	3
		UST71A	Industrial	3
		SS7	Industrial	3
	OU9	EFDZ 2 through EFSZ 10	Industrial/Recreational	3
		BS3	Industrial	3
		CHP5	Industrial	3

[i]Land Use Key (WPAFB 2012d):

1 – No digging, building, construction, or otherwise disturbing landfill covers.

2 – Digging, construction and other soil disturbances allowable after approval by CE and Environmental Management Division personnel; area subject to use restriction.

3 – Must check with Environmental Management Division prior to drilling or otherwise accessing groundwater.

4 – Unrestricted use.

1

4.0 ENVIRONMENTAL CONSEQUENCES

This section describes the potential consequences associated with implementing the Proposed Action or the No Action Alternative. In **Sections 4.1** to **4.10**, each alternative is evaluated for its potential to affect physical, biological, and socioeconomic resources in accordance with 40 CFR §1508.8. Potential impacts for each resource area are described in terms of their significance. Significant impacts are those that would result in substantial changes to the environment or socioeconomic resources (as defined by 40 CFR §1508.27) and should receive the greatest attention in the decision-making process.

The thresholds of change for the intensity of impacts are defined as follows:

- *Negligible*, the impact is localized and not measureable or at the lowest level of detection;
- *Minor*, the impact is localized and slight but detectable;
- *Moderate*, the impact is readily apparent and appreciable;
- *Major*, the impact is severely adverse or highly noticeable and considered to be significant; or
- *Beneficial*, the impact is considered positive for the resource area.

4.1 Land Use

4.1.1 Evaluation Criteria

Potential impacts on land use are based on the level of land use sensitivity in areas affected by a proposed action and compatibility of proposed actions with existing conditions. A land use impact would be adverse if it met the following criteria:

- Inconsistency or noncompliance with existing land use plans or policies
- Precluded the viability of existing land use
- Precluded continued use or occupation of an area
- Incompatibility with adjacent land use to the extent that public health or safety is threatened
- Conflict with planning criteria established to ensure the safety and protection of human life and property

4.1.2 Proposed Action

No adverse effects on land use are expected because no changes to land use would occur at or surrounding WPAFB as a result of implementing the Proposed Action. Therefore, there would be no significant impacts to land use resources.

4.1.3 No Action

The No Action Alternative would have no impact on land use over current conditions.

4.2 Air Quality

4.2.1 Evaluation Criteria

The environmental consequences to local and regional air quality conditions near a proposed federal action are determined based upon the increases in regulated pollutant emissions relative to existing conditions and ambient air quality. For the purposes of this EA, the impact in NAAQS "attainment" areas would be considered significant if the net increases in pollutant emissions from the federal action would result in any one of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Expose sensitive receptors to substantially increased pollutant concentrations
- Exceed any Evaluation Criteria established by a SIP

As mentioned in Section 3.2, the area including WPAFB is classified as a moderate maintenance area for O_3 and $PM_{2.5}$, and is designated as an unclassified/attainment area for all other criteria pollutants.

Impacts on air quality in NAAQS "nonattainment" areas (NAAs) are considered significant if the net changes in project-related pollutant emissions result in any of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Increase the frequency or severity of a violation of any ambient air quality standard
- Delay the attainment of any standard or other milestone contained in the SIP

Because WPAFB is located in areas designated as attainment/maintenance for O_3 and $PM_{2.5}$, a conformity applicability analysis is required to determine whether the Proposed Action or No Action Alternative is subject to the Conformity Rule. With respect to the General Conformity Rule, effects on air quality would be considered significant and, therefore, subject to an evaluation to determine compliance with the General Conformity Rule, if:

- The proposed federal action does not relate to transportation plans, programs, and projects developed, funded, or approved under Title 23 U.S.C. or the Federal Transit Act, and
- The Proposed Action-related direct and indirect emissions exceed *de minimis* threshold levels established in 40 CFR 93.153(b) for individual nonattainment pollutants or for pollutants for which the area has been re-designated as a maintenance area.

The *de minimis* threshold emission rates were established by the USEPA in the General Conformity Rule to focus analysis requirements on those federal actions with the potential to have "significant" air quality impacts. **Table 4-1** presents the *de minimis* thresholds for each regulated pollutant. The *de minimis* thresholds shown in **Table 4-1** vary depending on the severity of the nonattainment area classification.

Air Quality Regulations Applicable to the Proposed Action

Stationary Sources and New Source Review. Local and regional pollutant impacts resulting from direct and indirect emissions from stationary emission sources under the Proposed Action are addressed through federal and state permitting program requirements under NSR regulations (40 CFR 51 and 52).

Table 4-1. Conformity *de minimis* Emission Thresholds

Pollutant	Status	Classification	*de minimis* Limit (tpy)
Ozone (measured as NO_x or VOCs)	Nonattainment	Extreme	10
		Severe	25
		Serious	50
		Moderate/marginal (inside ozone transport region)	50 (VOCs)/100 (NO_x)
		All others	100
	Maintenance	Inside ozone transport region	50 (VOCs)/100 (NO_x)
		Outside ozone transport region	100
Carbon Monoxide (CO)	Nonattainment/ maintenance	All NAA's and Maintenance Areas	100
Particulate Matter (PM_{10})	Nonattainment	Serious	70
		Moderate	100
	Maintenance	All Areas	100
Particulate Matter ($PM_{2.5}$)	Nonattainment/ maintenance	Direct Emissions	100
		SO_2 precursors	100
		NO_x precursors	100
		VOC or Ammonia precursors (if significant)	100
Sulfur Dioxide (SO_2)	Nonattainment/ maintenance	All NAA's and Maintenance Areas	100
Nitrogen Oxides (NO_x)	Nonattainment/ maintenance	All NAA's and Maintenance Areas	100
Lead (Pb)	Nonattainment/ maintenance	All NAA's and Maintenance Areas	25

Source: 40 CFR 93.153 (b)
tpy: tons per year

Local stationary source permits are issued by OEPA and enforced by RAPCA. As noted previously, WPAFB has appropriate permits in place and has met all applicable permitting requirements and conditions for existing stationary devices. The Proposed Action is not subject to minor source permitting requirements or subject to NSR/PSD. Prescribed burns, even those conducted according to regular schedules as indicated in the WFMP, are considered fugitive sources of emissions, as well is tree planting activities. The open burn permits required by OEPA are not considered part of the New Source Review program.

National Emissions Standards for Hazardous Air Pollutants. Because WPAFB has the potential to emit more than 25 tpy of hazardous air pollutants, certain hazardous air pollutant-emitting activities on Base are subject to regulation under federal National Emissions Standards for Hazardous Air Pollutants (NESHAP) rules promulgated in 40 CFR Parts 61 and 63. These NESHAP require implementation of emissions control measures and detailed recordkeeping and reporting requirements to show compliance with applicable rules for select operations. Specific NESHAP that apply to activities at WPAFB include:

- 40 CFR 63 Subpart GG, Aerospace NESHAP
- 40 CFR 63 Subpart ZZZZ, Reciprocating Internal Combustion Engines (RICE) Maximum Achievable Control Technology (MACT)
- 40 CFR 63 Subpart DDDDD, Industrial, Commercial, and Institutional Boilers (Boiler MACT)
- 40 CFR 61 Subpart M, Asbestos Remediation

In addition, WPAFB would also be subject to the Defense Land Systems and Miscellaneous Equipment (DLSME) NESHAP when that rule is promulgated. This rule would cover military surface coating operations other than those subject to the Aerospace and Shipbuilding NESHAP. The intent is to simplify compliance for DoD facilities that are currently forced to comply with multiple overlapping, and sometimes conflicting, NESHAP including the Miscellaneous Metal Parts and Products Coating NESHAP, Plastic Parts and Products Coating NESHAP, Metal Furniture Coating NESHAP, Large Appliance Coating NESHAP, and Fabric and Other Textiles Coating NESHAP. The USEPA currently has no date set for publication of a draft DLSME NESHAP. Neither the Proposed Action nor the No Action Alternative is subject to NESHAP requirements. However, prescribed burns are fugitive sources of emissions that must be considered when determining if a source is a major source of HAPs.

Open Burning Regulations. The OAC rule 3745-19-04(C) allows open burning in unrestricted areas upon written receipt from OEPA (i.e., open burn permit). The open burn permit restricts burning to specific times of the year and may be revoked for failure to follow stipulations indicated in the permit that includes, but are not limited to:

- Maintaining all fires in a nuisance-free fashion.
- Notifying the WPAFB Fire Department prior to burning.
- Written permission notice must be on-site during burning.
- Fire extinguishing material must be on-site at all times.
- Burn only when wind is less than 12 miles per hour and at WPAFB Fire Department discretion.

Furthermore, OAC rule 3745-19-02 prohibits open burning during Air Pollution Advisory Days and does not exempt sources that obtain a valid open burn permit from compliance with any section of the Ohio Revised Code, or any regulation of any state department, or any local ordinance or regulation dealing with open burning.

Fugitive Dust Regulations. The OAC rule 3745-15-07 declares dust escaped from any source that causes damage to property to be a public nuisance. Pursuant to OAC rule 3745-17-08(A)(2), the OEPA Director may require any source that causes or contributes to such a nuisance to submit and implement a control plan that employs reasonably available control measures to prevent fugitive dust from becoming airborne. The fugitive emissions from any prescribed burn or soil disturbances from tree planting have the potential to become a nuisance in violation of the open burn permit and the fugitive dust regulations. Any fire management plan and tree planting contract developed by WPAFB should include mitigation steps to preempt any emissions from prescribed burning and soil disturbances from becoming a nuisance.

Greenhouse Gases. The GHG emissions from the Proposed Action have been quantified to the extent feasible for information and comparison purposes. As previously indicated, the CEQ guidance indicates the reference point of 25,000 metric tons of direct CO_2e GHG emissions provides agencies with a useful indicator. The GHG emissions from prescribed burning include CO_2, CH_4, and NO_2 components. The CO_2 emissions from burning vegetation are generally considered part of the natural carbon cycle and USEPA does not typically include those pollutants in GHG emission inventories.

The GHG emissions in terms of CO_2e emission level were estimated and reported in **Appendix B** at approximately 10,762 metric tons (11,864 long tons) for the Proposed Action. This emission total includes emissions from all three components CO_2, CH_4, and NO_2. These GHG emission levels fall below the CEQ guidance reference point for warranting further consideration. Noted here is the fact that the tree planting activities would eventually by design and over time, sequester more carbon from the atmosphere than would be lost in the forest removal and expended to replant the trees.

Conformity. Because NAAQS maintenance areas for two criteria pollutants are affected by the Proposed Action, the AF must comply with the federal General Conformity Rule. An analysis has been completed to ensure that, given the changes in direct and indirect emissions of the O_3 precursors (NO_x and VOCs), direct $PM_{2.5}$, and $PM_{2.5}$ precursors (CO_2 and NO_x), the Proposed Action would be in conformity with CAA requirements. The Conformity Determination requirements specified in this rule can be avoided if the project pollutant rate increase resulting from any Alternative is below *de minimis* threshold levels for each pollutant of interest. For purposes of determining conformity in these attainment/maintenance areas, AFI 32-7404 paragraph 3.4.2 states that the proponent shall perform a General Conformity Applicability Analysis using the Air Conformity Applicability Model (ACAM) or other AF-approved (A4C) automated air quality impact tool. Because the current ACAM 5.0.2 version does not provide an emission calculation module for prescribed burns or silviculture activities, projected regulated pollutant emissions associated with the Proposed Action were estimated using published USEPA emission factors. The emissions calculations and *de minimis* threshold comparisons are presented in the Air Conformity Analysis provided in **Appendix B**.

The emission calculations are based on information on the proposed prescribed burn areas identified in the WPAFB WFMP (WPAFB 2014) and a review of the tree planting project contractor bid documents. These calculations assume that all prescribed burns for each proposed area will occur annually over the entire area. It is further assumed that all prescribed burns will be conducted with WPAFB existing personnel and equipment. Thus, no commuter, vehicle, or equipment emissions are considered in the prescribed burn analysis. The tree planting project assumes that a contract crew of three individuals would be required for up to a two week period. Commuter, delivery vehicle, and equipment emissions are included in this analysis. The emissions calculated for the entire prescribed burn program annual emissions and the tree planting project in total are compared with the d*e minimis* level thresholds.

4.2.2 Proposed Action

Direct and Indirect Emissions

Prescribed Burn Areas. Under the Proposed Action, 12 total prescribed burn areas were identified for possible management. Currently, only the Huffman Prairie prescribed burn area is managed by controlled burns to one of four quadrants on a four year rotation. Emission estimates were calculated using USEPA AP-42 Chapter 13 along with its support document *Development of Emissions Inventory Methods for Wildland Fire*, February 2002. **Table 4-2** lists the total emissions for each of the 12 prescribed burn areas. The total emissions assume that 100 percent of the surface area of each prescribed burn area is combusted within one calendar year as a means to provide worst-case emission levels.

Table 4-2. Criteria Pollutant Emissions at WPAFB Associated with the Proposed Action Prescribed Burns

Prescribed Burn Area Unit Name	Area	VOC Emissions (tpy)	NO_x Emissions (tpy)	$PM_{2.5}$ Emissions (tpy)	SO_2 Emissions (tpy)
Huffman Prairie	A	3.83	4.19	10.15	0.99
Liquid Oxygen Plant	A	0.61	0.67	1.61	0.16
Sandhill	A	0.62	0.67	1.63	0.16
Sheep Pen	A	1.24	1.36	3.28	0.32
Huffman Prairie Flying Field	A	4.72	5.17	12.51	1.23
Licensed Shooting Preserve	A	5.83	6.37	15.43	1.51
Facility 20471	B	0.49	0.53	1.29	0.13
Gate 22B	B	0.87	0.95	2.30	0.23
Tillman Pit	B	0.73	0.79	1.92	0.19
Warfighter Training Center	A	2.33	2.55	6.17	0.60
Fire Training Center	A	0.22	0.24	0.58	0.06
Bass Lake	A	0.07	0.08	0.20	0.02
Prescribed Burn Project Subtotals		21.55	23.57	57.07	5.59

Note: Tpy = tons per year

For the purpose of this analysis, prairie grasses were presumed to be the predominant species in each area. The fuel loading factor selected for each area was 11 ton per acre derived from USEPA AP-42 Table 13.1-1 for the North Central Region. Included in these emission calculations are fuel oil combustion emissions from the use of drip-torches to start and control the prescribed burns. Additionally, because all prescribed burn activities are conducted by WPAFB personnel and equipment, no indirect emissions from personnel commuting or equipment idling was considered in this analysis. These indirect emissions would not add to the Basewide baseline levels.

Tree Planting Project. The proposed action includes a project to plant 1,500 native species trees on a five acre site in Area A at WPAFB. This action would require a contract crew of three individuals no

longer than two weeks to complete using a personal excavator and an auger. Three tree delivery trucks per day are assumed to be required for each day of work. Vehicle emissions from worker commuting and delivery trucks were calculated from emission factors derived from US EPA Mobile Source MOVES 2010b Model for calendar year 2017 and Greene County Ohio. Equipment engine emissions were determined using emissions factors located in the Air Emissions Guide for Air Force Mobile Sources, October 2014. Soil disturbance emissions generated during equipment movements and hole drilling were determined using emissions factors located in US EPA AP-42 sections 13.2.3 and 13.2.2-1. **Table 4-3** lists the total emissions for each of the main contributing tree planting activities and summarizes the total emissions from the proposed action.

Table 4-3. Criteria Pollutant Emissions at WPAFB Associated with the Proposed Action

Emission Activity	VOC Emissions (tpy)	NO_x Emissions (tpy)	$PM_{2.5}$ Emissions (tpy)	SO_2 Emissions (tpy)
Huffman Prairie	4.69E-04	4.13E-03	6.02E-02	2.01E-05
Liquid Oxygen Plant	2.32E-02	1.24E-01	1.56E-02	7.70E-03
Sandhill	0.00	0.00	0.15	0.00
Tree Planting Project Subtotals	0.02	0.13	0.22	0.01
Prescribed Burn Project Subtotals	21.55	23.57	57.07	5.59
Proposed Action Total Emissions	21.57	23.70	57.29	5.60

Note: Tpy = tons per year

Analysis. The information presented in **Table 4-3** shows that NO_x, VOC, SO_2, and $PM_{2.5}$ emissions are projected to increase recurring emissions for prescribed burns of the Proposed Action at WPAFB. The emission calculations represent a worse-case potential by including all proposed prescribed burn areas in the calculations (included for the Proposed Action). The tree planting project adds an insignificant amount of emissions only during the year that tree planting occurs. No Action Alternative is the status quo baseline as compared with the Proposed Action; therefore, separate emission calculations were not required.

The Proposed Action would not result in a net emission increase above conformity *de minimis* limits listed in 40 CFR 93.153(b) and **Table 4-1** when evaluated on a worse-case annual basis. This result is contingent upon the accuracy of the assumed area fuel loading factor and proposed scope of the proposed prescribed burning and tree planting. Any substantial changes to the program or the discovery of a significantly different fuel loading factor may trigger a need for a Conformity Determination. Because the annual emissions expected from the Proposed Action would not exceed *de minimis* levels, the General Conformity Rule does not apply and can be deemed to be in conformity with the Ohio SIP. **Appendix B** details the emissions factors, calculations, and estimates for the prescribed burns and tree planting project for the Proposed Action.

According to 40 CFR 81 Subpart D, no Class I visibility areas are located within 10 kilometers of WPAFB. The closest federal Class I area is Mammoth Cave National Park in Kentucky, 320 kilometers to the south. Therefore, air emissions from the Proposed Action would not affect any Class I area.

The Proposed Action is projected to result in net emissions increases for all pollutants on a recurring basis, but are below all General Conformity *de minimis* thresholds. As a result, air quality impacts would not be impacted in a substantial manner when compared with current conditions. This result is contingent upon the accuracy of assumptions made in deriving the emission calculations. The short-term impacts from prescribed burns and soil disturbances during tree planting have the potential to cause a nuisance as defined by OEPA. These short-term impacts from the prescribed burns would be reduced by continuing to include and observe mitigation and smoke control measures in both the WFMP and Open Burn permit applications. Such mitigation measures may include:

- Reducing the Area Burned – this would involve dividing an area into segments to burn separately over successive years; removing larger debris that can be earmarked for composting; or selective use of environmentally-friendly herbicides for weed control.

- Reducing Fuel Loading – this would involve burning at times of the year when there is naturally less fuel present; maintaining a rigorous burn schedule so that subsequent prescribed burns contain less material; or removing debris that can be earmarked for composting.

- Reducing Fuel Consumption – this would involve burning when there is higher fuel moisture content; using mass ignition techniques; or employing rapid mop-up practices.

- Increasing Combustion Efficiency – this would involve burning fuels in piles or windrows, if possible; setting backfires; employing rapid mop-up practices or using mass ignition techniques to promote shortened fire duration.

The estimated annual air emissions would be below all applicable significance criteria and would be conducted in accordance with the WFMP, which would meet the requirements of the USEPA's Interim Air Quality Policy on Wildland and Prescribed Fires. Therefore, there would be no significant impacts to air quality resources.

4.2.3 No Action

Currently, prescribed burns are only used as a natural resources management tool in the Huffman Prairie. The No Action Alternative would continue to have a minor adverse impact on air quality because WPAFB would continue to conduct prescribed burns at Huffman Prairie as described in the previous INRMP (WPAFB 2011b); however, there would be no increase in emissions over current conditions.

4.3 Noise

4.3.1 Evaluation Criteria

Noise impact analyses typically evaluate potential changes to existing noise environments that would result from implementation of a proposed action. Potential changes in the noise environment can be beneficial (i.e., if they reduce the number of sensitive receptors exposed to unacceptable noise levels), negligible (i.e., if the total area exposed to unacceptable noise levels is essentially unchanged), or adverse (i.e., if they result in increased noise exposure to unacceptable noise levels).

The immediate dispersal or depredation of certain birds and wildlife in the airfield "No Waterfowl Zone" occasionally require the use of one or more of the following techniques: firearms usage, vehicle harassment, or pyrotechnics (WPAFB 2013b). These techniques are indicated as means for dispersal or depredation and are specifically indicated in the BASH plan.

4.3.2 Proposed Action

Implementation of the 2015 INRMP would have short-term negligible impacts on noise at WPAFB. A slight increase in noise would result from the use of hand tools (i.e., chain saws) during clearing and cutting activities to enhance natural areas and manage invasive plant species as indicated in the EAB Plan, ISMP, WSMP, and WFMP. In addition, noise generated from techniques used in the dispersal or depredation of birds or wildlife as indicated in the BASH plan (e.g., firearms, vehicle harassment, pyrotechnics) would produce nominal noise. However, noise generation would be minimal and reduced by limiting activities to normal working hours (between 7:00 a.m. and 5:00 p.m.) for forestry and firefighting and as needed in the airfield to disperse/depredate birds or wildlife. The forestry and firefighting management practices would also likely be performed in remote areas of the Base and unlikely to disturb sensitive receptors.

In addition, short-term negligible impacts on noise would also be expected as a result of planting 1,500 trees on Base. Equipment used to plant trees would include delivery trucks, backhoes, and drilling equipment. Noise generation would be minimal and reduced by limiting activities to normal working hours. Furthermore, the proposed location of the tree planting is situated in a remote area of the Base and unlikely to disturb sensitive receptors. Therefore, there would be no significant impacts to noise resources.

4.3.3 No Action

The No Action Alternative would have short-term negligible impacts on noise because activities would be conducted under the previous INRMP (WPAFB 2011b). As these activities would continue under the Proposed Action, the impacts under the Proposed Action and the No Action would be similar. These impacts would be similar to those discussed for the Proposed Action. Therefore, there would be no increase in noise over current conditions.

4.4 Geology and Soils

4.4.1 Evaluation Criteria

Protection of unique geological features, minimization of soil erosion, and the siting of facilities in relation to potential geologic hazards are considered when evaluating potential impacts of a proposed action on geological resources. Generally, impacts can be avoided or minimized if proper construction techniques, erosion control measures, and structural engineering design are incorporated into project development.

Effects on geology and soils would be adverse if they would alter the lithology, stratigraphy, and geological structure that control groundwater quality, distribution of aquifers and confining beds, and groundwater availability; or change the soil composition, structure or function within the environment.

4.4.2 Proposed Action

Temporary but minor short-term adverse impacts to Basewide soils would be expected as a result of habitat restoration activities as part of implementing the 2015 INRMP. Restoration activities would include prescribed burns, routine grounds maintenance (mow, edge, trim, and prune landscaped areas; fertilize soil, plants, lawns, trees, shrubs, hedges, and flowers; hoe, weed, and rake lawns; sweep/pick-up paper/debris; water landscaped areas), and biological survey activities associated with protecting sensitive species and habitats. Prescribed burns could result in significant short- and long-term soil erosion impacts. Potential impacts would be minimized by implementing BMPs for erosion and sedimentation controls. Natural or existing man-made features utilized as BMPs include hay bales, drainage swales, silt fences, detention ponds, or rock berms. Soil disturbances would also be minimized through seeding and vegetation restoration following implementation of management practices. Minor adverse impacts to soil quality from routine pesticide and herbicide use would also occur as a result of the Proposed Action. The BMPs (utilizing personnel who are certified applicators, applying lowest amount of appropriate pesticide/herbicide to perform the job, triple-rinsing empty containers) identified in the IPMP would be implemented to minimize surface runoff of pesticides/herbicides into soils.

Long-term effects of implementing the 2015 INRMP would result in positive impacts to existing soils from implementation of the INRMP and component plans as soil stabilization would have an overall increase. Habitat restoration activities, such as controlling invasive plant species through prescribed burns, would also improve soil resources as native plant species would be expected to increase.

In addition, short-term temporary but minor adverse impacts would be expected from planting 1,500 trees in the vicinity of the south end of the primary runway. Impacts would be minimized by implementing BMPs for erosion and sedimentation controls. Therefore, there would be no significant impacts to geology and soil resources.

4.4.3 No Action

The No Action Alternative would have short-term negligible impacts on geology and soils because activities would continue to be conducted under the previous INRMP (WPAFB 2011b). As these activities would continue under the Proposed Action, the impacts under the Proposed Action and the No Action would be similar. Impacts would be minimized by adhering to BMPs. No long-term adverse impacts would be expected as a result of implementing the No Action Alternative. Therefore, there would be no significant impacts to geology and soil resources.

4.5 Water Resources

4.5.1 Evaluation Criteria

Evaluation criteria for impacts on water resources are based on water availability, quality, and use; existence of floodplains; and associated regulations. Impacts would be adverse if proposed activities result in one or more of the following:

- Reduces water availability or supply to existing users
- Overdrafts groundwater basins
- Exceeds safe annual yield of water supply sources
- Affects water quality adversely
- Endangers public health by creating or worsening health hazard conditions
- Threatens or damages unique hydrologic characteristics
- Violates established laws or regulations adopted to protect water resources

4.5.2 Proposed Action

No short- or long-term impacts to groundwater would be expected as a result of implementing the 2015 INRMP. However, temporary minor adverse impacts to surface water would result from pesticides/herbicides used for pest management control as implemented in the IPMP. The BMPs identified in the IPMP (utilizing personnel who are certified applicators, applying lowest amount of appropriate pesticide/herbicide to perform the job, triple-rinsing empty containers) would be implemented to minimize any runoff into surface waters. Prescribed burns implemented in the WFMP could potentially result in soil erosion, which would adversely impact storm water and surface water quality. However, impacts would be minimized by implementing erosion control BMPs (e.g., hay bales, drainage swales, silt fences, rock berms).

As the INRMP is a programmatic document, the Base Natural Resources Manager is not aware of upcoming new construction activities that would impact wetlands or floodplains (i.e., draining, dredging, channelizing, filling, diking, impounding, or related activities and any structures or facilities). However, should any INRMP management activities be scheduled in the future, WPAFB would comply with EO 11988 and EO 13690. Therefore, no short- or long-term impacts to floodplains would result from implementation of the Proposed Action as no new construction activities are planned in flood zones.

Short-term temporary but minor adverse impacts would also be expected from planting 1,500 trees in the vicinity of the south end of the primary runway. The BMPs would be implemented to minimize runoff into surface waters. In addition, no adverse impacts to the floodplain would be expected from tree planting. Therefore, as a result of implementation of the Proposed Action, there would be no significant impacts to water resources.

4.5.3 No Action

The No Action would have no adverse impact on groundwater resources. Temporary minor short-term impacts to surface waters would be expected from pesticides/herbicides used as implemented in the previous IPMP and INRMP (WPAFB 2011b). As these activities would continue under the Proposed Action, the impacts under the Proposed Action and the No Action would be similar. Therefore, there would be no significant impacts to water resources.

4.6 Biological Resources

Biological resources that could be impacted by the proposed project include vegetation, wildlife, threatened and endangered species, and wetlands; water availability, quality and use; existence of floodplains; and associated regulations.

4.6.1 Evaluation Criteria

Evaluation criteria for impacts on biological resources are based on:

- Importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource;
- Proportion of the resource that would be affected relative to its occurrence in the region;
- Sensitivity of the resource to the proposed activities; and
- Duration of ecological ramifications.

The impacts on biological resources would be adverse if species or habitats of high concern are negatively affected over relatively large areas. Impacts are also considered adverse if disturbances cause reductions in population size or distribution of a species of high concern.

As a requirement under the ESA, federal agencies must provide documentation that ensures that agency actions do not jeopardize the continued existence of any threatened or endangered species. If a federal action "may affect" a listed species, the federal action agency must consult with the USFWS as described under Section 7 of the ESA to authorize any incidental take that is likely to occur, and to ensure that the take will not jeopardize the continued existence of the species.

4.6.2 Proposed Action

Vegetation

Short-term minor adverse impacts to vegetation in specific areas would be expected as a result of implementing the 2015 INRMP; overall, the impacts would be negligible to the vegetation at WPAFB.

Impacts would result from prescribed burns and pest control management practices. Vegetation control activities specified in the IPMP may kill individual native plants; however, the action would be intended to enhance restoration activities, increase ecological value, and prevent the far greater loss of species diversity and ecosystem processes resulting from further uncontrolled non-native infestations. Many of the plant species would be protected by following label application limits and specified protection measures. Herbicide use may affect native plants in the short term, but in the long term would protect native plants and plant communities. These activities may result in minor ground disturbances and the inadvertent disruption of native vegetation. Impacts would be minimized by seeding and re-vegetation of affected areas.

Implementation of the WFMP would result in effective restoration and maintenance of the health of the Huffman Prairie ecosystem. Basewide positive impacts from prescribed burns include: changing mature forest structures to make way for newer growth; maintaining existing grasslands, shrub-grasslands, and oak dominated woodlands and savannas; maintaining open and semi-open conditions for Base operational and military training purposes; and reducing hardwood competition.

The EAB Plan indicates the ODNR Division of Forestry, the Ohio Department of Agriculture, and experts at the Ohio State University predict that all ash trees will eventually die from infestation of the EAB. However, in the interim, the EAB Plan proposes chemical application as a means of delaying those impacts and extending the life of ash trees at WPAFB. As a result of implementing the EAB Plan, positive short-term effects to ash trees would result and would aid in lessening the environmental, safety, and economic impacts that such a loss of all ash trees would have on the WPAFB community.

In addition, positive and beneficial impact to vegetation would result from planting 1,500 native tree species on Base suitable to the Indiana bat.

Wetlands

No short- or long-term adverse impacts to wetlands would be expected as a result of implementing the 2015 INRMP because no adverse impacts to wetlands or streams would occur. The 2015 INRMP allows the use of wetland-approved herbicides to control invasive species in wetlands. Therefore, the management of invasive wetland species would have long-term benefits to wetland ecosystems at WPAFB. Activities under the Proposed Action would continue to restore and enhance wetland habitats by conducting species surveys and monitoring programs.

As the INRMP is a programmatic document, the Base Natural Resources Manager is not aware of upcoming new construction activities that would impact wetlands (i.e., draining, dredging, channelizing, filling, diking, impounding, or related activities and any structures or facilities) or jurisdictional streams. However, should any wetland/stream management activities be scheduled in the future (i.e., airfield-related tree pruning), WPAFB would comply with EO 11990, AFPD 32-70, Sections 404 and 401 of the

Clean Water Act, and applicable sections of the Ohio Administrative Code. Therefore, no short- or long-term impacts to wetlands would result from implementation of the Proposed Action.

Wildlife and Threatened and Endangered Species

Negligible short-term impacts to wildlife and threatened and endangered species would be expected because prescribed burns and survey activities associated with preserving threatened and endangered species, prairies, wetlands, habitat preservation and restoration practices would continue to be implemented under the Proposed Action. The INRMP would continue to provide for a project-specific consultation process for the Indiana bat, which would require informal consultation with the USFWS and precautions to be taken for projects that involve cutting trees. The WPAFB BASH program and nuisance animal control activities would negatively affect select wildlife through displacement or mortality, but would not result in any negative effects at the population level. The Base maintains permits to conduct BASH and nuisance animal control, and is in compliance with all state and federal laws for these activities. The updated WFMP (WPAFB 2014) specifies additional guidelines for prescribed burns in Huffman Prairie to minimize potential impacts to the eastern massasauga rattlesnake.

Long-term positive impacts to threatened and endangered species would occur as a result of implementing the Proposed Action because habitat preservation activities and restoration practices would continue to preserve and stabilize native habitat and wildlife species. For example, grounds maintenance activities include selecting plants, trees, and shrubs for landscaping that considers management goals for the Indiana bat. Positive impacts would result from implementation of the WFMP and include the restoration and maintenance of habitats for rare, threatened, and endangered plant and animal species.

The USFWS and ODNR were contacted regarding potential effects on biological resources as a result of implementing the INRMP. The USFWS responded indicating they would not consult on the INRMP as a whole because some projects addressed under the INRMP (i.e., tree clearing) would result in potential impacts to suitable habitat; therefore, a "no effect" determination would not be appropriate for the INRMP as a whole. The INRMP provides for consultation with the USFWS, as needed, on a project-by-project basis for projects that potentially impact forest habitat suitable for Indiana bats or wetland habitat suitable for the eastern massasauga rattlesnake. The ODNR provided specific comments and recommendations regarding wildlife species in **Table 3-5**. Correspondence with the USFWS and ODNR regarding implementation of the INRMP is presented in **Appendix A**.

Fence Relocation Project – Tree Planting Mitigation

As described in Section 3.6.2, 2.05 acres of Indiana bat habitat was cleared as part of a fence relocation project that occurred in summer 2015. The USFWS provided comments and recommendations in a letter dated September 18, 2015 (**Appendix A**), indicating that mitigation would be required for impacts resulting from the removal of bat habitat.

The USFWS utilizes a Habitat Equivalency Analysis (HEA) model to quantify habitat needed to replace impacts to existing habitat and to ensure no net loss of ecological conditions and function, while recognizing that it takes time to restore various tracks of habitat to certain functions. The USFWS input the 2.05 acres of permanently impacted mature forest habitat cleared at WPAFB as part of the fence relocation project into the HEA model and the resulting output was 11.07 acres of mitigation necessary to offset the conditions and functions of the lost habitat.

The USFWS recommended that currently open habitat adjacent to the Mad River or its floodplain be restored to forest habitat by planting trees that are suitable for Indiana bat habitat as mitigation for the loss of Indiana bat habitat and the likely take of individual Indiana bats associated with tree clearing. The USFWS indicated that trees should be planted at a ratio of at least 600 stems per acre on the 11.07 acres calculated in the HEA. In addition, a minimum of four species identified as "exfoliating bark species" must be planted and equal at least 40 percent of the minimum stems per acre with the remaining 60 percent of the minimum stems per acre consisting of any approved species on the USFWS provided "Tree Species List for Indiana Bat Protection and Enhancement Plans" list. The USFWS also indicated tree survival should be monitored for at least five years and after five years the survival rate should be at least 300 stems per acre. The USFWS stated that the mitigation requested is not able to replace or rehabilitate individuals that may have been injured or killed, but is intended to ensure that Indiana bats remaining at WPAFB have available habitat now and into the future.

As mitigation for loss of Indiana bat habitat, WPAFB proposed to the USFWS (letter dated October 26, 2015, **Appendix A**) to plant three hundred 2-3 gallon potted trees suitable for Indiana bat habitat per acre over an area totaling approximately five acres of open habitat adjacent to the Mad River corridor (located in the vicinity of the south end of the primary runway in Area A). The WPAFB indicated that by planting 2-3 gallon potted stock versus the USFWS recommended bare-rooted seedlings, the mitigation area will be 10 to 15 years ahead in terms of regaining the value lost during the clearing operation. The WPAFB stated they plan on developing a project for execution in FY16 to plant, document tree species, and monitor tree growth for five years. During the five-year monitoring period, WPAFB proposed to re-plant any lost trees so three hundred trees per acre succeed. The Base also committed to incorporating an internal training program for designers and inspectors that would cover, at a minimum, coordination procedures and the location of natural resources and cultural resources, along with NEPA requirements. The WPAFB indicated the training would begin the first week of November 2015 and proceed on a bi-monthly basis.

The USFWS agreed with WPAFB's proposed mitigation plan that would include planting 300 potted trees per acre (1,500 total trees) as mitigation for the loss of 2.05 acres of Indiana bat habitat and to implement an internal training program to ensure awareness of coordination procedures for natural and cultural resources and the NEPA. The correspondence from USFWS is dated November 10, 2015 and provided in **Appendix A**.

The MCD also commented on the proposed mitigation plan to plant trees on Base. The MCD indicated that the proposed project of planting 1,650 potted trees would not adversely affect the retarding basin; however, any material that is excavated and not replaced would have to be removed from the retarding basin so the storage capacity of the dam is not reduced. The correspondence from MCD is dated August 9, 2016 and is provided in Appendix A.

A positive and beneficial impact to Indiana bats would be expected as 1,500 native trees would be planted on Base to encourage roosting and foraging by this endangered species.

4.6.3 No Action

With the exception of the EAB plan and the future areas for prescribed burns in the WFMP, the natural management activities described in the previous INRMP (WPAFB 2011b) would continue under the 2015 INRMP. In general, the potential impacts for the Proposed Action and No Action would be similar. However, the EAB Plan predicts the inevitable and eventual death of all ash trees at WPAFB. As a result of not implementing the EAB Plan that proposes chemical application to extend the life of ash trees, the death of ash trees at WPAFB would occur much sooner. With regard to the WFMP, prescribed burns would only be used as a natural resources management tool at the Huffman Prairie. No additional areas would be considered for prescribed burns; therefore, less vegetation and potential habitat would potentially be impacted under the No Action. Although these burns would result in short-term minor adverse impacts, the long-term effects would be beneficial due to habitat preservation and restoration activities.

In addition, if the Indiana bat suitable habitat trees are not planted on Base as a mitigation measure to clear-cutting 2.05 acres of potential bat habitat, potential adverse impact to this endangered species would be expected as potential roosting and foraging habitat would not be replaced.

4.7 Cultural Resources

4.7.1 Evaluation Criteria

Adverse impacts on cultural resources might include physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's significance; introducing visual or audible elements that are out of character with the property or alter its setting; neglecting the resource to the extent that it deteriorates or is destroyed; or the sell, transfer, or lease of the property out of agency ownership (or control) without adequate legally enforceable restrictions or conditions to ensure preservation of the property's historic significance.

4.7.2 Proposed Action

Implementation of the Proposed Action would not be expected to result in adverse impacts to cultural resources. In addition, the SHPO/ACHP views management plans, such as the INRMP or the ICRMP, as internal tools for the Air Force. Therefore, SHPO/ACHP does not recognize the need for Section 106

consultation on management plans because management plans change. Until an actual project representing an "undertaking" in accordance with the NHPA is proposed, there is no potential to affect historic properties. Management plans do have the potential to produce actions on the part of the Base, which could have effects on historic properties. However, once activities or projects are proposed due to adherence to either management plan (ICRMP or INRMP), those individual actions are reviewed through the standard Work Order review process. At the time a specific INRMP-associated action is proposed, it would be assessed for its applicability to NHPA Section 106 review and treated accordingly. There would be no significant impacts to cultural resources as a result of implementing the Proposed Action.

4.7.3 No Action

The No Action Alternative would have no direct effect on cultural resources. Natural resource management activities that may require ground disturbance are described in the previous INRMP (WPAFB 2011b). As these activities would potentially continue under the Proposed Action, the impacts under the Proposed Action and the No Action would be similar. However, these impacts would be minimized by adhering to procedures for digging and excavation in the LUC Plan (WPAFB 2012d). Therefore, there would be no significant impacts to cultural resources.

4.8 Socioeconomics

4.8.1 Evaluation Criteria

This section identifies potential economic and social impacts that might result from the proposed project. The methodology for the economic impact assessment is based on the Economic Impact Forecast System (EIFS) developed by the DoD in the 1970s to efficiently identify and address the regional economic effects of proposed military actions (EIFS 2001). The EIFS provides a standardized system to quantify the impact of military actions, and to compare various options or alternatives in a standard, non-arbitrary approach.

The EIFS assesses potential impacts on four principal indicators of regional economic impact: business volume, employment, personal income, and population. As a "first tier" approximation of effects and their significance, these four indicators have proven very effective. The methodology for social impacts is based on the Guidelines and Principles for Social Impact Assessment, developed by an inter-organizational committee of experts in their field (National Oceanic and Atmospheric Administration [NOAA] 1994).

The proposed project at WPAFB would have an adverse impact with respect to the socioeconomic conditions in the surrounding MA if it would:

- Change the local business volume, employment, personal income, or population that exceeds the MA's historical annual change; and/or
- Negatively affect social services or social conditions, including property values, school enrollment, county or municipal expenditures, or crime rates.

4.8.2 Proposed Action

A short- and long-term beneficial impact would be expected on the local economy from revenue generated by implementing improvements and enhancements to the outdoor recreation program at WPAFB. The Proposed Action does not involve changes in off-Base land use or new development. Therefore, there would be no significant impacts to socioeconomics.

4.8.3 No Action

The recreational programs implemented under the previous INRMP (WPAFB 2011b) would continue under the Proposed Action. The No Action would have no impact on socioeconomics over current conditions.

4.9 Health and Safety

4.9.1 Evaluation Criteria

Impacts on health and safety are evaluated for their potential to jeopardize the health and safety of Base personnel as well as the surrounding public. The Air Force regulations and procedures promote a safe work environment and guard against hazards to the public. The WPAFB programs and day-to-day operations are accomplished according to applicable Air Force federal and state health and safety standards.

4.9.2 Proposed Action

Potential minor adverse impacts would be expected from implementation of the 2015 INRMP from conducting wildlife surveys and prescribed burn activities. Potential risks associated with interaction with wildlife and treatment/removal of vegetation would be minimized by hiring trained/certified specialists perceptive to performing activities in a safe manner as described for activities in the IPMP, ISMP, and EAB plan. Under the WFMP, prescribed burns would be conducted by WPAFB firefighting personnel with activities coordinated to ensure firefighter and public safety with respect to mission activities. In addition, the 88th OSS would be notified of prescribed burns and kept apprised of situations, such as the potential for smoke and need for response equipment, that could affect airfield operations.

The BMPs proposed in the WFMP would be followed for any prescribed burn event and would include monitoring meteorological conditions prior to and during a burn event. This would reduce personnel risks associated with prescribed burns. In addition, personnel would adhere to INRMP safety procedures identified for any bird/wildlife aircraft strike hazard eradication activities identified in the BASH plan, species surveys, or monitoring activities as workers may interact or inadvertently have contact with wildlife. There would be positive impacts on overall airfield safety as a result of adhering to the BASH Plan. No long-term impacts would be expected as a result of implementation of the 2015 INRMP.

In addition, short-term potential minor adverse impacts to the health and safety of workers could occur as a result of planting 1,500 trees on Base. Potential risks associated with operating planting machinery

would be minimized by hiring personnel trained/certified in silviculture. Therefore, there would be no significant impacts to health and safety.

4.9.3 No Action

The No Action would have potential short-term adverse impacts on health and safety associated with the prescribed burn and bird/wildlife depredation activities described in the previous INRMP (WPAFB 2011b). As these activities would continue under the Proposed Action, the impacts under the Proposed Action and the No Action would be similar. These impacts would be minimized by adhering to standard operating procedures and safety protocols. The No Action Alternative would have no long-term impacts on the health and safety of WPAFB personnel. Therefore, there would be no significant impacts to health and safety.

4.10 Environmental Restoration Program

4.10.1 Evaluation Criteria

Impacts on the ERP would be considered adverse if the federal action disturbed (or created) contaminated sites resulting in negative effects on human health or the environment.

4.10.2 Proposed Action

There would be minimal ground disturbance under the Proposed Action in association with the actions implemented in the INRMP. The LUC Plan would be consulted to ensure that activities planned under the Proposed Action would not involve ground disturbance within any ERP sites. The LUCs would prevent and reduce risks to human health and the environment due to Basewide ERP sites. The Proposed Action would result in potential minor adverse impacts to ERP sites. Therefore, there would be no significant impacts to the ERP.

4.10.3 No Action

The No Action would have no impacts to ERP sites over current conditions. Natural resource management activities that may require ground disturbance are described in the previous INRMP (WPAFB 2011b). These activities would continue under the Proposed Action, as needed. Therefore, potential minor adverse impacts under the Proposed Action and the No Action would be similar. However, these impacts would be minimized by adhering to procedures for digging and excavation in the LUC Plan (WPAFB 2012d). Therefore, there would be no significant impacts to the ERP.

4.11 Cumulative Impacts

Cumulative impacts on environmental resources result from incremental effects of proposed actions when combined with other past, present, and reasonably foreseeable future projects in the project area. Cumulative impacts can result from individually minor but collectively substantial actions undertaken over a period of time by various agencies (federal, state, and local) or individuals. Informed decision-

making is served by consideration of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the foreseeable future.

4.11.1 Past, Present, and Reasonably Foreseeable Actions in the Project Area

This section discusses the potential for cumulative impacts caused by implementation of the Proposed Action when combined with other past, present, and reasonably foreseeable actions occurring in the project area. The project area is defined as all WPAFB properties including Areas A and B.

4.11.2 Past and Present Actions

The AF has not identified any other past or present actions that are relevant to the current Proposed Action.

4.11.3 Reasonably Foreseeable Future Actions

Projects proposed for the reasonably foreseeable future that are relevant to the project area include the following ancillary projects for WPAFB. However, these projects would be temporary in nature and would not be recurring events. In addition, the timeframes and budgets for each proposed project listed below can only be estimated or are uncertain. Although short-term adverse effects could be possible if these projects were to occur in conjunction with the Proposed Action, long-term cumulative impacts are not expected to result from these reasonably foreseeable future actions.

Glide Slope/Clear Zone Obstructions – This project involves on-going pruning or removal of vegetative overstory obstructing the primary surface area, clear zones, transitional areas, and glide slopes for both runways at WPAFB in order to protect human health and safety by providing adequate clearance for aircraft operations (WPAFB 2013c). A 14-acre section of invasive species was removed in the northwest corner of the Base during the winter of 2013-2014. Similarly, during the winter of 2014-2015, 14 acres of brush were removed as invasive species that were impacting the glide slope at the northeast corner of the Base. Removal of vegetation had not yet been addressed along the western edge of southern areas of the Base (WPAFB 2016). This project is not expected to result in any cumulative impacts associated with implementation of the INRMP because only 18 isolated areas require pruning or removal of vegetation. As described, some actions have already been taken. The remaining activities would not be expected to occur simultaneously with specific INRMP activities.

Entry Control Facility Reconfiguration and Base Perimeter Fence Relocation – Proposed plans include reconfiguring and relocating the following existing nine entry control facilities (gates) located in Area A: Gate 1A (F/30250), 8A, 9A, 12A, 15A (F/10921), 16A, 26A (F/34000), 38A, and 39A. This ancillary project was addressed in a previous WPAFB EIS (WPAFB 2012e). This project would not be expected to impact implementation of the INRMP.

Hilltop Community Services District – The Base plans to create the Hilltop Community Services District and construct community service facilities to meet the needs of new personnel that are relocating to WPAFB to support new missions in this area. The proposed action would implement the long-range Hilltop Community Development Plan and construct community services facilities. This proposed project includes the demolition of F/20167 in Area B. The programmed year for demolition of F/20167 is 2016 and if implemented as anticipated, is not expected to result in cumulative impacts associated with implementation of the INRMP.

Radar Tomography Range and Equipment Storage Facility – A radar tomography range is proposed for construction at Tillman Pit located in the southwest corner of Area B. The purpose of this facility is to improve the efficiency of the Air Force Research Laboratory Sensors Directorate research and development activities. The project includes construction of a range including tower foundations, utilities, access roads, and parking spaces. This project is not expected to result in any cumulative impacts associated with implementation of the INRMP.

Remedial Action at the Former Building 20059 Site (SS071) – Building 20059 was a former military clothing dry cleaning facility that ceased operations in January 2000. Volatile organic compounds contamination was found in the soil in July 2000 and the building was demolished in October 2009. Two excavation removal actions have been conducted at the site with a third and anticipated final excavation scheduled for fall 2015. The project includes stockpiling potentially contaminated soil on-site for disposal upon receipt of analytical results. To prevent potential site runoff of contaminated soil, BMPs will be used in accordance with the project work plan.

4.12 Irreversible and Irretrievable Commitment of Resources

The NEPA requires that EAs include identification of any irreversible and irretrievable commitment of resources that would be involved in the implementation of the Proposed Action. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the uses of these resources have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (i.e., energy and minerals) that cannot be replaced within a reasonable timeframe. Irretrievable resource commitments involve the loss of value of an affected resource that cannot be restored as a result of the Proposed Action (i.e., extinction of a threatened or endangered species or the disturbance of a cultural site).

As the objective of implementing the INRMP would be long-term sustainment of natural resources, the commitment of irreversible and irretrievable resources is not anticipated. Natural resources management has the goal of ensuring the continued health and availability of natural resources while sustaining the military mission. These effects are not likely to significantly decrease the availability of the resources. Small amounts of nonrenewable resources (fuels) would be used; however, the AF does not consider these amounts to be appreciable and does not expect them to affect the availability of these resources.

The prescribed burns conducted as part of the WFMP would result in the unavoidable loss of vegetation; however, as the WFMP indicates, prescribed burns are critical and beneficial for conserving biological diversity and sustaining ecological processes.

Similar to the unavoidable loss of vegetation resulting from prescribed burns, the dispersal or depredation of select birds/wildlife eradicated under the BASH program for the maintenance of a safe airfield would result in the unavoidable and irretrievable loss of select individuals, but would not result in any negative effects at the population level.

5.0 LIST OF PREPARERS

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B.S. Natural Resources and Environmental Science
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Installation Restoration Program
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6.0 LIST OF PERSONS CONTACTED

Name	Role	Affiliation
Raymond Baker	Chief, Environmental Branch	88 CEG/CEIE
John Banford	EIAP Program Manager	88 CEG/CEIEA
Justin Cook	Resource Protection and Review	Ohio Historic Preservation Office
Dan Everson	Threatened and Endangered Species	U.S. Fish and Wildlife Service
Roxanne Farrier	Floodplain Issues	Miami Conservancy District
Erwin Roemer	Cultural Resources Manager	AFCEC/CZOM
Megan Seymour	Wildlife Biologist	U.S. Fish and Wildlife Service
Sarah Tebbe	Natural Resources – Environmental Review Team	Ohio Department of Natural Resources; Ohio Natural Heritage Program; Columbus, Ohio
Jonathan Vimr	Resource Protection and Review	Ohio Historic Preservation Office
Darryn Warner	Natural Resources Program Manager	88 CEG/CEIEA
Debbie Woischke	Natural Resources	Ohio Department of Natural Resources; Ohio Natural Heritage Program; Columbus, Ohio
Paul Woodruff	Cultural Resources Program Manager	88 CEG/CEIEA

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1

Appendix A

Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) Correspondence and Notice of Availability (NOA)

Miami Conservancy District Consultation Letters:

1. **WPAFB Request (INRMP) – 23Jul15**

2. **MCD Response (INRMP) – 21Aug15**

3. **WPAFB Request (Tree Planting) – 26Apr16**

4. **MCD Response (Tree Planting) – 09Aug16**

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

23 July 2015

88 CEG/CEIEA
1450 Littrell Road, Building 22
Wright-Patterson AFB OH 45433-5209

Mr. Kurt Rinehart
Miami Conservancy District
38 E. Monument Avenue
Dayton, OH 45402

Dear Mr. Rinehart:

Wright-Patterson Air Force Base (WPAFB, Base) is preparing an Environmental Assessment (EA) to evaluate the impacts of implementing the 2012 Integrated Natural Resources Management Plan (INRMP). The 2012 WPAFB INRMP is a programmatic document that details planned natural resources management activities over a five-year period. The INRMP is consistent with the Sikes Act Improvement Act of 1997 (SAIA), as amended (16 United States Code §§670a-670f), which requires the preparation, implementation, update, and review of an INRMP for military installations in the United States and its territories that contain significant natural resources. The request for consultation concerns the implementation of these activities and the potential effects of the actions on federally protected threatened and endangered species.

The 2012 INRMP was developed in cooperation with the U.S. Fish and Wildlife Service (USFWS) and reflects the mutual agreement of all parties concerning conservation, protection, and management of natural resources on WPAFB. The SAIA requires the INRMP to be reviewed as to operation and effect on a regular basis, but not less than every five years. In accordance with Air Force Instruction (AFI) 32-7064, the INRMP must be reviewed annually in coordination with internal stakeholders and local representatives of the USFWS, and the state and wildlife agency, where applicable.

Proposed Action

The Proposed Action involves implementation of the integrated ecosystem management of natural resources at WPAFB under the 2012 INRMP. The 2012 INRMP would be reviewed annually as needed to maximize its usefulness to installation natural resources personnel. The INRMP would be formally reviewed at least every five years and updated, as needed. All management practices would be integrated and implemented in the context of the installation's mission support needs and regional setting, including integration of the following WPAFB INRMP component plans:

1. Bird/Wildlife Aircraft Strike Hazard, 2013
2. Emerald Ash Borer Management, 2010
3. Huffman Prairie Management, 2011
4. Integrated Pest Management, 2010
5. Invasive Species Management, 2010
6. Wetland and Stream Management, 2010
7. Wildland Fire Management, 2014

Two alternatives to the Proposed Action were considered. Alternative B involves implementation of a diminished approach to the proposed prescribed burn program at Huffman Prairie. The 2010 Huffman Prairie Assessment recommends prescribed burns to maintain native vegetation and minimize invasive woody species. The 2012 INRMP also proposes developing in-house resources to enable WPAFB to perform annual prescribed burns without the need to rely on outside agencies. Alternative B proposes prescribed burns would occur on an as-needed basis instead of annually as recommended in the Huffman Prairie Management plan under the Proposed Action. Alternative B also includes minimal and seasonal weeding to preserve native vegetation at Huffman Prairie.

The second alternative, Alternative C, proposes to implement a diminished outdoor recreation and game management program by reducing fish and pheasant stocks being provided to WPAFB lakes and licensed shooting preserves. The 2012 INRMP recommends improving the outdoor recreation program by annually stocking sport fish in lakes and pheasants in the licensed shooting preserve. Alternative C would delay enhancements to the current outdoor recreation program at WPAFB. Alternatives B and C would satisfy federal budget constraints and conform to the low priority of these objectives compared with other management measures proposed in the 2012 INRMP.

Under the No Action (Alternative D), management of natural resources would continue as provided in the previous WPAFB INRMP version, the 2007-2011 INRMP. All components of the 2007-2011 INRMP would maintain baseline activities as described in the goals and objectives for each component plan, except in situations where mission activity or policy changes have resulted in changes to the baseline, independent of natural resources management.

Given that the INRMP is a programmatic document intended to preserve and protect natural and biological resources at WPAFB, no impacts to the Huffman Dam Retarding Basin would be expected from the Proposed Action or Alternatives and none of the INRMP activities would result in a net gain or net loss for the retarding basin. Minor adverse effects to surface water resulting from pesticides/herbicides used for pest management control would be expected as a result of the Proposed Action or Alternatives; however, Best Management Practices (BMPs) from the Integrated Pest Management Program would be implemented to minimize runoff into surface waters.

Thank you for your consideration. Please return your comments to me at the above address. If you have questions, please contact me at 937/257-4857 or by email at Darryn.Warner@us.af.mil.

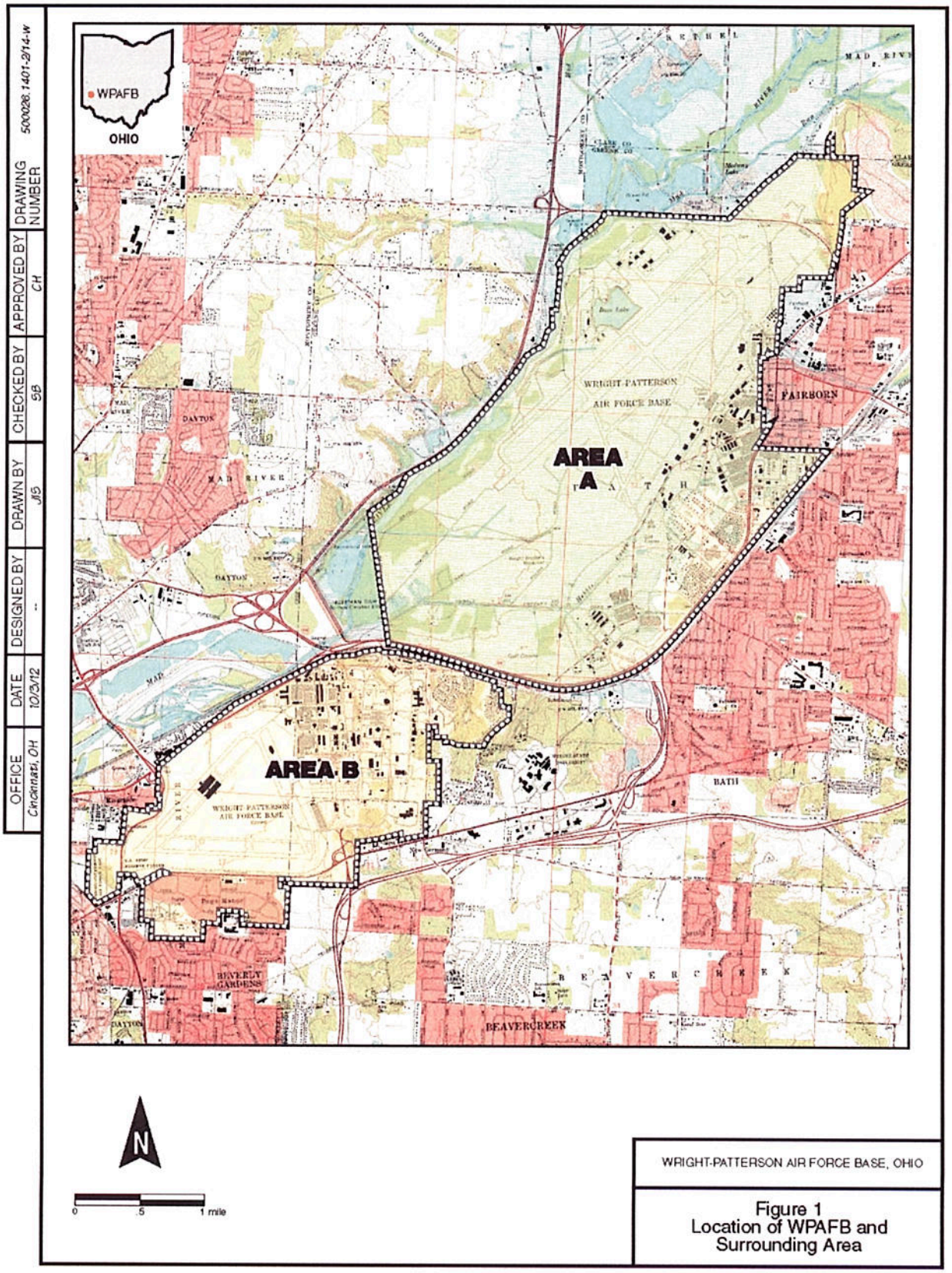
Sincerely

Darryn M. Warner

Darryn Warner
Natural Resources Program Manager
Environmental Assets Section
Environmental Branch

cc: John Banford (88 CEG/CEIEA, WPAFB)
Cynthia A. Hassan (CB&I)

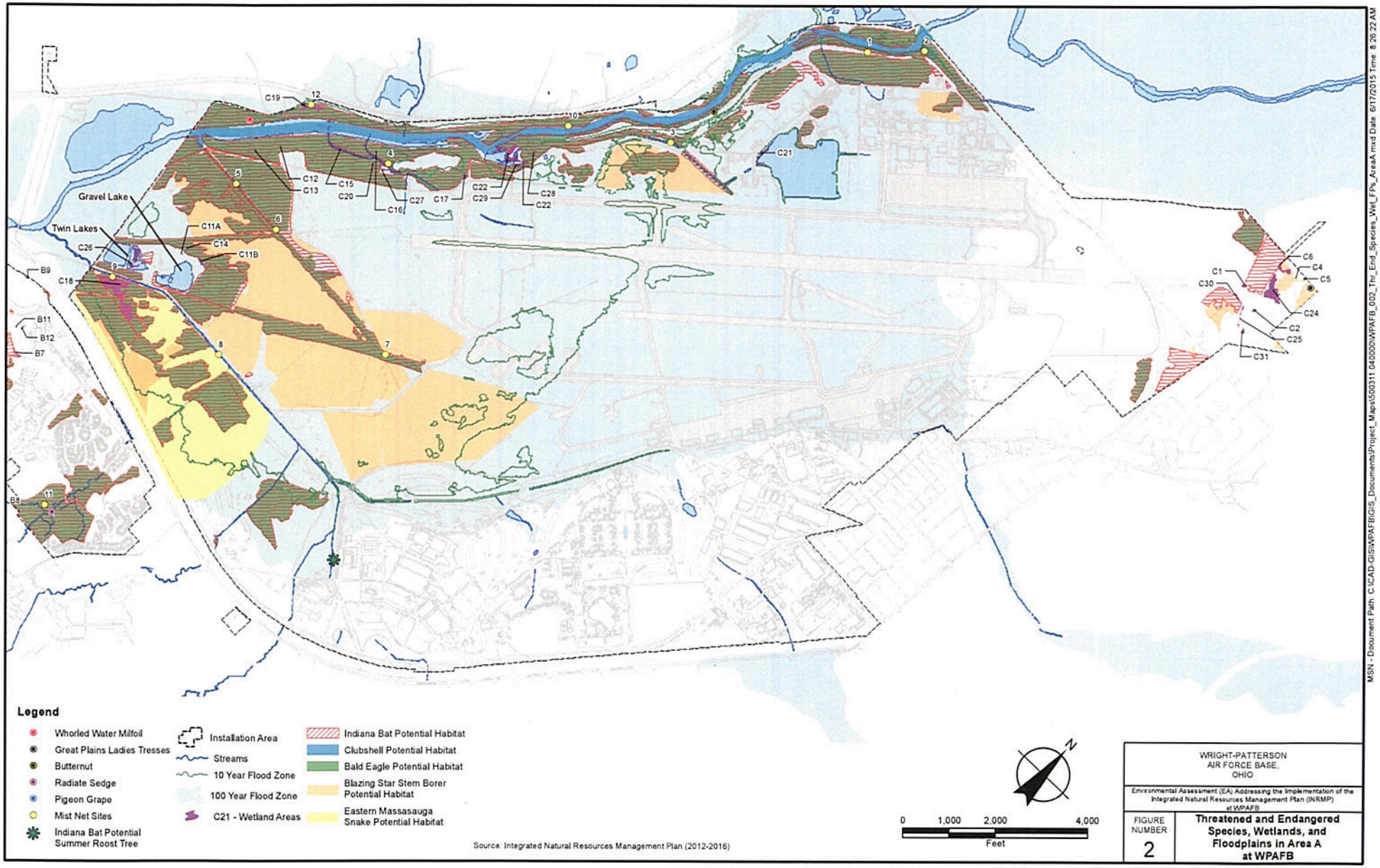
Attachments: Figure 1 – Location of WPAFB and Surrounding Area
Figure 2 – Threatened and Endangered Species, Wetlands, and Floodplains in Area A at WPAFB
Figure 3 – Threatened and Endangered Species, Wetlands, and Floodplains in Area B at WPAFB



OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	10/3/12	--	JJS	SB	CH	500028.1401-2/14-w

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 1
Location of WPAFB and Surrounding Area


Gravel Lake
Twin Lakes
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C12
C13
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C20
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C11A
C14
C11B
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Legend
Whorled Water Milfoil
Great Plains Ladies Tresses
Butternut
Radiate Sedge
Pigeon Grape
Mist Net Sites
Indiana Bat Potential Summer Roost Tree
Installation Area
Streams
10 Year Flood Zone
100 Year Flood Zone
C21 - Wetland Areas
Indiana Bat Potential Habitat
Clubshell Potential Habitat
Bald Eagle Potential Habitat
Blazing Star Stem Borer Potential Habitat
Eastern Massasauga Snake Potential Habitat
Source: Integrated Natural Resources Management Plan (2012-2016)
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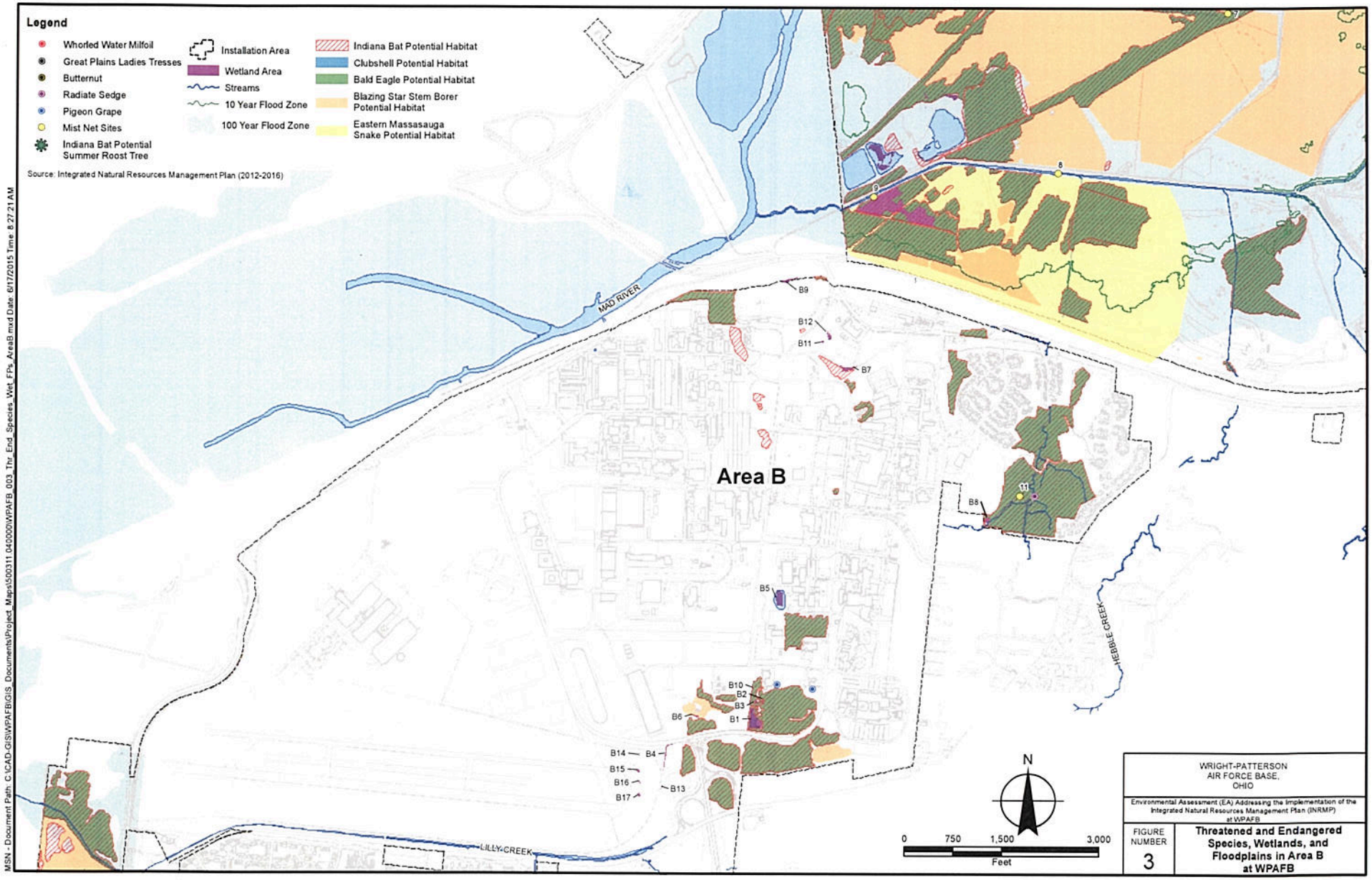
WRIGHT-PATTERSON AIR FORCE BASE, OHIO
Environmental Assessment (EA) Addressing the Implementation of the Integrated Natural Resources Management Plan (INRMP) at WPAFB
FIGURE NUMBER 2
Threatened and Endangered Species, Wetlands, and Floodplains in Area A at WPAFB
MSN - Document Path: C:\CAD-GIS\WPAFB\GIS_Documents\Project_Maps\500311.040000\WPAFB_002_Thr_End_Species_Wet_FPs_AreaA.mxd Date: 6/17/2015 Time: 8:26:22 AM


Legend
Whorled Water Milfoil
Great Plains Ladies Tresses
Butternut
Radiate Sedge
Pigeon Grape
Mist Net Sites
Indiana Bat Potential Summer Roost Tree
Installation Area
Wetland Area
Streams
10 Year Flood Zone
100 Year Flood Zone
Indiana Bat Potential Habitat
Clubshell Potential Habitat
Bald Eagle Potential Habitat
Blazing Star Stem Borer Potential Habitat
Eastern Massasauga Snake Potential Habitat
Source: Integrated Natural Resources Management Plan (2012-2016)
MSN - Document Path: C:\CAD-GIS\WPAFB\GIS_Documents\Project_Maps\500311.040000\WPAFB_003_Thr_End_Species_Wet_FPs_AreaB.mxd Date: 6/17/2015 Time: 8:27:21 AM
MAD RIVER
LILLY CREEK
HEBBLE CREEK
Area B
B1
B2
B3
B4
B5
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WRIGHT-PATTERSON AIR FORCE BASE, OHIO
Environmental Assessment (EA) Addressing the Implementation of the Integrated Natural Resources Management Plan (INRMP) at WPAFB
FIGURE NUMBER
3
Threatened and Endangered Species, Wetlands, and Floodplains in Area B at WPAFB

MCD
MIAMI CONSERVANCY DISTRICT

38 E. Monument Ave.
Dayton, OH 45402
(937) 223-1271

August 21, 2015

Mr. Darryn Warner
88 ABW/CEIEA
1450 Littrell Road, Building 22
Wright-Patterson AFB, OH 45433-5209

Re: Huffman Retarding Basin, WPAFB, 2012 INRMP

Dear Mr. Warner:

We have reviewed the proposed action involving implementation of the 2012 Integrated Natural Resources Management Plan (INRMP) in Area A and B at WPAFB.

As the project is located within the Huffman Retarding Basin, they are subject to those restrictions as set forth by the Miami Conservancy District (MCD) in Greene County Deed Book 129, Page 146 on December 16, 1922.

Based on our review it appears the proposed project will not adversely affect the retarding basin.

Thank you for your cooperation and the opportunity to review the projects. If you have any further questions please contact me at (937) 223-1278, ext. 3230.

Sincerely,

Roxanne H. Farrier
Property Administrator

cc: Kurt Rinehart

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING
WRIGHT-PATTERSON AIR FORCE BASE OHIO

26 April 2016

88 ABW/CEIEA
1450 Littrell Road, Building 22
Wright-Patterson AFB OH 45433-5209

Mr. Kurt Rinehart
Miami Conservancy District
38 E. Monument Avenue
Dayton, OH 45402

Dear Mr. Rinehart:

The U.S. Air Force is seeking informal consultation with the Miami Conservancy District with respect to the potential impacts to the conservancy district associated with planting 1650, 2-3 gallon potted trees in an undeveloped area of Wright Patterson Air Force Base in order to mitigate for impacts to threatened and endangered species habitat. Occasional tree planting is just one management activity included within the WPAFB Integrated Natural Resources Management Plan that you recently coordinated upon, but this project lies within the 100-year floodplain and the Huffman Retarding Basin and concurrence that no adverse impacts to the floodplain and/or retarding basin will ocurr as the result of this project is required.

Please see Figure 1 for the specific project location for further details. Thank you for your consideration. Please return your comments to me at the above address. If have any questions, please contact me at (937) 257-4857 or by email at Darryn.Warner@us.af.mil.

Darryn Warner
Natural Resources Program Manager
Environmental Assets Section
Environmental Branch

cc: Dr. Christina Powell (88 ABW/CEIEA, WPAFB)

Attachments: Figure 1 – Project Site

MCD
MIAMI CONSERVANCY DISTRICT

38 E. Monument Ave.
Dayton, OH 45402
(937) 223-1271

August 9, 2016

Mr. Darryn Warner
88 ABW/CEIEA
1450 Littrell Road, Building 22
Wright-Patterson AFB, OH 45433-5209

Re: Huffman Retarding Basin, WPAFB, Planting trees

Dear Mr. Warner:

We have reviewed the proposed action involving planting 1650, 2-3 gallon potted trees in an undeveloped area of WPAFB for mitigation purposes.

As the project is located within the Huffman Retarding Basin, it is subject to those restrictions as set forth by the Miami Conservancy District (MCD) in Greene County Deed Book 129, Page 146 on December 16, 1922.

Based on our review it appears the proposed project will not adversely affect the retarding basin; however, any material that is excavated and not replaced will have to be removed from the retarding basin so the storage capacity of the dam is not reduced.

Thank you for the opportunity to review your project and if you have any further questions please contact me at (937) 223-1278, ext. 3230 or by email at rfarrier@mcdwater.org.

Sincerely,

Roxanne H. Farrier
Property Administrator

cc: Kurt Rinehart

U.S. Fish & Wildlife Service Consultation Letters:

1. **WPAFB Request – 23Jul15**

2. **USFWS Response – 26Aug15, 06Jan16**

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

23 July 2015

88 CEG/CEIEA
1450 Littrell Road, Building 22
Wright-Patterson AFB OH 45433-5209

Mr. Dan Everson
U.S. Fish and Wildlife Service
4625 Morse Road, Suite 104
Columbus, OH 43230

Dear Mr. Everson:

Wright Patterson Air Force Base (WPAFB, Base) is preparing an Environmental Assessment (EA) in accordance with the requirements of the National Environmental Policy Act (NEPA) to address environmental impacts associated with implementation of the Integrated Natural Resources Management Plan (INRMP) at WPAFB. By way of this letter, WPAFB is seeking informal consultation with the U.S. Fish and Wildlife Service in compliance with Section 7 of the Endangered Species Act regarding the proposal.

The 2012 WPAFB INRMP is a programmatic document that details planned natural resources management activities over a five-year period. The INRMP is consistent with the Sikes Act Improvement Act of 1997 (SAIA), as amended (15 United States Code §§670a-670f), which requires the preparation, implementation, update, and review of an INRMP for military installations in the United States and its territories that contain significant natural resources. The request for consultation concerns the implementation of these activities and the potential effects of the action on federally protected threatened and endangered species.

The 2012 INRMP was developed in cooperation with the U.S. Fish and Wildlife Service (USFWS) and reflects the mutual agreement of all parties concerning conservation, protection, and management of natural resources on WPAFB. The SAIA requires the INRMP to be reviewed as to operation and effect on a regular basis, but not less than every five years. In accordance with Air Force Instruction (AFI) 32-7064, the INRMP must be reviewed annually in coordination with internal stakeholders and local representatives of the USFWS, and the state and wildlife agency, where applicable.

The geographic location of the proposed project area is Greene and Montgomery Counties as shown on Figure 1.

Proposed Action

The Proposed Action involves the implementation of the integrated ecosystem management of natural resources at WPAFB under the 2012 INRMP. The 2012 INRMP would be reviewed annually as needed to maximize its usefulness to installation natural resources personnel. The INRMP would be formally reviewed at least every five years and updated, as needed. All management practices would integrated and implemented in the context of the installation's mission support needs and regional setting, including integration of the following WPAFB INRMP component plans:

1. Bird/Wildlife Aircraft Strike Hazard, 2013
2. Emerald Ash Borer Management, 2010
3. Huffman Prairie Management, 2011
4. Integrated Pest Management, 2010
5. Invasive Species Management, 2010
6. Wetland and Stream Management, 2010
7. Wildland Fire Management, 2014

Two alternatives to the Proposed Action were considered. Alternative B involves implementation of a diminished approach to the proposed prescribed burn program at Huffman Prairie. The 2010 Huffman Prairie Assessment recommends prescribed burns to maintain native vegetation and minimize invasive woody species. The 2012 INRMP also proposes developing in-house resources to enable WPAFB to perform annual prescribed burns without the need to rely on outside agencies. Alternative B proposes prescribed burns would occur on an as-needed basis instead of annually as recommended in the 2012 INRMP. Alternative B also includes minimal and seasonal weeding to preserve native vegetation at Huffman Prairie.

The second alternative, Alternative C, proposes to implement a diminished outdoor recreation and game management program by reducing fish and pheasant stocks being provided to WPAFB lakes and licensed shooting preserves. The 2012 INRMP recommends improving the outdoor recreation program by annually stocking sport fish in lakes and pheasants in the licensed shooting preserve. Alternative C would delay enhancements to the current outdoor recreation program at WPAFB. Alternatives B and C would satisfy federal budget constraints and conform to the low priority of these objectives compared with other management measures proposed in the 2012 INRMP.

Under No Action (Alternative D), management of natural resources would continue as provided in the previous WPAFB INRMP version, the 2007-2011 INRMP. All components of the 2007-2011 INRMP would maintain baseline activities as described in the goals and objectives for each component plan, except in situations where mission activity or policy changes have resulted in changes to the baseline, independent of natural resources management.

WPAFB has determined four federally listed endangered species: Indiana bat (*Myotis sodalis*), Clubshell mussel (*Pleurobema clava*), Snuffbox mussel (*Epioblasma triquerta*) and Rayed bean mussel (*Villosa fabalis*) are known to or may occur on WPAFB (Figures 2 and 3 for Areas A and B, respectively). The Eastern massasauga rattlesnake (*Sistrurus catenatus*), a federal candidate species, may also occur on WPAFB. Based on our review of the April 2015 revised list for Ohio counties (http://www.fws.gov/midwest/Endangered/lists/ohio-spp.html), no other threatened, endangered, proposed, or candidate species are known to or may occur in the project area. No critical habitat has been designated or proposed for WPAFB.

Because the project areas are not within suitable habitat nor will any potential habitat be disturbed, no listed species would be directly or indirectly impacted. Furthermore, there are no impacts to trees and/or wetlands or other native habitat that supports the above listed species. WPAFB has therefore determined the proposed project will have no effect on listed species and further consultation with your office is not necessary. Your written concurrence with this determination of no effect is, however, requested.

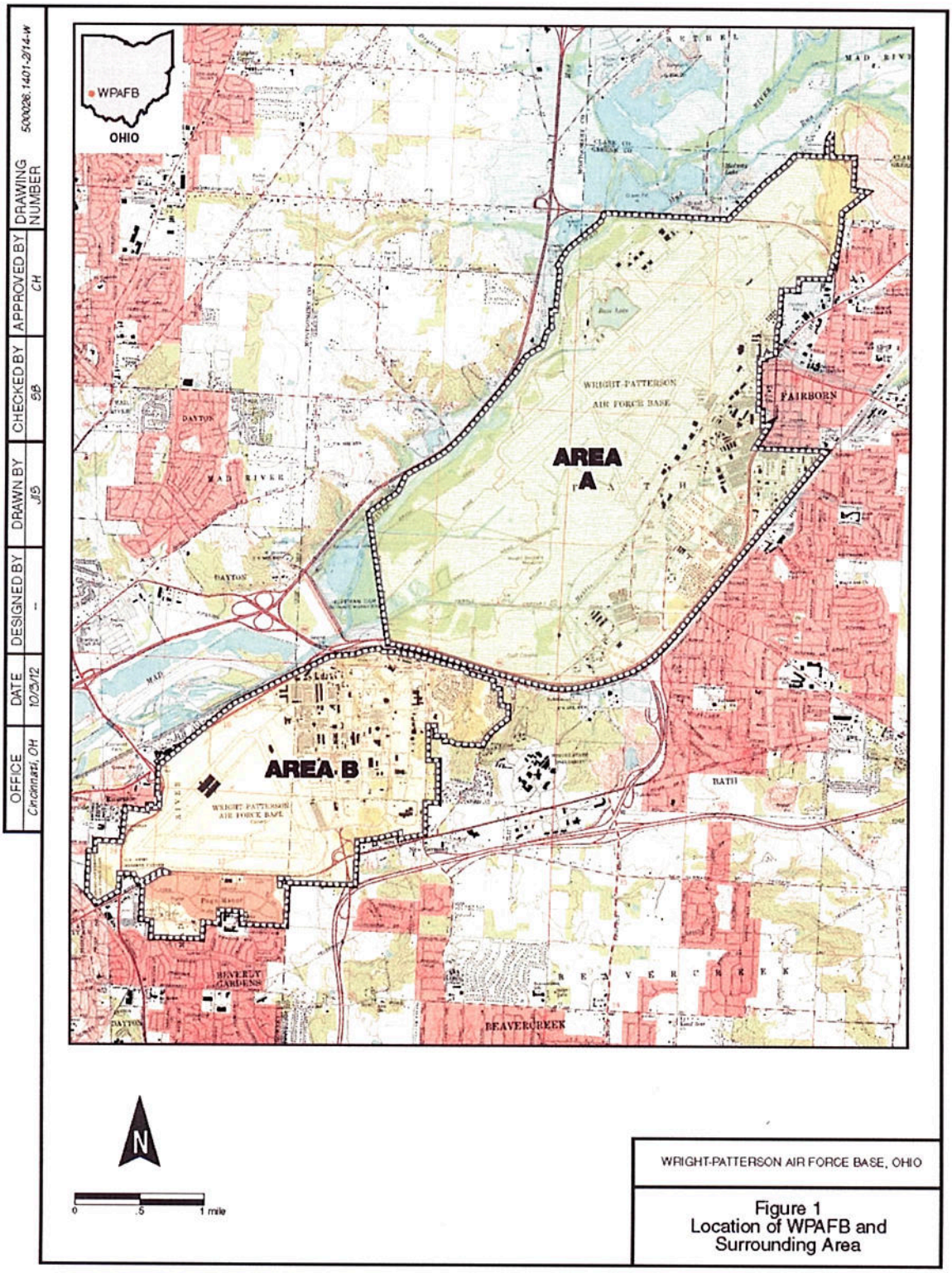
Thank you for your assistance. If there are any questions or additional detail is needed, please contact me by telephone at 937-257-4857 or by e-mail at darryn.warner@us.af.mil.

Sincerely

DARRYN M. WARNER
Natural Resources Program Manager
Environmental Quality Section
Environmental Branch

cc:
John Banford (88 CEG/CEIEA, WPAFB)
Cynthia A. Hassan (CB&I Federal Services, LLC)

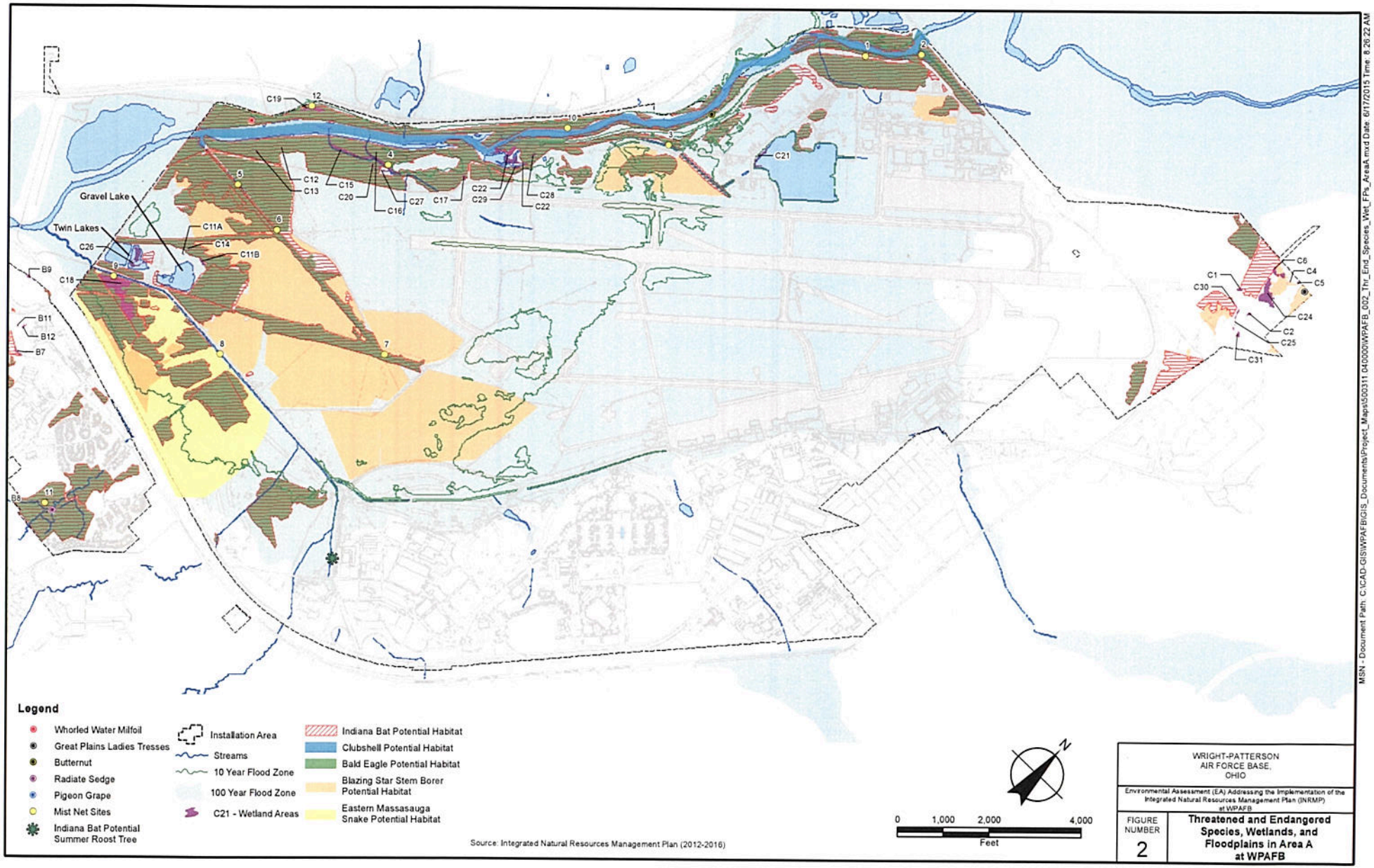
Attachments:
Figure 1 – Location of WPAFB and Surrounding Area
Figure 2 – Threatened and Endangered Species, Wetlands, and Floodplains in Area A at WPAFB
Figure 3 – Threatened and Endangered Species, Wetlands, and Floodplains in Area B at WPAFB

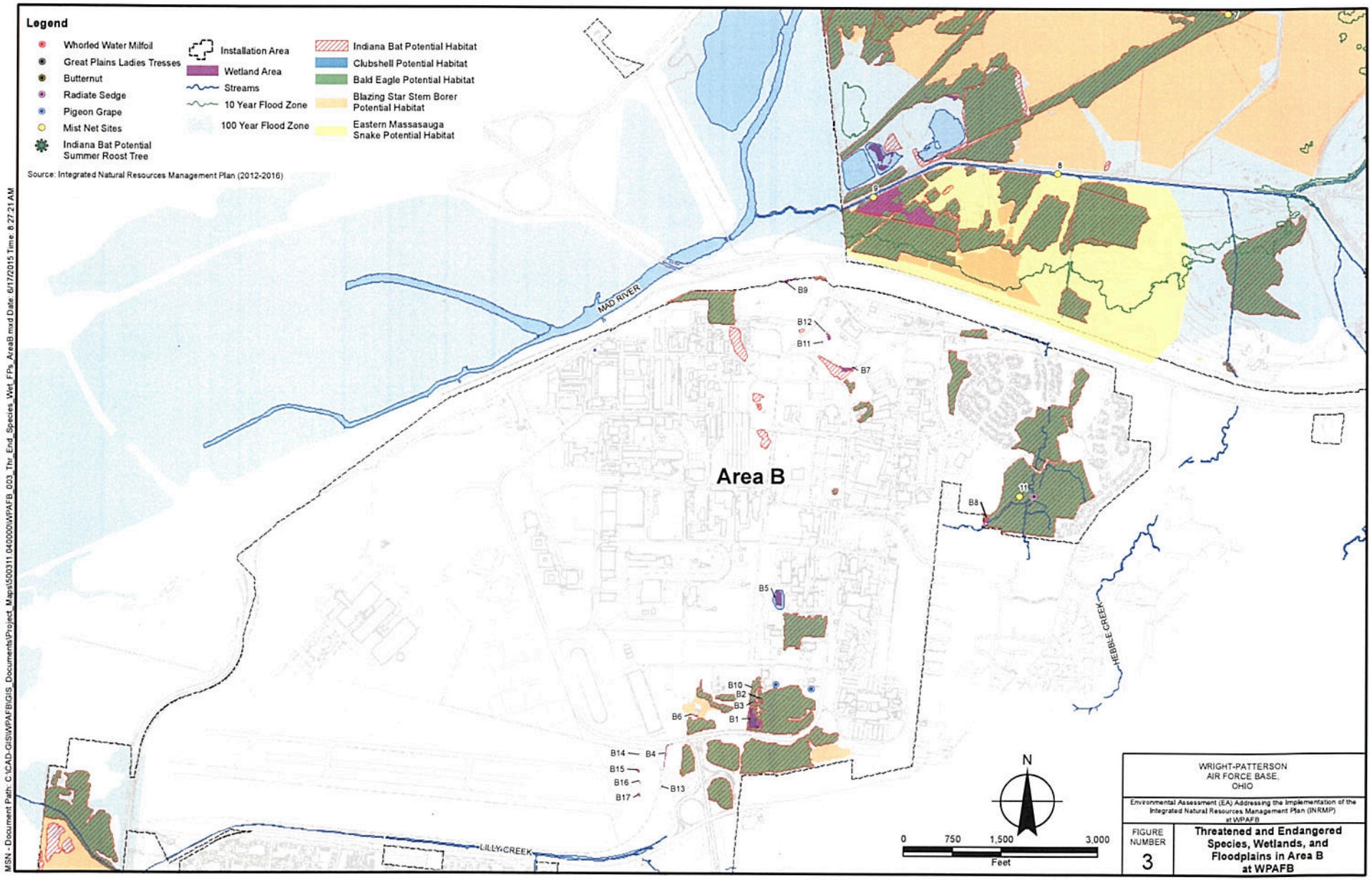


OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	10/3/12	-	JB	SB	CH	500026.1401-2/14-w

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 1
Location of WPAFB and Surrounding Area


Gravel Lake
Twin Lakes
C19
12
10
1
2
3
4
5
6
7
8
9
11
C21
C12
C13
C15
C20
C16
C27
C17
C22
C29
C28
C22
C11A
C14
C11B
C26
B9
C18
B11
B12
B7
B8
C1
C30
C6
C4
C5
C24
C2
C25
C31
Legend
Whorled Water Milfoil
Great Plains Ladies Tresses
Butternut
Radiate Sedge
Pigeon Grape
Mist Net Sites
Indiana Bat Potential Summer Roost Tree
Installation Area
Streams
10 Year Flood Zone
100 Year Flood Zone
C21 - Wetland Areas
Indiana Bat Potential Habitat
Clubshell Potential Habitat
Bald Eagle Potential Habitat
Blazing Star Stem Borer Potential Habitat
Eastern Massasauga Snake Potential Habitat
Source: Integrated Natural Resources Management Plan (2012-2016)
N
0
1,000
2,000
4,000
Feet
WRIGHT-PATTERSON AIR FORCE BASE, OHIO
Environmental Assessment (EA) Addressing the Implementation of the Integrated Natural Resources Management Plan (INRMP) at WPAFB
FIGURE NUMBER 2
Threatened and Endangered Species, Wetlands, and Floodplains in Area A at WPAFB
MSN - Document Path: C:\CAD-GIS\WPAFB\GIS_Documents\Project_Maps\500311.040000\WPAFB_002_Thr_End_Species_Wet_FPs_AreaA.mxd Date: 6/17/2015 Time: 8:26:22 AM


Legend
Whorled Water Milfoil
Great Plains Ladies Tresses
Butternut
Radiate Sedge
Pigeon Grape
Mist Net Sites
Indiana Bat Potential Summer Roost Tree
Installation Area
Wetland Area
Streams
10 Year Flood Zone
100 Year Flood Zone
Indiana Bat Potential Habitat
Clubshell Potential Habitat
Bald Eagle Potential Habitat
Blazing Star Stem Borer Potential Habitat
Eastern Massasauga Snake Potential Habitat
Source: Integrated Natural Resources Management Plan (2012-2016)
MSN - Document Path: C:\CAD-GIS\WPAFB\GIS_Documents\Project_Maps\500311 040000\WPAFB_003_Thr_End_Species_Wet_FPs_AreaB.mxd Date: 6/17/2015 Time: 8:27:21 AM
MAD RIVER
Area B
HEBBLE CREEK
LILLY CREEK
B1
B2
B3
B4
B5
B6
B7
B8
B9
B10
B11
B12
B13
B14
B15
B16
B17
N
0
750
1,500
3,000
Feet
WRIGHT-PATTERSON AIR FORCE BASE, OHIO
Environmental Assessment (EA) Addressing the Implementation of the Integrated Natural Resources Management Plan (INRMP) at WPAFB
FIGURE NUMBER 3
Threatened and Endangered Species, Wetlands, and Floodplains in Area B at WPAFB

From:	Hassan, Cindy
To:	Burns, Stephanie A
Subject:	FW: FW: INRMP questions...
Date:	Tuesday, September 01, 2015 10:17:11 AM

From: Seymour, Megan [mailto:megan_seymour@fws.gov]
Sent: Wednesday, August 26, 2015 9:46 AM
To: WARNER, DARRYN M GS-13 USAF AFMC 88 CEG/CEIEA; Hassan, Cindy
Subject: Re: FW: INRMP questions...

Darryn and Cindy,
Thanks for the response. I was referring to the consultation letter.

A "no effect" determination is appropriate in instances where there are no listed species, and no suitable habitat for species present in a given project area.
A "may affect, not likely to adversely affect" determination is appropriate where there may be listed species or suitable habitat for listed species, but due to avoidance and minimization measures, all effects will either be extremely unlikely to occur, so small as to be undetectable, or purely beneficial.
A "may affect, likely to adversely affect" determination is appropriate when, even with minimization measures, adverse effects to listed species cannot be completely avoided.

Because we know Indiana bats occur on the base, and that some suite of projects addressed under the INRMP will result in tree clearing (impacts to suitable habitat), I would say that "no effect" is not an appropriate determination for the INRMP as a whole. I am also not entirely comfortable saying that "all projects that require tree clearing will use the seasonal dates, so all projects are not likely to adversely affect Indiana bats." Occasionally projects come up that for some reason or another cannot implement the seasonal clearing dates. Or if large amounts of tree clearing were proposed in areas where Indiana bats are known to occur, we may not agree that seasonal clearing alone is sufficient to avoid all adverse effects.

I am very comfortable, however, with how the INRMP is currently written: describing the process for determining if a project will have "no effect" and thus does not require additional consultation with the FWS, versus projects that "may affect" a listed species and should be consulted on, and leaving it at that. Thus we would NOT consult on the INRMP as a whole (no determination of effects would be made from implementing the INRMP). Instead we consult, as needed, on a project-by-project basis, for those projects that impact forest habitat suitable for Indiana bats or wetland habitat suitable for massasauga.

Hope this is clear. We can discuss over the phone if you'd like--I'm free on Friday this week before 1:30 pm. Thanks!

Megan

On Tue, Aug 25, 2015 at 2:45 PM, WARNER, DARRYN M GS-13 USAF AFMC 88 CEG/CEIEA <darryn.warner@us.af.mil> wrote:
Megan,

FYI- our contractor preparing our INRMP EA had an answer or 2 below as well as a question!!

Darryn

-----Original Message-----
From: Hassan, Cindy [mailto:Cindy.Hassan@CBIFederalServices.com]
Sent: Friday, August 14, 2015 5:25 PM
To: WARNER, DARRYN M GS-13 USAF AFMC 88 CEG/CEIEA
Cc: BANFORD, JOHN R CIV USAF AFMC 88 CEG/CEIEC; Burns, Stephanie A
Subject: RE: INRMP questions...

Hi, Darryn

My apologies for the delay in responding. I still have a couple of questions about these comments, but believe that I have figured out where some clarification is needed.

With regard to the "NEPA scoping documents", was the USFWS reviewer referring to the DOPAA or to the consultation letter?

For purposes of NEPA, we would say that there is "no adverse impact" to the Indiana bat because the INRMP provides for a consultation process on a project-specific basis. This process and any precautions taken with respect to this species and its habitat (e.g., cutting trees only within the allowable timeframe, etc.) would be intended to avoid adverse impacts. Table 2-1 in the Draft DOPAA was preliminary and we have been updating it as we have been preparing the Draft EA. Therefore, it has been revised since you last reviewed it.

In re-reading the consultation letter, I think the discussion regarding the "project area" should be clarified. Similar to the reviewer's comments, we could revise the second-to-last paragraph of the letter to reflect that the INRMP provides a process for evaluating projects and coordinating with USFWS on a project-specific basis. In a broad sense, there would be "no effect" because the INRMP also prescribes measures that would be taken to avoid, minimize, or compensate for potential impacts, as identified. Would having these procedures in place be sufficient enough to obtain a determination of "no effect" for implementing the INRMP itself?

Please see what you think and we can discuss it further. We could also assist with drafting a follow-up letter, if you like.

Thanks,
Cindy

Cindy Hassan
Senior Risk Assessor
Federal Services
Environmental Solutions
Tel: +1 513 782 4967 (Direct)
Tel: +1 513 782 4700 (Main)
Fax: +1 513 782 4807

cindy.hassan@cbifederalservices.com

CB&I
5050 Section Avenue
Cincinnati, OH 45212
USA
www.CBI.com

-----Original Message-----
From: WARNER, DARRYN M GS-13 USAF AFMC 88 CEG/CEIEA
[mailto:darryn.warner@us.af.mil]
Sent: Thursday, August 06, 2015 2:54 PM
To: Hassan, Cindy
Cc: BANFORD, JOHN R CIV USAF AFMC 88 CEG/CEIEC
Subject: FW: INRMP questions...

Please let me know what you think about the INRMP question below?

Darryn

-----Original Message-----
From: Seymour, Megan [mailto:megan_seymour@fws.gov]
Sent: Wednesday, July 29, 2015 10:55 AM
To: WARNER, DARRYN M GS-13 USAF AFMC 88 CEG/CEIEA
Subject: INRMP questions...

Hey Darryn,

I got 2 NEPA scoping documents from you this week. One was for tank replacement, and you should be getting a "no effect" letter back from us shortly. The other one is for the INRMP. I had some questions about that one, as it determines "No effect" for all T&E species. The INRMP section 7.4.2.1 describes the consultation process for Indiana bats (eg, if trees are proposed to be removed for any projects under the INRMP, consultation will be implemented). Thus I don't know if it is appropriate to conclude that implementation of the INRPM as a whole will have no effect on Indiana bats. Rather, the INRMP describes how each project will be evaluated to determine if there is an effect, and if so, WPAFB will consult with FWS on the individual project. It is possible to complete a consultation on the entire INRMP as a whole and evaluate all possible effects to listed species from implementation of the entire program, but to date we have not done that. To some degree, the same approach could be used for eastern massasauga too--consult with FWS if there will be impacts to suitable habitat.

Thoughts?
Megan

--

Megan Seymour
Wildlife Biologist

U.S. Fish and Wildlife Service, 4625 Morse Rd., Suite 104, Columbus, OH 43230
(614) 416-8993 ext 16, (614) 416-8994 fax

--

Megan Seymour
Wildlife Biologist
U.S. Fish and Wildlife Service, 4625 Morse Rd., Suite 104, Columbus, OH 43230
(614) 416-8993 ext 16, (614) 416-8994 fax

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / FAX (614) 416-8994

January 6, 2016

Mr. John Banford
EIAP Program Manager
88 CEG/CEIEA
1450 Littrell Road
WPAFB, OH 45433-5209

TAILS #03E15000-2016-CPA-0319

Re: Environmental Assessment to Implement the Integrated Natural Resources Management Plan at Wright-Patterson Air Force Base, Ohio

Dear Mr. Banford:

The U.S. Fish and Wildlife Service (FWS) has completed our review of the Draft Environmental Assessment (EA) for the proposed implementation of the Integrated Natural Resources Management Plan (INRMP) at Wright-Patterson Air Force Base (WPAFB), Ohio. Below we provide several comments that apply to the document as a whole and in the attached spreadsheet you will find additional section-specific comments.

1. The draft EA describes Alternative A (Proposed Action) as implementation of the 2012 INRMP or the "2012 updated INRMP." It is unclear to us why the 2012 INRMP was addressed in this EA, as that document is outdated (addressed the period of time from 2012-2016), and has been implemented nearly in its entirety already. WPAFB recently provided funding to FWS to develop an updated INRMP. In May of 2015 FWS provided a draft INRMP and in October 2015 the FWS provided a final INRMP. This 2015 INRMP describes management actions planned for implementation from 2016-2020. We strongly recommend that the Draft EA, particularly Chapter 4, be revised to address the 2015 INRMP and the management activities planned for the period from 2016-2020.
2. The 2015 INRMP should be circulated with the Draft EA, to enable reviewers to fully understand the proposed actions being evaluated in the EA.
3. Alternative B, C, and D should be explained in more detail so that the reader can better understand the distinctions between the alternatives and so that the EA can more clearly distinguish between effects of the various alternatives.
4. As addressed in the EA, the FWS has recommended that determinations of effect under the Endangered Species Act be made on a project-specific basis. The 2015 INRMP discusses this in detail. We request that project-specific determinations include supporting detail (such as avoidance and minimization measures to be implemented) to support any determinations made.

Thank you for the opportunity to review the Draft EA. If you have questions, or if we can be of further assistance in this matter, please contact Biologist Megan Seymour at (614) 416-8993 ext. 16, or Megan_Seymour@fws.gov.

Sincerely,

Dan Everson
Field Supervisor

cc: Nathan Reardon, ODNR-DOW
Jennifer Norris, ODNR-DOW

			WPAFB INRMP Draft EA Review Dec 2015	
No.	**Page**	**Section**	**Revisions**	**Agency Comments/Requests**
	2-1	2.2	Alternative A should be to implement the 2015 INRMP which outlines proposed actions from 2016-2020.	
	2-7	2.3	The description of Alternative B should be more specific relative to the frequency of controlled burns. The 2015 INRMP describes the recommended frequency of burns (1/4 to 1/2 of Huffman Prairie and specific other locations) on an annual basis. Alternative B contemplates burning only on an "as needed basis," and is presumably less frequent than recommeded in the INRMP, but it is not clear what the frequency or extent would be.	
	2-7	2.4	The description of Alternative C should be more specific relative to which aspects of the outdoor recreation and game management program would be "diminished." Here it says, "similar to the Proposed Action, Alternative C also supports maintenance of the whitetailed deer population." Later in this section it describes that the alternative would "delay enhancements to the current outdoor recreation program." Does this mean that deer hunting would continue as-is but that fish and pheasants would not be stocked? Chapter 4 reads that under this alternative, deer management/hunting opportunities would decrease. Please clarify.	
	2-8	2.5	The description of Alternative D should be revised to address the current status-quo, which is implementation of the 2012 INRPM.	
	2-12	Table 2-4	What is the "Environmental Restoration Program"? Is it still being carried out? This is not addressed in the 2015 INRMP.	
	3-24	3.6.2	Lines 34-35 state: "The majority of the project areas are located within disturbed areas of the Base." This statement does not seem accurate as activities such as hunting, management of Huffman Prairie, species surveys, and habitat management/enhancement will all occur in natural areas. Please revise.	
	3-25	3.6.2	Lines 7-8 describe the Endangered Species Management Plan. This plan is outdated and no longer being used. The 2015 INRMP does not include this plan.	
	3-25	3.6.2	Table 3-4 should be revised to be consistent with the 2015 INRMP. Because one of the main the purposes of the INRMP is to manage to benefit listed species, it would be appropriate to include in this section a more thorough discussion of the current status of state and federally-listed species that occur on WPAFB. The 2015 INRMP contains substantial discussion on the status of federal and state-listed species that occur on WPAFB.	

	3-28	3.6.2	Lines 6-13 describe FWS's response to a request for consultation on the INRMP as a whole. Refer to the 2015 INRMP for detailed information on the life history and status of listed species on WPAFB. Further, the 2015 INRMP outlines specific avoidance and minimization measures that will be implemented to ensure that individual projects are not likely to adversely affect federally listed species and describes the consultation process in detail. These measures should be mentioned in the EA.	
	4-1	4	Chapter 4 should be updated in its entirety to evaluate the 2015 INRMP as Alternative A.	
	4-6	4.2.1	Lines 2-4 describe the assumption that all of Huffman Prairie will be burned every year and that each of 12 other burn areas will be burned in their entirety every year. While we understand that this is a worst-case scenario assumption for analysis of potential impacts to air quality from controlled burning, this scenario is not reasonable or likely, and could not be implemented under the INRMP due to the potential adverse impacts that could occur to Huffman Prairie. We suggest developing a more reasonable worst-case scenario for assessment purposes, for example burning half of Huffman Prairie and the two largest other areas in a given year. This would be more consistent with the INRMP.	
	4-12	4.6.1	To be consistent with the Endangered Species Act, lines 29-34 should be modified to read as follows (changes in bold type): "As a requirement under the ESA, Federal agencies must provide documentation that ensures that agency actions do not **jeopardize the continued existence of** any threatened or endangered species. **If a Federal action "may affect" a listed species, the Federal action agency must consult with the USFWS as described under section 7 of the ESA to authorize any incidental take that is likely to occur, and to ensure that the take will not jeopardize the continued existence of the species."**	
	4-13	4.6.2	Lines 24-27: The 2015 INRMP allows the use of wetland-approved herbicides to control invasive species in wetlands. Thus, this statement should be revised here and in the other Alternatives. Management of invasive wetland species will have long-term benefits to wetland ecosystems on WPAFB.	

	4-13	4.6.2	Lines 30-38: The 2015 INRMP contains substantial discussion on various management actions that will be implemented to monitor and manage for federally and state-listed species. One of the major aspects of the INRMP is to manage for listed species, thus this section should include more discussion on how implementation of the INRMP will result in beneficial long-term effects for listed species. For some management actions (e.g., controlled burns) that have potential to result in adverse effects to listed species (e.g., massasauga, smooth green snake) species-specific measures to minimize adverse effects have been described and will be implemented. These should also be described in the EA.	

UNITED STATES DEPARTMENT OF THE INTERIOR
U.S. Fish and Wildlife Service
Ecological Services Office
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / Fax (614) 416-8994

September 18, 2015

Col. John M. Devillier
88 ABW/CC
5135 Pearson Rd., Ste. 223
Wright-Patterson AFB, OH 45433-5319

TAILS #03E15000-2015-TA-1556

Dear Col. Devillier:

This letter is in response to a notification our office received from your Natural Resources Program Manager regarding tree clearing/removal activities associated with the Fence Replacement Project (no. ZHTV041906 and ZHTV041907). According to the information provided, a forestry mower was used to clear cut approximately 2.05 acres of forest adjacent to the floodplain of the Mad River on or just before July 1, 2015. Photographs provided document the location and extent of the clearing and document some of the trees that were cut. The U.S. Fish and Wildlife Service (Service) was not provided the opportunity to review or comment on this project prior to implementation, nor was Section 7 consultation under the Endangered Species Act of 1973, as amended (ESA) conducted.

Endangered Species Act Comments:
The project lies within the range of the federally endangered **Indiana bat** (*Myotis sodalis*). Indiana bats have been documented within the forested areas of the Mad River floodplain during multiple summer bat surveys at Wight-Patterson Air Force Base (WPAFB) from 1993-2012. The presence of female and juvenile bats in this area in the summer indicates that a maternity colony (reproductive unit consisting of many adult females and their offspring) of Indiana bats is using this habitat for roosting and foraging. Indiana bats exhibit philopatry, returning to the same roosting and foraging areas each summer. As described in WPAFB's current (and prior) Integrated Natural Resources Management Plan (INRMP), bat surveys conducted every five years or so continue to document the presence of the maternity colony. These repeated surveys comprise one of the longest-term monitoring programs of any Indiana bat colony in Ohio. The INRMP specifically targets this area for habitat management to benefit Indiana bats, including control of invasive species and planting of specific trees that provide high quality habitat.

During summer Indiana bats roost in trees during the day and forage for insects at night. Suitable summer habitat for Indiana bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥3 inches diameter at breast height (dbh) that have any exfoliating bark, cracks,

crevices, hollows and/or cavities), as well as linear features such as fencerows, riparian forests, and other wooded corridors.

As noted above, the 2.05-acre area where tree clearing occurred is known to provide suitable foraging habitat for an Indiana bat maternity colony, as bats that are captured during summer netting are typically foraging. Your summary documented that 188 trees greater than 8 inches dbh were cleared, and photos indicated that at least some of these trees had characteristics of suitable Indiana bat roost trees. Thus, the area cleared provided high quality roosting and foraging habitat for a documented Indiana bat maternity colony.

In all instances where tree clearing is proposed and Indiana bats are known or suspected to occur, the Service recommends that tree clearing only occur after September 30 and before April 1, when Indiana bats are hibernating in caves or mines, and thus would not be exposed to potential mortality from cutting of roost trees when bats are using them. Tree clearing for this project occurred on or just before July 1, 2015. This is a period of time when female bats would have just given birth to offspring (pups), and the pups are dependent on the females for nourishment and are not yet able to fly. Thus, if pups were roosting in any of the trees that were cleared, it is likely that they were injured or killed when the trees were cleared. Likewise, though adult female Indiana bats can fly, they could be injured or killed by felling of trees, depending on the particular location they are roosting in and how the tree falls relative to that location. Furthermore, activities that force a bat to flee a roost location are also considered to be harassment. Mortality, injury, harassment, and habitat loss that causes bats to alter breeding, feeding, or sheltering patterns are considered "take" under the ESA. Take is prohibited under Section 9 of the ESA unless an incidental take statement or incidental take permit has been issued by the Service.

Based on the habitat at the site, the documented presence of Indiana bats in past surveys at this location, and the timeframe within which trees were cut, we believe that Indiana bats may have been taken during tree clearing associated with this project. Under Section 11 of the ESA, civil penalties for violations can total up to $25,000 and criminal penalties can total up to $50,000.

In instances where a Federal nexus exists, such as projects occurring on Federal property, consultation under Section 7 of the ESA is required for projects that "may affect" an ESA-listed species. Projects involving tree clearing in areas where Indiana bats are known to occur "may affect" this species, and thus consultation is required. The evaluation and consultation process for Indiana bats at WPAFB is described in detail in Section 7.4.2.1. of the 2015 Draft INRMP, and was described similarly in prior versions of the INRMP. All proposed projects at WPAFB should be submitted to the Installation Management Division, which will determine which projects are subject to ESA consultation and contact our office directly. Our office regularly consults with the Natural Resources Program Manager in the Installation Management Division on projects that may affect listed species; however, this project was not submitted to our office for review or consultation.

We strongly recommend that future projects be coordinated with this office prior to clearing and ground disturbing activities commencing, and that mitigation for un-authorized impacts to Indiana bat habitat and the bats using that habitat be implemented as soon as possible.

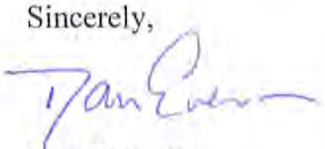
The Service has developed a Habitat Equivalency Analysis (HEA) model to quantify how much habitat is needed to replace impacts to existing habitat, and ensure a no net loss of ecological conditions and functions, while recognizing that it takes time to restore various tracks of habitat to certain functions. The HEA inputs are the quantity of habitat impacted, the type of habitat impacted, and the permanency of the impact. The HEA outputs are the number of acres required to mitigate the impact, and an estimate of the cost of those acres on a per state basis. The Service input the 2.05 acres of permanently impacted mature forest habitat into the HEA model. The resulting output is 11.07 acres of mitigation necessary to offset the conditions and functions of the lost habitat over time.

To mitigate for the loss of Indiana bat habitat and the likely take of individual Indiana bats associated with this project, we recommend that currently open habitat adjacent to the Mad River or its floodplain be restored to forest habitat by planting trees that are suitable for Indiana bat habitat (see attached). The area planted should total at least 11.07 acres. Trees should be planted at a ratio of at least 600 stems per acre. A minimum of four species identified as "exfoliating bark species" on the attached list must be planted and equal at least 40 percent of the minimum stems per acre. The remaining 60 percent of the minimum stems per acre may be any of the species on the list. Each of the selected tree species should be planted at approximately equal rates. Tree survival should be monitored for at least 5 years and after 5 years the survival rate should be at least 300 stems per acre. This area should be permanently protected from disturbance. We recommend that WPAFB permanently protect all remaining forest habitat within the Mad River corridor and commit to avoiding future development in this area to ensure the long-term availability of habitat for Indiana bats on the Base.

While it is likely that Indiana bats roosting within the area may have been harassed, injured, or killed, we are uncertain of how many individuals may have been exposed. The mitigation requested is not able to replace or rehabilitate individuals that may have been injured or killed, but is intended to ensure that Indiana bats remaining at WPAFB have available habitat now and into the future.

If you would like to discuss this project or any of the associated recommendations in further detail, we would welcome a call or meeting. Please contact myself at extension 12, or Biologist Megan Seymour at extension 16, or Megan_Seymour@fws.gov.

Sincerely,



Dan Everson
Field Supervisor

Attachment: Tree Species List for Indiana Bat Protection and Enhancement Plans

TREE SPECIES LIST FOR INDIANA BAT PROTECTION AND ENHANCEMENT PLANS

Exfoliating Bark Species

Acer rubrum	Red Maple
[a]*Acer saccharinum*	Silver Maple
Acer saccharum	Sugar Maple
Carya cordiformis	Bitternut hickory
Carya glabra	Pignut hickory
Carya laciniosa	Shellbark hickory
[b]*Carya ovata*	Shagbark hickory
Carya tomentosa	Mockernut hickory
Oxydendron arboreum	Sourwood
Pinus echinata	Shortleaf pine
[a]*Populus detloides*	Cottonwood
Quercus alba	White oak
Quercus coccinea	Scarlet oak
Quercus imbricaria	Shingle oak
Quercus prinus	Chestnut oak
Quercus rubra	Northern red oak
Quercus stellata	Post oak
Quercus velutina	Black oak
Sassafras albidum	Sassafras
[a]*Ulmus americana*	American elm
[b]*Ulmus rubra*	Slippery elm

Nitrogen-fixing Trees

Cercis canadensis	Redbud

Other Trees

[b]*Castanea dentata*	Chestnut
Cornus florida	Flowering dogwood
Diospyros virginiana	Persimmon
Morus rubra	Red mulberry
Prunus serotina	Wild black cherry

[a] Species survival and growth is best in moist areas, including stream riparian zones.
[b] Species survival and growth is best in drier habitats.

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE OHIO

CERTIFIED MAIL

October 26, 2015

Mr. Raymond Baker
Chief, Environmental Branch
1450 Littrell Rd, Bldg. 22
Wright-Patterson AFB OH 45433

Mr. Dan Everson
U.S. Fish and Wildlife Service
Ecological Services Office
4625 Morse Road, Suite 104
Columbus OH 43230

Dear Mr. Everson

In response to your Fence Replacement Project Letter, TAILS #03E15000-2015-TA-1556, dated September 18, 2015 concerning the potential impacts to threatened and endangered species habitat, Wright-Patterson Air Force Base proposes to plant three hundred 2-3 gallon potted trees suitable for Indiana bat habitat per acre over an area totaling approximately five acres. These five acres would be open habitat adjacent to the Mad River corridor as shown in Figure 1. By planting 2-3 gallon potted stock verses the recommended bare-root seedlings, the mitigation area will be 10 to 15 years ahead in terms of regaining the values lost during the clearing operation. We plan on developing a project for execution in FY16 to plant, document the tree species, and monitor the growth for five years. During the five-year monitoring period any trees lost will be re-planted so there will be three hundred trees per acre. During the plan development, coordination will occur with the USFWS in order to ensure an open-dialogue is maintained and actions being taken are in the best interest of the mitigation goals.

We have also incorporated an internal training program for our designers and inspectors that will cover, at a minimum, coordination procedures and the location of natural resources and cultural resources, along with National Environmental Policy Act requirements. This training will start the first week of November 2015 and proceed on a bi-monthly basis.

We trust that these actions demonstrate that we take our environmental stewardship seriously and look forward to continuing our cooperative working relationship with you. This proposal shall be subject to the availability of appropriated funds. Please send a written confirmation of your concurrence within 60 days of receiving this letter so we can plan accordingly. If you have any questions, please contact my Natural Resources Program Manager, Mr. Darryn Warner at (937) 257-4857 or by email at darryn.warner@us.af.mil.

Sincerely

RAYMOND F. BAKER
Chief, Environmental Branch
88th Civil Engineer Group

Attachment: Figure 1

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / FAX (614) 416-8994

November 10, 2015

Mr. Raymond Baker
88 CEG/CEIEA
1450 Littrell Road, Building 22
Wright-Patterson AFB OH 45433-5209

TAILS #03E15000-2015-TA-1556

Re: Fence Replacement Project, Tree Planting

Dear Mr. Baker,

We have received your correspondence dated October 26, 2015 regarding proposed tree planting to compensate for tree removal activities associated with the Fence Replacement Project (no. ZHTV041906 and ZHTV041907). The U.S. Fish and Wildlife Service (Service) previously commented on this project in letters dated September 18, 2015 and October 8, 2015.

Your letter describes your proposal to plant five acres of currently open land near the Mad River corridor with three hundred 2-3 gallon potted trees per acre. This would occur during fiscal year 2016, and would be monitored for a five year period to ensure survival of 300 trees per acre. Further, your letter describes an internal training program that will be implemented in November 2015 to ensure awareness of coordination procedures for natural and cultural resources and the National Environmental Policy Act.

We appreciate Wright-Patterson Air Force Base's commitment to implement these actions, and agree that they are appropriate to compensate for the clearing of occupied Indiana bat habitat that occurred during the summer of 2015. Additionally, the proposed training program will avoid future tree clearing prior to consultation with the Service.

If you have questions, or if we can be of further assistance in this matter, please contact our office at (614) 416-8993 or ohio@fws.gov.

Sincerely,

Dan Everson
Field Supervisor

cc: Nathan Reardon, ODNR-DOW
Jennifer Norris, ODNR-DOW

Ohio Department of Natural Resources Consultation Letters:

1. **CB&I Request – 27Jul15**

2. **ODNR Response – 05Oct15**

CB&I
5050 Section Avenue
Cincinnati, OH 45212
Tel: +1 513 782 4700
Fax: +1 513 782 4807
www.CBI.com

July 27, 2015

Ms. Debbie Woischke
Ohio Department of Natural Resources
Division of Wildlife
Ohio Biodiversity Database Program
2045 Morse Road, Building G-3
Columbus, Ohio 43229-6693

Subject: Rare Species Data Request and Informal Consultation
Environmental Assessment Addressing Implementation of the Integrated Natural Resources Management Plan
Wright-Patterson Air Force Base, Ohio

Dear Ms. Woischke:

The purpose of this letter is to request information from the National Heritage Program for State and Federally-listed threatened or endangered plants and animals in the vicinity of Areas A and B at Wright-Patterson Air Force Base (WPAFB, Base). The WPAFB is preparing an Environmental Assessment (EA) to implement the Integrated Natural Resources Management Plan (INRMP) at WPAFB. The 2012 WPAFB INRMP is a programmatic document that details planned natural resources management activities over a five-year period. The INRMP is consistent with the Sikes Act Improvement Act (SAIA), as amended (16 United States Code §§670a-670f), which requires the preparation, implementation, update, and review of an INRMP for military installations in the United States and its territories that contain significant natural resources. The request for consultation concerns the implementation of these activities and the potential effects of the actions on federally protected threatened and endangered species.

The 2012 INRMP was developed in cooperation with the U.S. Fish and Wildlife Service (USFWS) and reflects the mutual agreement of all parties concerning conservation, protection, and management of natural resources on WPAFB. The SAIA requires the INRMP to be reviewed as to operation and effect on a regular basis, but not less than every five years. In accordance with Air Force Instruction (AFI) 32-7064, the INRMP must be reviewed annually in coordination with internal stakeholders and local representatives of the USFWS, and the state and wildlife agency, where applicable.

Proposed Action

The Proposed Action involves implementation of the integrated ecosystem management of natural resources at WPAFB under the 2012 INRMP. The 2012 INRMP would be reviewed annually as needed to maximize its usefulness to installation natural resources personnel. The INRMP would be formally reviewed at least every five years and updates, as needed. All management practices would be integrated and implemented in the context of the installation's mission support needs and regional setting, including integration of the following WPAFB INRMP component plans:

1. Bird/Wildlife Aircraft Strike Hazard, 2013
2. Emerald Ash Borer Management, 2010
3. Huffman Prairie Management, 2011
4. Integrated Pest Management, 2010
5. Invasive Species Management, 2010
6. Wetland and Stream Management, 2010
7. Wildland Fire Management, 2014

Two alternatives to the Proposed Action were considered. Alternative B involves implementation of a diminished approach to the proposed prescribed burn program at Huffman Prairie. The 2010 Huffman Prairie Assessment recommends prescribed burns to maintain native vegetation and minimize invasive woody species. The 2012 INRMP also proposes developing in-house resources to enable WPAFB to perform annual prescribed burns without the need to rely on outside agencies. Alternative B proposes prescribed burns would occur on an as-needed basis instead of annually as recommended in the 2012 INRMP. Alternative B also includes minimal and seasonal weeding to preserve native vegetation at Huffman Prairie.

The second alternative, Alternative C, proposes to implement a diminished outdoor recreation and game management program by reducing fish and pheasant stocks being provided to WPAFB lakes and licensed shooting preserves. The 2012 INRMP recommends improving the outdoor recreation program by annually stocking sport fish in lakes and pheasants in the licensed shooting preserve. Alternative C would delay enhancements to the current outdoor recreation program at WPAFB. Alternatives B and C would satisfy federal budget constraints and conform to the low priority of these objectives compared with other management measures proposed in the 2012 INRMP.

Under the No Action (Alternative D), management of natural resources would continue as provided in the previous WPAFB INRMP version, the 2007-2011 INRMP. All components of the 2007-2011 INRMP would maintain baseline activities as described in the goals and objectives for each component plan, except in situations where mission activity or policy changes have resulted in changes to the baseline, independent of natural resources management.

The Base has determined that management actions, as implemented within the INRMP, would either not likely adversely affect or have an effect on six species known to occur or have occurred at WPAFB (bald eagle, Indiana bat, eastern massasauga rattlesnake, clubshell mussel, snuffbox mussel, rayed bean). This determination is based on the notion that the INRMP is a programmatic document intended to preserve and protect natural and biological resources at WPAFB.

The form for our Data Request is attached. We would appreciate any information from your database that applies to our project area. Please let us know if you concur with the no effect determination. Please contact me at 513/782-4967 or by email at Cindy.Hassan@cbifederalservices.com if you have any questions. Thank you for your consideration.

Sincerely,

CB&I FEDERAL SERVICES LLC

Cynthia A. Hassan

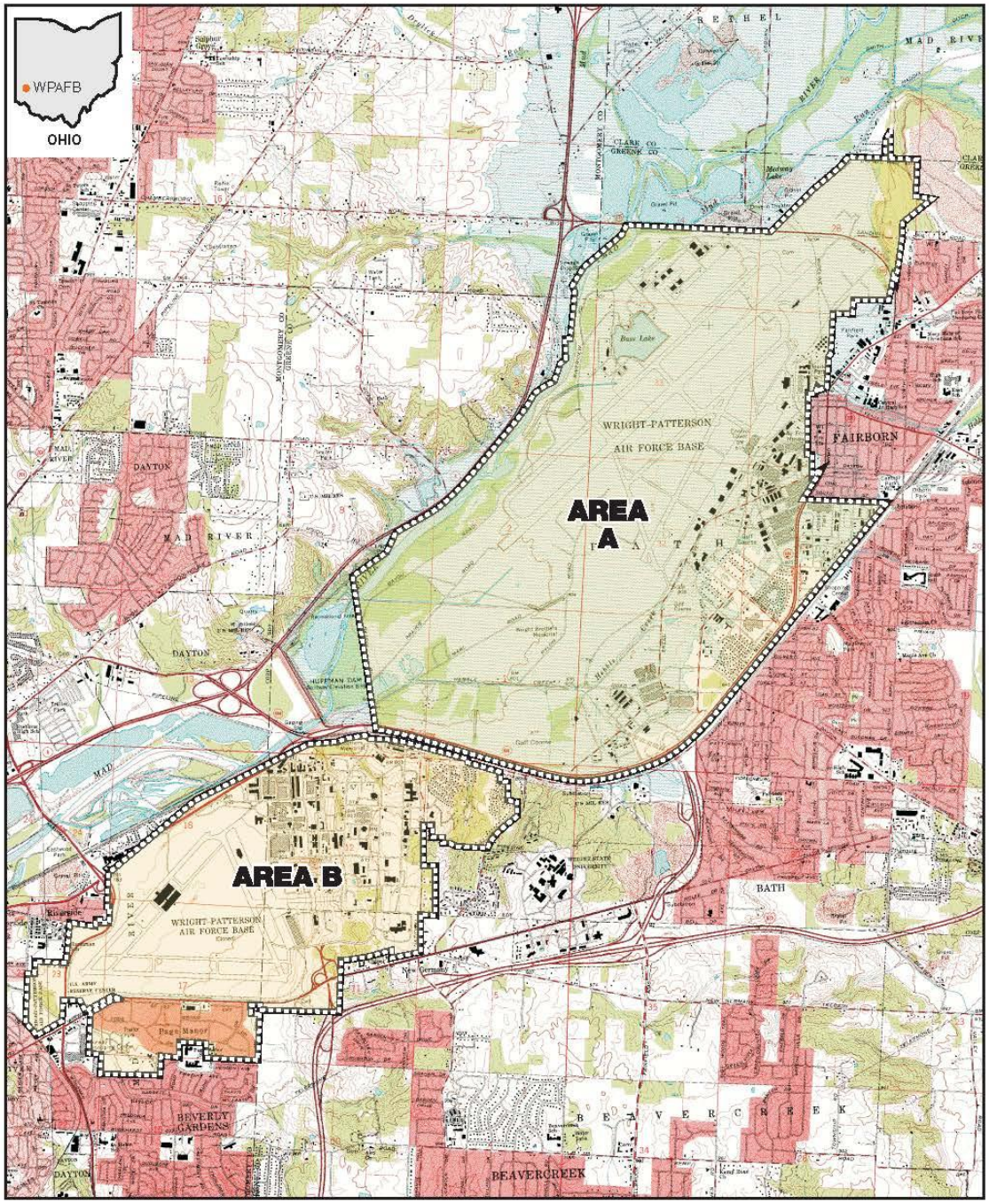
Cynthia A. Hassan
Project Manager

cc: John Banford (88 CEG/CEIEA, WPAFB)

Attachments: Figure 1 – Location of WPAFB and Surrounding Area
Figure 2 – Threatened and Endangered Species, Wetlands, and Floodplains in Area A at WPAFB
Figure 3 – Threatened and Endangered Species, Wetlands, and Floodplains in Area B at WPAFB

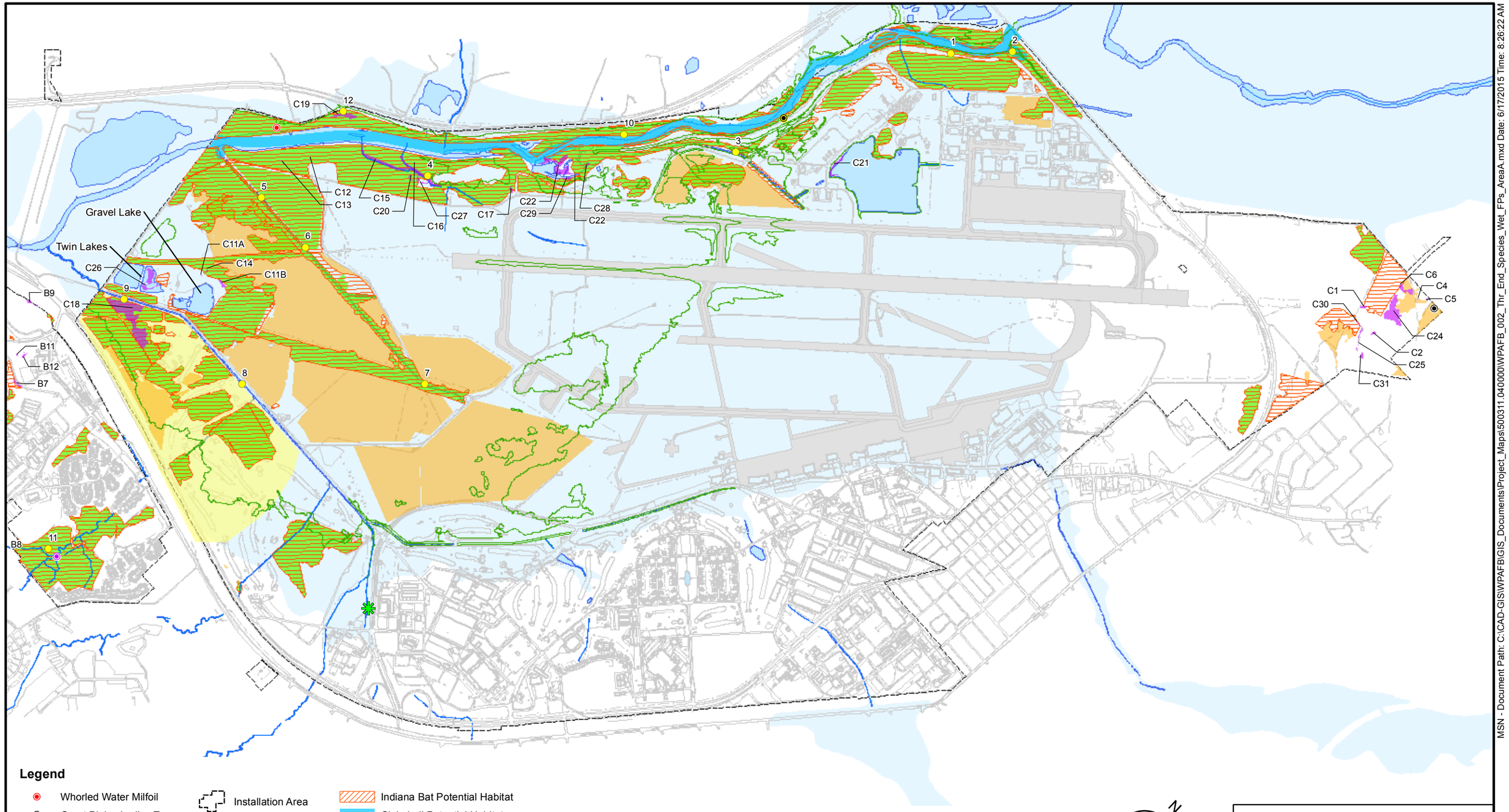
Enclosure: Natural Heritage Data Request Form

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	10/3/12	--	JIS	SB	CH	500026.1401-2/14-W



WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 1
Location of WPAFB and Surrounding Area



Legend

- Whorled Water Milfoil
- Great Plains Ladies Tresses
- Butternut
- Radiate Sedge
- Pigeon Grape
- Mist Net Sites
- Indiana Bat Potential Summer Roost Tree
- Installation Area
- Streams
- 10 Year Flood Zone
- 100 Year Flood Zone
- C21 - Wetland Areas
- Indiana Bat Potential Habitat
- Clubshell Potential Habitat
- Bald Eagle Potential Habitat
- Blazing Star Stem Borer Potential Habitat
- Eastern Massasauga Snake Potential Habitat

Source: Integrated Natural Resources Management Plan (2012-2016)

N

0 1,000 2,000 4,000

Feet

WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Environmental Assessment (EA) Addressing the Implementation of the Integrated Natural Resources Management Plan (INRMP) at WPAFB

FIGURE NUMBER 2

Threatened and Endangered Species, Wetlands, and Floodplains in Area A at WPAFB

MSN - Document Path: C:\CAD-GIS\WPAFB\GIS_Documents\Project_Maps\500311.040000\WPAFB_002_Thr_End_Species_Wet_FPs_AreaA.mxd Date: 6/17/2015 Time: 8:26:22 AM

Legend

- Whorled Water Milfoil
- Great Plains Ladies Tresses
- Butternut
- Radiate Sedge
- Pigeon Grape
- Mist Net Sites
- Indiana Bat Potential Summer Roost Tree
- Installation Area
- Wetland Area
- Streams
- 10 Year Flood Zone
- 100 Year Flood Zone
- Indiana Bat Potential Habitat
- Clubshell Potential Habitat
- Bald Eagle Potential Habitat
- Blazing Star Stem Borer Potential Habitat
- Eastern Massasauga Snake Potential Habitat

Source: Integrated Natural Resources Management Plan (2012-2016)

Area B

MAD RIVER
LILLY CREEK
HEBBLE CREEK

B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13 B14 B15 B16 B17

7 8 9 11

N

0 750 1,500 3,000
Feet

WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Environmental Assessment (EA) Addressing the Implementation of the Integrated Natural Resources Management Plan (INRMP) at WPAFB

FIGURE NUMBER 3

Threatened and Endangered Species, Wetlands, and Floodplains in Area B at WPAFB

MSN - Document Path: C:\CAD-GIS\WPAFB\GIS_Documents\Project_Maps\500311.040000\WPAFB_003_Thr_End_Species_Wet_FPs_AreaB.mxd Date: 6/17/2015 Time: 8:27:21 AM

NATURAL HERITAGE DATA REQUEST FORM

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE
OHIO NATURAL HERITAGE PROGRAM
2045 MORSE RD., BLDG. G-3
COLUMBUS, OHIO 43229-6693
PHONE: 614-265-6452; EMAIL: obdrequest@dnr.state.oh.us

INSTRUCTIONS:
Please complete both pages of this form, sign and return it to the address or email address above along with: **(1)** a brief letter describing your project, and **(2)** a map detailing the boundaries of your project site. A copy of the pertinent portion of a USGS 7.5 minute topographic map is preferred but other maps are acceptable. Data requests will be competed within approximately 30 days. There is currently no charge for data requests.

WHAT WE PROVIDE: The Natural Heritage Database is the most comprehensive source of information on the location of Ohio's rare species and significant natural features. Records for the following will be provided: plants and animals (state and federal listed species), high quality plant communities, geologic features, breeding animal concentrations and unprotected significant natural areas. We also provide locations for managed areas including federal, state, county, local and non-profit sites, as well as state and national scenic rivers. A minimum one mile radius around the project site will automatically be searched. Because the data is sensitive information, it is our policy to provide only the data needed to complete your project. The information is generally provided without comment on potential impacts to the species and their habitats and therefore does not constitute coordination with ODNR under NEPA, the Fish & Wildlife Coordination Act or the Federal Water Pollution Control Act. If your project requires ODNR coordination, please submit it for a more extensive environmental review by contacting John Kessler in the Office of Real Estate at 614-265-6621 or john.kessler@dnr.state.oh.us

****

Date: July 27, 2015 Company name: CB&I Federal Services, LLC

Name of person response letter should be addressed to: Mr. ☐ Ms. ☐
Cynthia Hassan, Project Manager

Address: 5050 Section Road

City/State/Zip: Cincinnati, Ohio 45212-2025

Phone: 513-782-4967 Fax: 513-782-4807

E-mail address: cindy.hassan@cbifederalservices.com

Project Name: EA to Implement the Integrated Natural Resources Management Plan

Project Number: N/A

Project Site Address: Wright-Patterson Air Force Base, OH

Project County: Greene and Montgomery

Project City/Township: Mad River, Bath, Beavercreek

Project site is located on the following USGS 7.5 minute topographic quad(s): Fairborn

Project Latitude and Longitude if available (decimal degrees is preferred): N/A

Description of work to be performed at the project site: Activities associated with implementation of the Integrated Natural Resources Management Plan (INRMP) at WPAFB

How do you want your data reported? (Both formats provide exactly the same data. The only difference is in the format of our response. The manual search is most appropriate for small scale projects or for those who do not have GIS capabilities. Please choose only one option.)

Printed list and map (manual search) X **OR** GIS shapefile (computer search) _____

Additional information you require: For the Indiana bat, include information with a five-mile radius of the project area.

How will the information be used? The name, status, and location of each species will be published in an environmental assessment (EA) that is being performed to satisfy requirements under the National Environmental Policy Act (NEPA).

I certify that data supplied by the Ohio Natural Heritage Program will not be published without crediting the ODNR Division of Wildlife as the source of the material. In addition, I certify that electronic datasets will not be distributed to others without the consent of the Division of Wildlife, Ohio Natural Heritage Program.

Signature Cynthia A. Hansen

Date: July 27, 2015

DNR 5203
REV 3/2013

Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR JAMES ZEHRINGER, DIRECTOR

Office of Real Estate
Paul R. Baldridge, Chief
2045 Morse Road – Bldg. E-2
Columbus, OH 43229
Phone: (614) 265-6649
Fax: (614) 267-4764

October 5, 2015

Cindy Hassan
CB&I Federal Services
5050 Section Avenue
Cincinnati, Ohio 45212

Re: 15-500; Rare Species Data Request and Informal Consultation, Environmental Assessment Addressing Implementation of the Integrated Natural Resources Management Plan, Wright-Patterson Air Force Base

Project: The proposed project involves the implementation of the INRMP at the Wright Patterson Air Force Base.

Location: The proposed project is located in Mad River, Bath, and Beavercreek Townships, Greene and Montgomery Counties, Ohio.

The Ohio Department of Natural Resources (ODNR) has completed a review of the above referenced project. These comments were generated by an inter-disciplinary review within the Department. These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the National Environmental Policy Act, the Coastal Zone Management Act, Ohio Revised Code and other applicable laws and regulations. These comments are also based on ODNR's experience as the state natural resource management agency and do not supersede or replace the regulatory authority of any local, state or federal agency nor relieve the applicant of the obligation to comply with any local, state or federal laws or regulations.

Natural Heritage Database: The Natural Heritage Database has the following data at or within a one mile radius of the project area:

Great Plains ladies'-tresses (*Spiranthes magnicamporum*), P
Ear-leaved-foxglove (*Agalinis auriculata*), E, FSC
Midland sedge (*Carex mesochorea*), T
Eastern massasauga (*Sistrurus catenatus*), E, FC
Upland sandpiper (*Bartramia longicauda*), E
Sedge wren (*Cistothorus platensis*), SC
Indiana bat (*Myotis sodalis*), E, FE
Tonguetied minnow (*Exoglossum laurae*), T
Badger (*Taxidea taxus*), SC
Beer's noctuid (*Papaipema beeriana*), E
Huffman Metro Park – Five Rivers Metro Parks
Dayton Aviation Heritage Park – National Park Service

Cemex Reserve – Greene Co. Park District

We are unaware of any unique ecological sites, geologic features, animal assemblages, scenic rivers, state wildlife areas, nature preserves, other parks or forests or national wildlife refuges or forests within the project area. The review was performed on the project area you specified in your request as well as an additional one mile radius. Records searched date from 1980.

Please note that Ohio has not been completely surveyed and we rely on receiving information from many sources. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Although all types of plant communities have been surveyed, we only maintain records on the highest quality areas.

Statuses are defined as: E = state endangered; T = state threatened; P = state potentially threatened; SC = state species of concern; SI = state special interest; A = species recently added to state inventory, status not yet determined; X = presumed extirpated in Ohio; FE = federal endangered, FT = federal threatened, FSC = federal species of concern, FC = federal candidate species.

Fish and Wildlife: The Division of Wildlife (DOW) has the following comments.

The DOW recommends that impacts to wetlands and other water resources be avoided and minimized to the fullest extent possible, and that best management practices be utilized to minimize erosion and sedimentation.

The project is within the range of the Indiana bat (*Myotis sodalis*), a state endangered and federally endangered species. The following species of trees have relatively high value as potential Indiana bat roost trees to include: shagbark hickory (*Carya ovata*), shellbark hickory (*Carya laciniosa*), bitternut hickory (*Carya cordiformis*), black ash (*Fraxinus nigra*), green ash (*Fraxinus pennsylvanica*), white ash (*Fraxinus americana*), shingle oak (*Quercus imbricaria*), northern red oak (*Quercus rubra*), slippery elm (*Ulmus rubra*), American elm (*Ulmus americana*), eastern cottonwood (*Populus deltoides*), silver maple (*Acer saccharinum*), sassafras (*Sassafras albidum*), post oak (*Quercus stellata*), and white oak (*Quercus alba*). Indiana bat roost trees consists of trees that include dead and dying trees with exfoliating bark, crevices, or cavities in upland areas or riparian corridors and living trees with exfoliating bark, cavities, or hollow areas formed from broken branches or tops. However, Indiana bats are also dependent on the forest structure surrounding roost trees. If suitable habitat occurs within the project area, the DOW recommends trees be conserved. If suitable habitat occurs within the project area and trees must be cut, the DOW recommends cutting occur between October 1 and March 31. If suitable trees must be cut during the summer months, the DOW recommends a net survey be conducted between June 1 and August 15, prior to any cutting. Net surveys should incorporate either nine net nights per square 0.5 kilometer of project area, or four net nights per kilometer for linear projects. If no tree removal is proposed, this project is not likely to impact this species.

The project is within the range of the clubshell (*Pleurobema clava*), a state endangered and federally endangered mussel, the rayed bean (*Villosa fabalis*), a state endangered and federally endangered mussel, and the snuffbox (*Epioblasma triquetra*), a state endangered and federally endangered mussel, and the fawnsfoot (*Truncilla donaciformis*), a state threatened mussel. If no in-water work is proposed in a perennial stream, these species are not likely to be impacted.

The project is within the range of the tongue-tied minnow (*Exoglossum laurae*), a state threatened fish, and the channel darter (*Percina copelandi*), a state threatened fish. The DOW recommends

no in-water work in perennial streams from April 15 through June 30 to reduce impacts to indigenous aquatic species and their habitat. If no in-water work is proposed in a perennial stream, these species are not likely to be impacted.

Recent surveys conducted at WPAFB have identified the presence of the smooth greensnake (*Opheodrys vernalis*), a state endangered species. This species is primarily a prairie inhabitant, but also found in marshy meadows and roadside ditches. The DOW recommends that prescribed burning not be conducted when ground/soil surface temperatures have reached 60 degrees Fahrenheit or greater for 4 consecutive days. In general, burning after April 15th and before October 30 is discouraged in areas where state-listed reptiles are known to occur, or have the potential to occur. However weather conditions vary greatly from year to year, and harm may be minimized for many species if unusually cool conditions (overcast, less than 50 degrees Fahrenheit) have persisted for many days. Burns should not be conducted within 50 meters of known state-listed snake hibernacula. In addition, the DOW recommends that the smooth greensnake be included in the INRMP.

The project is within the range of the spotted turtle (*Clemmys guttata*), a state threatened species. This species prefers fens, bogs and marshes, but also is known to inhabit wet prairies, meadows, pond edges, wet woods, and the shallow sluggish waters of small streams and ditches. If these types of habitats or areas adjacent to these types of habitats are not impacted, this species is not likely to be impacted.

The project is within the range of the Kirtland's snake (*Clonophis kirtlandii*), a state threatened species. This secretive species prefers wet fields and meadows. The DOW recommends that prescribed burning not be conducted when ground/soil surface temperatures have reached 60 degrees Fahrenheit or greater for 4 consecutive days. In general, burning after April 15th and before October 30 is discouraged in areas where state-listed reptiles are known to occur, or have the potential to occur. However weather conditions vary greatly from year to year, and harm may be minimized for many species if unusually cool conditions (overcast, less than 50 degrees Fahrenheit) have persisted for many days. Burns should not be conducted within 50 meters of known state-listed snake hibernacula.

The project is within the range of the eastern massasauga (*Sistrurus catenatus*), a state endangered and a federal candidate snake species. The eastern massasauga uses a range of habitats including wet prairies, fens, and other wetlands, as well as adjacent drier upland habitat. The DOW recommends that prescribed burning not be conducted when ground/soil surface temperatures have reached 60 degrees Fahrenheit or greater for 4 consecutive days. In general, burning after April 15th and before October 30 is discouraged in areas where state-listed reptiles are known to occur, or have the potential to occur. However weather conditions vary greatly from year to year, and harm may be minimized for many species if unusually cool conditions (overcast, less than 50 degrees Fahrenheit) have persisted for many days. Burns should not be conducted within 50 meters of known state-listed snake hibernacula. The DOW recommends that any prescribed burning proposed outside of the Huffman Prairie be coordinated with the DOW and USFWS.

If construction is proposed within areas that may be considered potential habitat for any state listed reptile species, the DOW recommends that an exclusionary/minimization plan be developed through coordination with a DOW approved herpetologist.

The project is within the range of the upland sandpiper (*Bartramia longicauda*), a state endangered bird. Nesting upland sandpipers utilize dry grasslands including native grasslands,

seeded grasslands, grazed and ungrazed pasture, hayfields, and grasslands established through the Conservation Reserve Program (CRP). If this type of habitat will be impacted, construction and/or burning should be avoided in this habitat during the species' nesting period of April 15 to July 31. If this type of habitat will not be impacted, this species is not likely to be impacted.

The project is within the range of the northern harrier (*Circus cyaneus*), a state endangered bird. This is a common migrant and winter species. Nesters are much rarer, although they occasionally breed in large marshes and grasslands. Harriers often nest in loose colonies. The female builds a nest out of sticks on the ground, often on top of a mound. Harriers hunt over grasslands. If this type of habitat will be impacted, construction and/or burning should be avoided in this habitat during the species' nesting period of May 15 to August 1. If this habitat will not be impacted, this species is not likely to be impacted.

ODNR appreciates the opportunity to provide these comments. Please contact John Kessler at (614) 265-6621 if you have questions about these comments or need additional information.

John Kessler
ODNR Office of Real Estate
2045 Morse Road, Building E-2
Columbus, Ohio 43229-6693
John.Kessler@dnr.state.oh.us

Notice of Availability (NOA)

PUBLIC NOTICE
Notice of Availability

Draft-Final Environmental Assessment to Implement the Integrated Natural Resources Management Plan Wright-Patterson Air Force Base

Beginning September 13, 2016 through October 12, 2016, the United States Air Force will accept comments on the Environmental Assessment (EA) to Implement the Integrated Natural Resources Management Plan (INRMP). The Proposed Action also includes a project for planting native tree species suitable for the Indiana bat at Wright-Patterson Air Force Base (AFB), Ohio. The results, as found in the EA, show that the Proposed Action of implementing the 2015 INRMP and planting native tree species suitable for the Indiana bat would not have an adverse impact on the environment—indicating that a Finding of No Significant Impact / Finding of No Practicable Alternative (FONSI/FONPA) would be appropriate. The public is invited to review the documents at the Greene County Public Library, Fairborn Branch, located at 1 East Main Street, Fairborn, OH 45324-4701, (937) 878-9383 or to access the documents on-line at http://www.wpafb.af.mil/units/cev. Written comments and inquiries can be mailed to:
88 ABW / Public Affairs, 5135 Pearson Road, Bldg 10, Room 252, WPAFB, Ohio 45433. 88abw.pa@us.af.mil.

Appendix B

Clean Air Act
General Conformity Analysis

EXECUTIVE SUMMARY

Agencies:	U.S. Air Force (USAF), Wright-Patterson Air Force Base (WPAFB), Ohio
Designation:	Clean Air Act General Conformity Applicability Analysis
Affected Location:	WPAFB, Ohio
Proposed Action:	Implement the Integrated Natural Resources Management Plan (INRMP)
Abstract:	The purpose of the Proposed Action is to implement the projects and component plans identified in the WPAFB INRMP. The Proposed Action is needed to comply with the Sikes Act Improvement Act of 1997 (SAIA), which governs the planning and implementation of conservation programs on military installations. The purpose of a military conservation program is conservation and rehabilitation of natural resources; sustainable multipurpose use of those resources; and public access to military lands, subject to safety requirements and military security. The INRMP has been prepared in accordance with Air Force Instruction (AFI) 32-7064.
	The Proposed Action at WPAFB would be located in the Dayton-Springfield Metropolitan Area, which is currently designated as a "maintenance" area for attainment with the National Ambient Air Quality Standard (NAAQS) for ozone (O_3) and for very fine particulate matter ($PM_{2.5}$) for the annual standard (Ohio Environmental Protection Agency [OEPA] 2014b).
	Based upon the conformity applicability criteria requirements, and the current attainment status of the areas affected by the INRMP, this conformity applicability analysis focuses on potential air emissions of O_3 precursors, (i.e., volatile organic compounds [VOCs] and nitrogen oxides [NO_x], $PM_{2.5}$ direct emissions, and $PM_{2.5}$ precursors (i.e., sulfur dioxide [SO_2] and NO_x). This analysis does not address the pollutants for which affected areas are in "attainment" – sulfur oxides (SO_x), nitrogen dioxide (NO_2), carbon monoxide (CO), fine particulate matter (PM_{10}), and lead (Pb).
	Emissions of VOC, NO_x, $PM_{2.5}$, and SO_2 in the vicinity of WPAFB (Metropolitan Dayton Intrastate Air Quality Control Region [AQCR]) are all not expected to interfere with the Ohio State Implementation Plan (SIP) maintenance plans as a result of the Proposed Action or Alternatives.
	The conformity applicability analysis completed for this project concluded that the Proposed Action will not be required to conduct a full conformity determination under the requirements of the Federal Conformity Rule. Emissions estimates attached to this analysis predict that emission levels of all criteria pollutants of the proposed project would fall below the 100 tons per year (tpy) *de minimis* thresholds of VOC, NO_x, $PM_{2.5}$, and SO_2 for triggering a formal Conformity determination, as defined in 40 CFR 93.153(b). This conclusion is contingent upon the assumptions used to determine fuel loading for each potential prescribed burn area identified in the plan and the associated tree planting project does not significantly change. Any major alteration, such as, to the size of the prescribed burn areas or if site specific fuel loading factors significantly change, then reevaluation within the context of this initial general conformity applicability analysis as required by 40 CFR 93.157.

Conformity Analysis: After careful and thorough consideration of the facts contained herein, and following consideration of the views of those agencies having jurisdiction by law or special expertise with respect to air quality impacts and the SIP, the project proponent finds that the proposed Federal actions are consistent with the objectives as set forth in Section 176(c) of the Clean Air Act (CAA), as amended, and its implementing regulation, 40 (Code of Federal Regulations) CFR Part 93, Subpart B, *Determining Conformity of General Federal Actions to State or Federal Implementation Plans*, and said actions conform to the Ohio SIP in accordance with the law.

The conformity applicability analysis is based upon the total direct and indirect emissions associated with the prescribed burn proposed activities identified in the INRMP and associated tree planting at WPAFB. If the Proposed Action activities are changed so that there would be a change in the total direct and indirect emissions reported in this analysis, a new conformity analysis must be performed.

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B.1. Introduction

The Clean Air Act Amendments (CAAA) of 1990 require Federal agencies to ensure that their actions conform to the applicable State Implementation Plan (SIP). The SIP is a U.S. Environmental Protection Agency (USEPA) approved plan developed by state or local agencies. It provides for implementation, maintenance, and enforcement of the National Ambient Air Quality Standards (NAAQS). The SIP includes emission limitations, rules, schedules, and specific control measures to attain and maintain the NAAQS. Conformity to a SIP, as defined in the Clean Air Act (CAA), means conforming to the SIP's purpose of reducing the severity and number of violations of the NAAQS to achieve attainment of such standards.

As a Federal agency and proponent of a "Federal Action," the U.S. Air Force (USAF) must complete a conformity analysis to determine whether the implementation of the Integrated Natural Resources Management Plan (INRMP) plus tree planting project, as proposed, and associated regulated pollutant emissions at WPAFB would conform to the Ohio SIP. The Proposed Action proposes to conduct prescribed burns on twelve natural resources areas on Wright-Patterson Air Force Base (WPAFB) for the purpose of range management and control of woody and invasive species. The proposed action also includes planting native tree species suitable for the Indiana bat, a federal- and state-listed endangered species. The purpose of tree planting is to mitigate impacts that resulted from clearing trees that were determined to be suitable Indiana bat roosting and foraging habitat. The No Action was not evaluated in this determination because the existing prescribed burn program for Huffman Prairie would maintain the status quo where only one quadrant is burned annually or less often; thus, no changes to baseline air emissions would occur. Under the Proposed Action, prescribed burns would occur annually. The emissions from the Proposed Action could affect areas covered by the SIP; therefore, a conformity analysis is required.

B.1.1 Background

The CAA and CAAA were passed by Congress and corresponding rules were promulgated by USEPA because it has been determined that certain pollutants have the potential to cause an adverse effect on public health and the environment when certain concentrations are exceeded in ambient air. In order to control and regulate these "criteria pollutants" and better maintain healthful air, NAAQS were established for seven criteria pollutants. These pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), coarse particulate matter less than 10 microns in diameter (PM_{10}), fine particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), sulfur oxides (SO_x), and lead (Pb). Ozone is not typically emitted directly from emission sources, but rather is formed in the

atmosphere by photochemical reactions involving sunlight and other emitted pollutants, or "ozone precursors." These ozone precursors consist primarily of nitrogen oxides (NO_x) and volatile organic compounds (VOCs), which are emitted directly from a wide range of stationary and mobile sources. Therefore, O_3 concentrations in the atmosphere are controlled through limiting the emissions of NO_x and VOCs. The $PM_{2.5}$ can be emitted from emission sources directly as very fine dust and/or liquid mist or formed secondarily in the atmosphere as condensable particulate matter typically forming nitrate and sulfate compounds. Precursors of condensable $PM_{2.5}$ can include SO_2, NO_x, VOC, and ammonia. Secondary (indirect) emissions vary by region depending upon the predominant emission sources located within the area. States must determine which precursors are considered significant for $PM_{2.5}$ formation when developing SIP revisions. USEPA approved Ohio SIP revisions on June 25, 2015 implementing the $PM_{2.5}$ NAAQS including Ohio Administrative Code (OAC) Rule 3745-31-01(WWWW) defining $PM_{2.5}$ precursors to include sulfur dioxide and nitrogen oxides (USEPA 2015b).

Air quality conformity provisions first appeared in the CAA of 1977. These provisions stated that no Federal agency could engage in, support in any way, provide financial assistance for, license, permit, or approve any activity that did not conform to a SIP after approval and promulgation. Section 176(c) (42 United States Code 7506c) of the CAA, as amended in 1990, further explained conformity as it pertains to an implementation plan as meaning conformity to the plan's purpose of eliminating or reducing the severity of violations of the NAAQS, and achieving timely attainment of these standards. In November 1993, USEPA promulgated regulations and requirements that clarify the applicability, procedures, and analyses necessary to ensure that Federal facilities comply with the CAA.

In establishing the Final General Conformity Rule, USEPA requires Federal agencies to evaluate a proposed Federal action and ensure that it does not:

1. Cause a new violation of a NAAQS
2. Contribute to an increase in the frequency or severity of violations of NAAQS
3. Delay the timely attainment of any NAAQS, interim progress milestones, or other milestones toward achieving compliance with the NAAQS

The General Conformity Rule requires that Federal agencies consider total direct and indirect emissions of criteria pollutants. Conformity must be shown for those pollutants (or precursors) emitted in areas designated as nonattainment for those pollutants as well as pollutants for which an area has been re-designated from nonattainment to attainment (i.e., a maintenance area).

The Conformity Rule requires that Federal agencies do a conformity applicability analysis to determine whether a formal conformity determination is required. The primary criteria used in an applicability analysis are the *de minimis* thresholds. The total direct and indirect emissions associated with a proposed action are compared to the *de minimis* threshold levels promulgated in 40 Code of Federal Regulations (CFR), 93.153(b). **Table B-1** presents the applicable *de minimis* thresholds under the General Conformity Rule.

Table B-1. General Conformity Rule *de minimis* Emission Thresholds

Pollutant	Status	Classification	*de minimis* Limit (tpy)
Ozone (measured as NO_x or VOCs)	Nonattainment	Extreme Severe Serious Moderate/marginal (inside ozone transport region) All others	10 25 50 50 (VOCs)/100 (NO_x) 100
	Maintenance	Inside ozone transport region Outside ozone transport region	50 (VOCs)/100 (NO_x) 100
Carbon Monoxide (CO)	Nonattainment/ maintenance	All	100
Particulate Matter (PM_{10})	Nonattainment/ maintenance	Serious Moderate Not applicable	70 100 100
Particulate Matter ($PM_{2.5}$)	Nonattainment/ maintenance	Direct Emissions Sulfur Dioxide NOx (unless not a significant precursor) VOC or Ammonia (if a significant precursor)	100 100 100 100
Sulfur Dioxide (SO_2)	Nonattainment/ maintenance	Not applicable	100
Nitrogen Oxides (NOx)	Nonattainment/ maintenance	Not applicable	100
Lead (Pb)	Nonattainment/ maintenance	All	25

Source: 40 CFR 93.153(b)
tpy: tons per year

When applicable, another required analysis is a comparison of the Federal action's emissions to any existing SIP emission budgets that have been established specifically for the Federal facility or the affected region. If the action would cause an increase in emissions such that the established SIP

emissions budgets would be exceeded, a formal conformity determination and other applicable rule requirements would apply. In the case of WPAFB, there is no facility-specific emissions budget in the Ohio SIP.

B.1.2 Purpose

The purpose of this general conformity analysis is to document the USAF's compliance with CAA requirements in accordance with 40 CFR 93 subpart B. This conformity applicability analysis will analyze the air quality impact of emissions of nonattainment pollutants (i.e., NO_x, VOC, $PM_{2.5}$, and SO_2) resulting from the proposed Federal action in order to determine whether the Proposed Action would be subject to these Federal conformity rules.

B.1.3 Document Organization

Section B.1 presents the purpose and background for the document, describes the proposed project at WPAFB and summarizes the existing air quality conditions in the region. Section B.2 of this analysis outlines the regulatory requirements of the General Conformity Rule and their relationships to this General Conformity Applicability Analysis.

Section B.3 details the applicability of the conformity rule to the implementation of the proposed INRMP and tree planting at WPAFB. Section B.4 provides the conformity analysis results for the Proposed Action. Finally, the emissions estimations attached to this analysis detail the calculation methodologies and results used for this General Conformity Applicability Analysis.

B.1.4 Existing Air Quality

Air Basins/Air Quality Control Regions

Wright-Patterson Air Force Base is located in Greene and Montgomery Counties, Ohio, which are in the Metropolitan Dayton Intrastate Air Quality Control Region (AQCR). The Metropolitan Dayton AQCR includes the counties of Clark, Greene, Miami, Montgomery, Clarke, and Preble. The majority of the proposed prescribed burn areas and tree planting project are located in the Greene County portion of the Base.

Air quality resources in the Metropolitan Dayton AQCR are managed by the Ohio Environmental Protection Agency (OEPA), Division of Air Pollution Control (DAPC). Local permitting of stationary air emissions sources is delegated to the Regional Air Pollution Control Agency (RAPCA) in Dayton. Ambient air quality for the Metropolitan Dayton Intrastate AQCR is formerly classified as a maintenance area for the 1997 8-hour O_3 standards and the 1997 annual $PM_{2.5}$ standards (USEPA

2013a). Recently, the USEPA formally designated the area to unclassifiable/attainment for the new 2008 O_3 NAAQS effective July 20, 2012 (USEPA 2012a); the new 2010 NO_2 NAAQS effective February 29, 2012 (USEPA 2012b); and the new 2010 SO_2 NAAQS effective October 4, 2013 (USEPA 2013b). Except as noted in the following paragraph for recently revised NAAQS, the Metropolitan Dayton Intrastate AQCR is designated as an unclassifiable/attainment area for all other criteria pollutants, which include PM_{10}, 24-hour $PM_{2.5}$, 1-hour O_3, CO, NO_2, and Pb.

Ambient Air Quality Attainment Designations for Affected Air Quality Control Region

The USEPA recently finalized new NAAQS standards for several criteria pollutants including Pb (November 2008) and $PM_{2.5}$ (January 2013, USEPA 2008, USEPA 2013c). For the new annual $PM_{2.5}$ NAAQS, the OEPA submitted a report in December, 2013 recommending that Montgomery and Greene Counties be designated as "unclassified/attainment" (OEPA 2013). This designation was approved by USEPA effective April 15, 2015 (USEPA 2015a). Additionally, the revised General Conformity Rule added new *de minimis* thresholds for $PM_{2.5}$ and retained the other pollutant thresholds (USEPA 2010).

Re-designated Nonattainment Pollutants (Maintenance Area Pollutants)

Ozone is a secondary pollutant formed in the atmosphere by photochemical reactions of previously emitted pollutants (mainly VOCs and NO_x) when in the presence of sunlight. A brown odorless gas, O_3 can cause irritation of the respiratory tract in humans and animals, and can damage vegetation. The maximum effect of the precursor emissions on O_3 formation may be many miles from the source due to O_3 being the by-product of a photochemical reaction.

$PM_{2.5}$ can be emitted from emission sources directly as very fine dust and/or liquid mist or formed secondarily in the atmosphere as condensable particulate matter typically forming nitrate and sulfate compounds. Precursors of condensable $PM_{2.5}$ can include SO_2, NO_x, VOC, and ammonia. Secondary (indirect) emissions vary by region depending upon the predominant emission sources located in the area. USEPA has approved Ohio SIP revisions implementing the PM2.5 NAAQS including OAC Rule 3745-31-01(WWWW) defining $PM_{2.5}$ precursors to include sulfur dioxide and nitrogen oxides (USEPA 2015b). Health studies have shown a significant association between exposure to fine particles and premature death from heart and lung disease. Fine particles can aggravate heart and lung diseases and have been linked to health effects such as: cardiovascular symptoms; cardiac arrhythmias; heart attacks; respiratory symptoms; asthma attacks; and bronchitis.

State Implementation Plan

In accordance with Federal and state CAA requirements, the OEPA and all agencies responsible for CAA implementation in nonattainment areas must develop and implement a plan to reduce and maintain regulated air pollution levels that are less than the NAAQS. On April 24, 2009 and January 10, 2014, the OEPA (OEPA, 2014a) completed draft amendments to several rules in OAC Rule 3745-31 and OAC Rule 3745-17-08 related to Federal changes affecting the implementation of $PM_{2.5}$. On December 9, 2009, the OEPA drafted new rules and amended several rules in OAC Rule 3745-21, OAC Rule 3745-72, and OAC Rule 3745-110 intended to assist in achieving and maintaining the NAAQS for O_3 through the control of O_3 precursors. A portion of these draft rules have become SIP approved by the USEPA as of the completion of this applicability determination, though others are still under review. In accordance with Ohio Revised Code (ORC) 119.032, the OEPA initiated the 5-year review of the General Conformity Rules OAC Rule 3745-102 in August 2012. Because the state rules nearly fully align it with the federal rules of 40 CFR Part 93, the OEPA proposed to rescind the state rules (OEPA 2014c). The rescission of these state rules became effective as of June 12, 2014 (OEPA 2014d). The OEPA maintains a current listing of the Dayton-Springfield Metropolitan Area attainment status on its website at http://www.epa.ohio.gov/dapc/general/naaqs.aspx.

B.2. GENERAL CONFORMITY DETERMINATION REQUIREMENTS

B.2.1 Regulatory Background

The USEPA has promulgated rules that establish the conformity determination criteria and procedures for Federal actions, pursuant to Section 176(c) of the CAA. The General Conformity Rule (40 CFR Part 93, Subpart B) defines the "general" conformity criteria and procedures for Federal agencies that propose to implement non-transportation projects. The OAC Rule 3745-102 contained the General Conformity Rules promulgated by the state of Ohio that have been rescinded effective June 12, 2014 (OEPA 2014d).

The General Conformity Rule applies to Federal actions in areas that are failing to meet one or more of the Federal air quality standards (designated as nonattainment areas), and/or areas that are subject to attainment maintenance plans (re-designated as maintenance areas). As noted in Section B.1, the Proposed Action (Alternative A) and Alternatives will be located in the Metropolitan Dayton AQCR in Ohio. This AQCR has been re-designated to maintenance area for O_3 and re-designated to attainment/maintenance for $PM_{2.5}$. The AQCR is in attainment with NAAQS for each of the other criteria pollutants. This general conformity applicability analysis will evaluate the conformity of the Proposed Action emissions of O_3 precursors (NO_x and VOC), direct $PM_{2.5}$, and indirect $PM_{2.5}$ precursors (SO_2 and NO_x) in the affected region. The following subsections describe the General Conformity Rule procedures and criteria, and how they specifically pertain to this general conformity applicability analysis.

B.2.2 Exemptions and Applicability

Source Exemptions

The general conformity provisions identify specific Federal actions or portions of actions that are exempt from the conformity procedural requirement, because the USEPA has deemed these actions to conform. These actions include those that must undergo air quality analysis to comply with other statutory requirements; actions that would result in no emission increase or an increase in emissions that is clearly *de minimis*; or actions presumed to conform by the agency through separate rule-making actions. These exemptions include the transfer of ownership of real property under 40 CFR 93.153(c)(2)(xiv and xx), as well as leasing agreements pending environmental restoration under 40 CFR 93.153(c)(2)(xix).

The only source exemption potentially applicable to the USAF's Proposed Action for implementing the INRMP at WPAFB is the exemption for major or minor new or modified *stationary* sources, which are subject to permits under OEPA's New Source Review (NSR) program or Prevention of Significant Deterioration (PSD) program (40 CFR 93.153(d)(1)). No new or modified stationary sources associated with this Proposed Action are anticipated to require a permit, permit-by-rule, or a determination for permit exemption. The emissions from such sources, if any, are not included in this general conformity applicability analysis.

De minimis Emission Levels

In addition to the specific source exemptions identified in the general conformity rule, Federal actions might be exempt from the conformity requirements if the action meets the applicability criteria for *de minimis* emission levels. The applicability determination procedures presented in the rule include the following elements:

- Define the applicable emission sources for the Federal action
- Quantify the total direct and indirect emissions of nonattainment pollutants from these sources
- Compare these emission rates against the appropriate *de minimis* emission levels

If the total direct and indirect emissions of nonattainment pollutants reach or exceed these applicability threshold values, a Conformity Determination must be prepared by the Federal agency before undertaking the action.

The conformity rule defines direct and indirect emissions based upon the timing and location of the emissions. Direct emissions are those that are caused or initiated by the Federal actions, and occur at the same time and place as the action and are reasonably foreseeable. Indirect emissions are those that originate in the same nonattainment or maintenance area, but occur at a different time or place from the Federal action. In addition, the conformity rule limits the scope of indirect emissions to those that are *reasonably foreseeable* by the agency at the time of analysis, and those emissions that the Federal agency can practicably control and maintain control of through its continuing program responsibility.

The definitions of direct and indirect emissions do not distinguish among specific source categories; point, area, and mobile sources are given equal consideration in the conformity requirements. All substantive procedural requirements of the General Conformity Rule apply to the total of the net increases and decreases in direct and indirect emissions resulting from the action.

If the total of direct and indirect emissions from the action meet or exceed the *de minimis* emission levels, the agency must perform a conformity determination to demonstrate the positive conformity of the Federal action. The *de minimis* emission levels vary by the criteria pollutant and the severity of the region's nonattainment conditions.

Section B.3 presents the specific emission thresholds and the applicability analysis results for the USAF's Proposed Action to implement the INRMP and tree planting project at WPAFB.

B.2.3 CAA General Conformity Criteria

If a proposed action is not exempt from the conformity demonstration requirements, the General Conformity Rule defines conformity and provides five basic criteria to determine whether a Federal action conforms to an applicable SIP. These criteria assess conformity based upon emission analyses and/or dispersion modeling for the nonattainment/maintenance area pollutants. If the Federal action meets the conformity criteria and requirements, the action is demonstrated to conform to the applicable SIP. If the action cannot meet the criteria and requirements, the agency must develop an enforceable implementation plan to mitigate effectively (e.g., completely offset) the increased emissions from the proposed action to meet the conformity requirements. The Federal action cannot proceed unless positive conformity can be demonstrated. Any analyses required by the General Conformity Rule must be completed, and any mitigation requirements necessary for a finding of conformity must be identified before the determination of conformity is made.

The General Conformity Rule provides the option to select any one of several criteria to analyze the conformity of the Proposed Action. Presented in 40 CFR 93.158, the criteria are primarily based upon the type of pollutant and the status of the applicable SIP. If the applicability analysis concludes that further conformity analyses are required to demonstrate positive conformity (i.e., *de minimis* thresholds are exceeded) the following conformity criteria (paraphrased below) can be used to demonstrate conformity for a proposed action in a nonattainment area:

- The total direct and indirect emissions for a proposed action are specifically identified and accounted for in the applicable SIP's attainment or maintenance demonstration. [40 CFR 93.158(a)(1)].
- The total direct and indirect emissions of O_3 precursors or PM are fully offset within the same nonattainment or maintenance area through a revision to the applicable SIP or a similarly enforceable measure so that there is a no net increase in emissions of that pollutant [40 CFR 93.158(a)(2)].

- The State has made a revision to the area's attainment or maintenance demonstration after 1990 and the State either:
  - Determines and documents that the action, together with all other emissions in the nonattainment (or maintenance) area, *would not* exceed the emissions budget specified in the applicable SIP.
  - Determines that the action, together with all other emissions in the nonattainment (or maintenance) area, *would* exceed the emissions budget specified in the applicable SIP but the State's Governor or designee for SIP actions makes a written commitment to the USEPA to demonstrate CAA conformity through specific measures and scheduled actions [40 CFR 93.158(a)(5)(i)(A & B)].
- The Federal action fully offsets its entire emissions within the same nonattainment area through a revision to the SIP or a similar measure so that there is no net increase in nonattainment pollutant emissions [40 CFR 93.158(a)(5)(iii)].
- Where USEPA has not approved a revision to the relevant SIP since the area was designated or reclassified, and the total emissions from the action do not increase emissions above the baseline emissions which are either:
  - Calendar Year 1990 (CY 90) emissions or another calendar year that was the basis for the nonattainment area designation [40 CFR 93.158(a)(5)(iv)(A)].
  - Historic activity levels and emissions calculated for future years using appropriate emission factors and methods for future years.
- Dispersion modeling analysis demonstrates that direct and indirect emissions from the Federal action will not cause or contribute to violations of Federal ambient air quality standards [40 CFR 93.158(a)(4) & (b)].

The USEPA revised the general conformity regulation on April 5, 2010 (USEPA 2010). One of the changes to the regulation relates to the determination of regional significant action. The USEPA deleted the provision of the then existing regulation (40 CFR 93.153) that requires Federal agencies to conduct conformity determinations for regional significant actions where the direct and indirect emissions of any pollutant represent 10 percent or more of a nonattainment or maintenance area's emission inventory for that pollutant. This rule applied even though the total direct and indirect emissions from the actions are below the *de minimis* emission levels or the actions are otherwise "presumed to conform." Because the "regionally significant action" provision no longer appears in the Federal rules, this emission level calculation and applicability determination is not required.

B.2.4 Other State Implementation Plan Consistency Requirements

The general conformity applicability analysis must also demonstrate that total direct and indirect emissions from the Proposed Action (Alternative A) and Alternatives will be consistent with the applicable SIP requirements and milestones, including:

- Reasonable further progress schedules
- Assumptions specified in the attainment or maintenance demonstration
- SIP prohibitions, numerical emissions limits, and work practice requirements

B.3. APPLICABILITY ANALYSIS

This section of the general conformity applicability analysis describes the detailed analysis performed on the proposed implementation of the INRMP at WPAFB to the General Conformity Rule requirements.

B.3.1 Sources Included in the General Conformity Applicability Analysis

In accordance with the General Conformity Rule, total direct and indirect emissions resulting from a proposed Federal action includes several types of stationary and mobile sources. These emissions would occur during prescribed burns and tree planting project identified for the Proposed Action. As defined by the rule and applied to the Proposed Action at WPAFB, direct emissions would result from fugitive emissions sources not subject to air permitting. Prescribed burns require obtaining open burn permits from OEPA, however, these are temporary permits and are not considered minor source permits exempt under General Conformity. Examples of direct emissions sources include vegetation combustion and mop-up activities for the prescribed burns; and soil disturbances and equipment engine exhaust. Indirect pollutant emissions for the include activities that the USAF can control as part of the Federal action and include privately-owned vehicle (POV) operation used in conjunction with personnel and contractors performing prescribed burn and tree planting activities at the Base.

B.3.2 Total Direct and Indirect Emission Calculations

The detailed estimates of the changes in nonattainment and maintenance area pollutant emissions that would result from implementation of the Proposed Action at WPAFB are presented in the attachment of this Appendix. The emission calculations are based on information on the proposed prescribed burn areas identified in the WPAFB Wildland Fire Management Plan (WFMP) and a review of the tree planting project contractor bid documents. These calculations assume that all prescribed burns for each proposed area will occur annually over the entire area to provide the most possible worst-case analysis. It is further assumed that all prescribed burns will be conducted with WPAFB existing personnel and equipment. Thus no commuter, vehicle, or equipment emissions are considered in the prescribed burn analysis. The tree planting project assumes that a contract crew of three individuals will be required for up to a two week period. Commuter, delivery vehicle, and equipment emissions are all included in this analysis. The emissions calculated for the entire prescribed burn program annual emissions and the tree planting project in total are compared to the de minimis level thresholds. The changes in direct and indirect VOC, NO_x, $PM_{2.5}$, and SO_2 emissions from these elements of the Proposed Action are presented below.

Prescribed Burn Areas

Under the Proposed Action, twelve total prescribed burn areas were identified for possible management. Currently, only the Huffman Prairie prescribed burn area is managed by controlled burns in one of four quadrants on a four year rotation. **Table B-2** lists the total emissions for each of the twelve prescribed burn areas. The total emissions assume that 100 percent of the surface area of each prescribed burn area is combusted within one calendar year. This estimation method was used to provide worst-case emission levels for comparison to air conformity *de minimis* levels.

Table B-2. Emissions for Each Prescribed Burn Area Associated With the Proposed Action at WPAFB

Prescribed Burn Unit Name	VOC (tpy)	NO_x (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)
Huffman Prairie	3.83	4.19	10.15	0.99
Liquid Oxygen Plant	0.61	0.67	1.61	0.16
Sandhill	0.62	0.67	1.63	0.16
Sheep Pen	1.24	1.36	3.28	0.32
Huffman Prairie Flying Field	4.72	5.17	12.51	1.23
Licensed Shooting Preserve	5.83	6.37	15.43	1.51
Building 471	0.49	0.53	1.29	0.13
Gate 22B	0.87	0.95	2.30	0.23
Tillman Pit	0.73	0.79	1.92	0.19
Warfighter Training Center	2.33	2.55	6.17	0.60
Fire Training Center	0.22	0.24	0.58	0.06
Bass Lake	0.07	0.08	0.20	0.02
Prescribed Burn Totals	**21.55**	**23.57**	**57.07**	**5.59**

tpy: tons per year

For the purpose of this analysis, prairie grasses were presumed to be the predominant species in each area. The fuel loading factor selected for each area was 11 ton per acre derived from USEPA AP-42 Table 13.1-1. Included in these emission calculations are fuel oil combustion emissions from the use of drip-torches to start and control the prescribed burns. Additionally, because all prescribed burn activities are conducted by WPAFB personnel and equipment, no indirect emissions from personnel commuting or equipment idling was considered in this analysis. These indirect emissions would not add to the base-wide baseline levels.

Tree Planting Project

The proposed action includes a project to plant 1,500 native species trees on a five acre site in Area A at WPAFB. This will require a contract crew of three individuals no longer than two weeks to complete using a personal excavator and an auger. Three tree delivery trucks per day are assumed to

be required for each day of work. Vehicle emissions from worker commuting and delivery trucks were calculated from emission factors derived from US EPA Mobile Source MOVES 2010b Model for calendar year 2017 and Greene County Ohio. Equipment engine emissions were determined using emissions factors located in the *Air Emissions Guide for Air Force Mobile Sources, October 2014*. Soil disturbance emissions generated during equipment movements and hole drilling were determined using emissions factors located in US EPA AP-42 sections 13.2.3 and 13.2.2-1. **Table B-3** lists the total emissions for each of the main contributing tree planting activities.

Table B-3. Emissions for Each Tree Planting Activity Associated With the Proposed Action at WPAFB

Tree Planting Emission Activity	VOC (tpy)	NO_x (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)
Vehicle Emissions	4.69E-04	4.13E-03	6.02E-02	2.01E-05
Equipment Emissions	2.32E-02	1.24E-01	1.56E-02	7.70E-03
Soil Disturbance	0.00	0.00	0.15	0.00
Tree Planting Totals	**0.02**	**0.13**	**0.22**	**0.01**

tpy: tons per year

B.3.3 Applicability Analysis Results

WPAFB Operations

Table B-4 presents the Proposed Action total emissions and sum total net emissions increase when the actual Huffman Prairie prescribed burn emission data is factor into the calculations. Both of those results are compared to the applicable General Conformity *de minimis* thresholds. The results of the applicability analysis indicate that total cumulative direct and indirect emissions at WPAFB within the Metropolitan Dayton Intrastate AQCR for each analysis would *not* exceed the 100 tpy *de minimis* for any of the criteria pollutants of concern. Therefore, Federal General Conformity rules are not applicable, and no full formal conformity determination is required for the Proposed Action.

Table B-4. Nitrogen Oxides (NO_x), Volatile Organic Compounds (VOC), Fine Particulate Matter ($PM_{2.5}$), and Sulfur Dioxide (SO_2) Emissions – Comparison to Conformity *de minimis* Thresholds for Metropolitan Dayton Intrastate Air Quality Control Region

Analysis	NO_x (as O_3 precursor) (tpy)[1]	VOC (tpy)	$PM_{2.5}$ (tpy)	SO_2 (as $PM_{2.5}$ precursor) (tpy)[1]	NO_x (as $PM_{2.5}$ precursor) (tpy)[1]
Proposed Action					
Worst-case Burn	23.57	21.55	57.07	5.59	23.57
Tree Planting	0.13	0.02	0.22	0.01	0.13
Proposed Action	23.70	21.57	57.29	5.60	23.70
Actual Net Emission Increase					
Less Huffman	18.67	17.07	45.21	4.43	18.67
Tree Planting	0.13	0.02	0.22	0.01	0.13
Year 1 Actual	18.80	17.09	45.43	4.44	18.80
***de minimis* Threshold**	100	100	100	100	100
Attainment Status	Maintenance	Maintenance	Maintenance	Maintenance	Maintenance

[1] There are no NO_x (NO_2) or SO_2 nonattainment areas at this time. The *de minimis* threshold for NO_x and SO_2 emissions is defined by the ozone and $PM_{2.5}$ attainment statuses respectively.

tpy: tons per year

B.4. CONFORMITY ANALYSIS AND RESULTS

This section presents the results of the conformity analysis for the implementation of the INRMP and tree planting project at WPAFB. The purpose of this analysis is to determine whether the USAF's Proposed Action will conform to the applicable SIP based upon the criteria established in the General Conformity Rule and promulgated in 40 CFR 93.158.

The regulatory basis and specific criteria for this analysis is presented in Section B.2. The results of the conformity applicability analysis use the following criterion:

> *A Conformity Determination is required for each criteria pollutant or precursor where the total of direct and indirect emissions of the criteria pollutant or precursor in a nonattainment or maintenance area caused by a Federal Action would equal or exceed any of the (de minimis) rates.[40 CFR, 93.153(b)]*

This criterion is satisfied by the information presented in Section B.3, **Tables B-2, B-3,** and **B-4**, which show that the reasonably foreseeable project emissions of NO_2, VOC, $PM_{2.5}$, and SO_2 would not exceed the General Conformity Rule *de minimis* levels. This conclusion is supported by the calculations attached to this analysis and contingent upon the prescribed burn area sizes, assumed fuel composition and loading factors, and tree planting duration used in the analysis. The analysis additionally assumed for worst-case purposes that all areas would undergo a controlled burn over 100 percent of the area annually. Any major alteration or substantial changes to these assumptions may need to be reevaluated within the context of this initial general conformity applicability analysis as required by 40 CFR 93.157.

Based upon the conformity applicability analysis results summarized in the previous sections, the proposed Federal actions at WPAFB have been shown to meet the conformity criteria for consistency with the Ohio SIP requirements. The proposed Federal actions are therefore consistent with the objectives as set forth in Section 176(c) of the CAA, as amended, and its implementing regulation, 40 CFR Part 93, Subpart B, Determining Conformity of General Federal Actions to State and Local Implementation Plans, and said actions conform to the Ohio SIP in accordance with the law.

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WPAFB - EA to Implement the Integrated Natural Resources Management Plan

Calculation of Project Air Pollutant Emissions

Summary of Prescribed Burn Areas and Tree Planting Project

Proposed Action	**Total Emissions by Prescribed Burning of Total Area (tons/yr)**							
Prescribed Burn Unit Name	NOx	VOC	CO	PM	PM-10	PM-2.5	SO2	CO2e
Huffman Prairie	4.19	3.83	89.84	11.98	11.98	10.15	0.99	2,108.06
Liquid Oxygen Plant	0.67	0.61	14.27	1.90	1.90	1.61	0.16	334.90
Sandhill	0.67	0.62	14.44	1.93	1.93	1.63	0.16	338.77
Sheep Pen	1.36	1.24	29.04	3.87	3.87	3.28	0.32	681.41
Huffman Prairie Flying Field	5.17	4.72	110.72	14.76	14.76	12.51	1.23	2,597.81
Licensed Shooting Preserve	6.37	5.83	136.54	18.21	18.21	15.43	1.51	3,203.72
Building 471	0.53	0.49	11.39	1.52	1.52	1.29	0.13	267.14
Gate 22B	0.95	0.87	20.38	2.72	2.72	2.30	0.23	478.14
Tillman Pit	0.79	0.73	17.00	2.27	2.27	1.92	0.19	398.78
Warfighter Training Center	2.55	2.33	54.62	7.28	7.28	6.17	0.60	1,281.49
Fire Training Center	0.24	0.22	5.12	0.68	0.68	0.58	0.06	120.03
Bass Lake	0.08	0.07	1.73	0.23	0.23	0.20	0.02	40.66
Total Emissions of All Prescribed Burn Areas	23.57	21.55	505.07	67.34	67.34	57.07	5.59	11,850.91
Contract to Plant New Trees	0.13	0.02	0.10	1.77	0.85	0.22	0.01	13.45
Total Emissions Proposed Action	23.70	21.57	505.17	69.11	68.19	57.29	5.60	11,864.36

Existing Prescribed Burn Areas	**Annual Emissions of Prescribed Burning per Year (tons/yr)**							
Prescribed Burn Unit Name	NOx	VOC	CO	PM	PM-10	PM-2.5	SO2	CO2e
Year 1, Huffman Prairie - Unit 1	1.34	1.22	28.71	3.83	3.83	3.24	0.32	673.65
Year 2, Huffman Prairie - Unit 2	0.70	0.64	15.10	2.01	2.01	1.71	0.17	354.25
Year 3, Huffman Prairie - Unit 3	0.81	0.74	17.33	2.31	2.31	1.96	0.19	406.51
Year 4, Huffman Prairie - Unit 4	1.34	1.22	28.71	3.83	3.83	3.24	0.32	673.65
Total Emissions of Existing Prescribed Burn Areas	4.19	3.83	89.84	11.98	11.98	10.15	0.99	2,108.06

Proposed Action	**Worst-case Actual Annual Emissions Increase of Prescribed Burning (tons/yr)**							
Prescribed Burn Unit Name	NOx	VOC	CO	PM	PM-10	PM-2.5	SO2	CO2e
Proposed New Prescribed Burn Areas	19.38	17.72	415.22	55.36	55.36	46.92	4.60	9,742.84
Year 2, Huffman Prairie - Unit 2	0.70	0.64	15.10	2.01	2.01	1.71	0.17	354.25
Proposed Actual Emissions Increase	18.67	17.07	400.13	53.35	53.35	45.21	4.43	9,388.59

WPAFB - EA to Implement the Integrated Natural Resources Management Plan

Calculation of Project Air Pollutant Emissions

Detailed Emissions Calculations of Prescribed Burn Areas

Prescribed Burn Area Emission Factors										
Emission Factor Units	PM-10	PM-2.5	CO	NOx	VOC	SO2	CO2	CH4	N2O	CO2e
(g/kg of fuel)	10.00	8.47	75.00	3.50	3.20	0.83	1,521.00	6.80	0.23	1,759.54
(lb/ton of fuel)	20.00	16.95	150.00	7.00	6.40	1.66	3,042.00	13.60	0.46	3,519.08

Notes:

1. PM-10 and CO emission factors from AP-42 Table 13.1-3 for Grasslands; PM-10 = Total PM
2. PM-2.5 = PM-10 ÷ 1.18, from equation 10, *Development of Emissions Inventory Methods for Wildland Fire* , February 2002.
3. NOx emission factor for grasses from Table 39, *Development of Emissions Inventory Methods for Wildland Fire* , February 2002.
4. VOC emission factor for Grass, Overall Total from Table 28, *Development of Emissions Inventory Methods for Wildland Fire* , February 2002.
5. SO2, CO2, and CH4 emission factors from Table 39, *Development of Emissions Inventory Methods for Wildland Fire* , February 2002.
6. N2O emission factor from AP-42 Table 13.1-5
7. CO2e = CO2 + (CH4 x 25) + (N2O x 298)

Newly Proposed Prescribed Burn Areas	Size	Fuel Load	Fuel	PM-10	PM2.5	CO	NOx	VOC	SO2	CO2	CH4	N2O	CO2e
	(Acre)	(ton/Acre)	(ton)	(ton)	(ton)	(ton)	(ton)	(ton)	(ton)	(ton)	(ton)	(ton)	(ton)
Liquid Oxygen Plant	17.3	11	190.3	1.90	1.61	14.27	0.67	0.61	0.16	289.45	1.29	0.04	334.84
Sandhill	17.5	11	192.5	1.93	1.63	14.44	0.67	0.62	0.16	292.79	1.31	0.04	338.71
Sheep Pen	35.2	11	387.2	3.87	3.28	29.04	1.36	1.24	0.32	588.93	2.63	0.09	681.29
Huffman Prairie Flying Field	134.2	11	1476.2	14.76	12.51	110.72	5.17	4.72	1.23	2,245.30	10.04	0.34	2,597.43
Licensed Shooting Preserve	165.5	11	1820.5	18.21	15.43	136.54	6.37	5.83	1.51	2,768.98	12.38	0.42	3,203.24
Building 471	13.8	11	151.8	1.52	1.29	11.39	0.53	0.49	0.13	230.89	1.03	0.03	267.10
Gate 22B	24.7	11	271.7	2.72	2.30	20.38	0.95	0.87	0.23	413.26	1.85	0.06	478.07
Tillman Pit	20.6	11	226.6	2.27	1.92	17.00	0.79	0.73	0.19	344.66	1.54	0.05	398.71
Warfighter Training Center	66.2	11	728.2	7.28	6.17	54.62	2.55	2.33	0.60	1,107.59	4.95	0.17	1,281.30
Fire Training Center	6.2	11	68.2	0.68	0.58	5.12	0.24	0.22	0.06	103.73	0.46	0.02	120.00
Bass Lake	2.1	11	23.1	0.23	0.20	1.73	0.08	0.07	0.02	35.14	0.16	0.01	40.65
Subtotal	503.3		5,536.30	55.36	46.92	415.22	19.38	17.72	4.60	8,420.71	37.65	1.27	9,741.34
Existing Prescribed Burn Area													
Huffman Prairie	108.9	11	1197.9	11.98	10.15	89.84	4.19	3.83	0.99	1,822.01	8.15	0.28	2,107.75
Total	612.2		6,734.20	67.34	57.07	505.07	23.57	21.55	5.59	10,242.72	45.79	1.55	11,849.09

Existing Actual Annual Prescribed Burns	Size	Fuel Load	Fuel	PM-10	PM2.5	CO	NOx	VOC	SO2	CO2	CH4	N2O	CO2e
	(Acre)	(ton/Acre)	(ton)	(ton)	(ton)	(ton)	(ton)	(ton)	(ton)	(ton)	(ton)	(ton)	(ton)
Huffman Prairie	108.9	11	1197.9	11.98	10.15	89.84	4.19	3.83	0.99	1,822.01	8.15	0.28	2,107.75
Year 1, Unit 1	34.8	11	382.8	3.83	3.24	28.71	1.34	1.22	0.32	582.24	2.60	0.09	673.55
Year 2, Unit 2	18.3	11	201.3	2.01	1.71	15.10	0.70	0.64	0.17	306.18	1.37	0.05	354.20
Year 3, Unit 3	21.0	11	231	2.31	1.96	17.33	0.81	0.74	0.19	351.35	1.57	0.05	406.45
Year 4, Unit 4	34.8	11	382.8	3.83	3.24	28.71	1.34	1.22	0.32	582.24	2.60	0.09	673.55

Notes:

1. Area Sizes from Figure 19, *Wright-Patterson, AFB Wildfire Management Plan,* Draft 2014.
2. Fuel Load from AP-42 Table 13.1-1 for North Central Region
3. Fuel (ton) = Size (acre) x Fuel Load (ton/acre)
4. Emissions (ton) = Fuel (ton) x Emission Factor (lb/ton fuel) ÷ 2,000 (lb/ton)

Emission Factors for Fuel Oil Combustion										
Emission Factor Units	PM-10	PM-2.5	CO	NOx	VOC	SO2	CO2	CH4	N2O	CO2e
(lb/1,000 gal)	2	0.83	5	18	0.34	7.1	22,385.16	0.89	0.18	22,460.71

Notes:

1. Driptorch fuel assumed to be kerosene, diesel, or a combination of the two.

2. Emission Factors for NOx, CO, SO2, and PM-10 from AP-42 Table 1.3-1 for Distillate Oil
3. Emission Factors for VOC from AP-42 Table 1.3-3 for Distillate Oil NMTOC
4. Emission Factor for PM-2.5 from AP-42 Table 1.3-7
5. Emission Factors for CO2, CH4, and N2O from 40 CFR Part 98 Subpart C Tables C-1 and C-2 for kerosene

Driptorch Emissions	Number (Each)	Size (Gallon)	Fuel (Gallon)	PM-10 (ton)	PM2.5 (ton)	CO (ton)	NOx (ton)	VOC (ton)	SO2 (ton)	CO2 (ton)	CH4 (ton)	N2O (ton)	CO2e (ton)
Liquid Oxygen Plant	4	1.25	5.00	5.00E-06	2.08E-06	1.25E-05	4.50E-05	8.50E-07	1.78E-05	5.60E-02	2.23E-06	4.47E-07	5.62E-02
Sandhill	4	1.25	5.00	5.00E-06	2.08E-06	1.25E-05	4.50E-05	8.50E-07	1.78E-05	5.60E-02	2.23E-06	4.47E-07	5.62E-02
Sheep Pen	8	1.25	10.00	1.00E-05	4.15E-06	2.50E-05	9.00E-05	1.70E-06	3.55E-05	1.12E-01	4.47E-06	8.93E-07	1.12E-01
Huffman Prairie Flying Field	27	1.25	33.75	3.38E-05	1.40E-05	8.44E-05	3.04E-04	5.74E-06	1.20E-04	3.78E-01	1.51E-05	3.01E-06	3.79E-01
Licensed Shooting Preserve	34	1.25	42.50	4.25E-05	1.76E-05	1.06E-04	3.83E-04	7.23E-06	1.51E-04	4.76E-01	1.90E-05	3.80E-06	4.77E-01
Building 471	3	1.25	3.75	3.75E-06	1.56E-06	9.38E-06	3.38E-05	6.38E-07	1.33E-05	4.20E-02	1.67E-06	3.35E-07	4.21E-02
Gate 22B	5	1.25	6.25	6.25E-06	2.59E-06	1.56E-05	5.63E-05	1.06E-06	2.22E-05	7.00E-02	2.79E-06	5.58E-07	7.02E-02
Tillman Pit	5	1.25	6.25	6.25E-06	2.59E-06	1.56E-05	5.63E-05	1.06E-06	2.22E-05	7.00E-02	2.79E-06	5.58E-07	7.02E-02
Warfighter Training Center	14	1.25	17.50	1.75E-05	7.26E-06	4.38E-05	1.58E-04	2.98E-06	6.21E-05	1.96E-01	7.81E-06	1.56E-06	1.97E-01
Fire Training Center	2	1.25	2.50	2.50E-06	1.04E-06	6.25E-06	2.25E-05	4.25E-07	8.88E-06	2.80E-02	1.12E-06	2.23E-07	2.81E-02
Bass Lake	1	1.25	1.25	1.25E-06	5.19E-07	3.13E-06	1.13E-05	2.13E-07	4.44E-06	1.40E-02	5.58E-07	1.12E-07	1.40E-02
Subtotal	107	1.25	133.75	1.34E-04	5.55E-05	3.34E-04	1.20E-03	2.27E-05	4.75E-04	1.50E+00	5.97E-05	1.19E-05	1.50E+00
Existing Prescribed Burn Area													
Huffman Prairie	22	1.25	27.50	2.75E-05	1.14E-05	6.88E-05	2.48E-04	4.68E-06	9.76E-05	3.08E-01	1.23E-05	2.46E-06	3.09E-01
Total	129	1.25	161.25	1.61E-04	6.69E-05	4.03E-04	1.45E-03	2.74E-05	5.72E-04	1.80E+00	7.20E-05	1.44E-05	1.81E+00

Driptorch Emissions	Number (Each)	Size (Gallon)	Fuel (Gallon)	PM-10 (ton)	PM2.5 (ton)	CO (ton)	NOx (ton)	VOC (ton)	SO2 (ton)	CO2 (ton)	CH4 (ton)	N2O (ton)	CO2e (ton)
Huffman Prairie	22	1.25	27.50	2.75E-05	1.14E-05	6.88E-05	2.48E-04	4.68E-06	9.76E-05	3.08E-01	1.23E-05	2.46E-06	3.09E-01
Year 1, Unit 1	7	1.25	8.75	8.75E-06	3.63E-06	2.19E-05	7.88E-05	1.49E-06	3.11E-05	9.79E-02	3.91E-06	7.81E-07	9.83E-02
Year 2, Unit 2	4	1.25	5.00	5.00E-06	2.08E-06	1.25E-05	4.50E-05	8.50E-07	1.78E-05	5.60E-02	2.23E-06	4.47E-07	5.62E-02
Year 3, Unit 3	4	1.25	5.00	5.00E-06	2.08E-06	1.25E-05	4.50E-05	8.50E-07	1.78E-05	5.60E-02	2.23E-06	4.47E-07	5.62E-02
Year 4, Unit 4	7	1.25	8.75	8.75E-06	3.63E-06	2.19E-05	7.88E-05	1.49E-06	3.11E-05	9.79E-02	3.91E-06	7.81E-07	9.83E-02

Notes:
1. Number of Driptorch Tanks/refills assumed to approximately one for each five acres of prescribed burn.
2. Driptorch size is a typically available industry standard size.
3. Fuel (gallon) = Number x Size (gallon)
4. Emissions (ton) = Fuel (gallon) x Emission Factor (lb/1,000 gallon) ÷ 1,000 (gallon/1,000 gallon) ÷ 2,000 (lb/ton)

WPAFB - EA to Implement the Integrated Natural Resources Management Plan
Calculation of Project Air Pollutant Emissions
Vehicle Engine Emissions

Step 1 Estimate the Vehicle Miles Traveled (VMT) by Vehicle Class

For this analysis, it is assumed that the commuter fleet corresponding to the construction workers will use a passenger truck on the roads in the vicinity of Wright-Patterson AFB. The passenger truck data for Greene County, Ohio, were derived from the US EPA Mobile Source MOVES 2010b Model for Calendar Year 2017, Greene County Ohio

The following average construction worker counts have been assumed for this analysis:

Area Description	Number of Workers	Working Days
Proposed Action		
Contract to Plant New Trees	3	10
Totals:	**3**	**30**

Assumptions Used To Estimate Mileage

1	Riders per vehicle
30	Miles avg. commute round trip
50%	Vehicles do daytime errands/lunch
10	Miles avg. errand/lunch round trip
1,050	Total Commuter Mileage Calculated

Assumptions Used To Estimate Mileage

3	Delivery Trucks per Day
40	Miles avg. delivery round trip
10	Total Work Days
1,200	Total Delivery Mileage Calculated

Greene County Truck Vehicle VMT Mix

VClassId	Vehicle Class	Fuel Type
31	Passenger Truck	Gasoline
52	Single Unit Short-haul Truck	Diesel

Step 2 Select the Appropriate Air Pollutant Emission Factors (grams per mile) for the Worker and Delivery Vehicles

Emission Factors

Emission factors are taken from the U.S. EPA MOVES2010b emissions model, as compiled for 2017 Calendar Year

Note that PM10 and PM 2.5 emission factors include exhaust emissions only. Fugitive emissions (paved road, brake & tire dust, etc.) are included with roadway emissions.

Emission Factors in g/mi from MOVES2010b for Vehicles in Greene County Ohio CY2017.

	Moves2010b Greene County g/mi - 2017						
	NOx	VOC	CO	SO2	PM10	PM2.5	CO2
(31) Gasoline	0.4853	0.0940	3.7048	0.0073	0.0121	0.0111	487.910
(52) Diesel	2.6935	0.2722	1.0591	0.0088	0.1125	0.1091	1,247.691

Step 3 Multiply the Emission Factors Times the Annual Vehicle Miles Traveled for Each Vehicle Class

Proposed Action							
Contract to Plant New Trees							
Construction Commuter & Material Delivery Emissions by Vehicle Class							
	NOx	VOC	CO	SO2	PM10	PM2.5	CO2
(31) Gasoline	1.12	0.22	8.58	0.02	0.03	0.03	1,129.63
(52) Diesel	7.13	0.72	2.80	0.02	0.30	0.29	3,301.39
Total (lb/yr)	**8.25**	**0.94**	**11.38**	**0.04**	**0.33**	**0.31**	**4,431.02**
Total (ton/yr)	**4.13E-03**	**4.69E-04**	**5.69E-03**	**2.01E-05**	**1.63E-04**	**1.57E-04**	**2.22**

WPAFB - EA to Implement the Integrated Natural Resources Management Plan
Calculation of Project Air Pollutant Emissions
Roadway Surface Emissions

ROADWAY SURFACE PARTICULATE EMISSIONS FACTORS

Description of Roadway Scenarios		Brakewear PM-10 Factor lbs/VMT	Brakewear PM-2.5 Factor lbs/VMT	Tirewear PM-10 Factor lbs/VMT	Tirewear PM-2.5 Factor lbs/VMT	k (TSP)	k (PM-10)	k (PM2.5)	sL	W	TSP Emission Factor lbs/VMT	PM-10 Emission Factor lbs/VMT	PM-2.5 Emission Factor lbs/VMT	VMT/yr
Proposed Action														
	Contract to Plant New Trees													
	Construction Commuting	1.345E-05	3.528E-06	2.867E-06	6.615E-07	0.011	0.0022	0.00054	8.2	2	0.14	0.03	0.01	1,050
	Construction Material Delivery Trucks	4.741E-05	1.235E-05	6.395E-06	1.544E-06	0.011	0.0022	0.00054	8.2	30	2.17	0.43	0.11	1,200

ROADWAY SURFACE PARTICULATE EMISSIONS

Description of Roadway Scenarios			Uncontrolled TSP Emissions		Control Efficiency	Controlled TSP Emissions	Uncontrolled PM-10 Emissions		Control Efficiency	Controlled PM-10 Emissions	Uncontrolled PM-2.5 Emissions		Control Efficiency	Controlled PM-2.5 Emissions
			(lb/yr)	(ton/yr)	(%)	(ton/yr)	(lb/yr)	(ton/yr)	(%)	(ton/yr)	(lb/yr)	(ton/yr)	(%)	(ton/yr)
Proposed Action														
	Contract to Plant New Trees													
	Construction Commuting		144	0.07	16	0.06	29	0.01	16	0.01	7	0.004	16	0.00
	Construction Material Delivery Trucks		2,600	1.30	16	1.09	520	0.26	16	0.22	128	0.06	16	0.05
	Totals		2,744	1.37		1.15	549	0.27		0.23	135	0.07		0.06

Greene County Vehicle VMT Mix	Moves2010b Greene County g/mi - 2017			
	Brakewear		Tirewear	
	PM10	PM2.5	PM10	PM2.5
(31) Gasoline, Passenger Truck	0.0061	0.0016	0.0013	0.0003
(52) Diesel, Single Unit Short-Haul Truck	0.0215	0.0056	0.0029	0.0007

NOTES:

Emission estimation equations from AP-42 Section 13.2.1 (11/06), Equation (2) for industrial paved roads. Variable definitions:

k = base emission factor for particle size Particulate Matter(TSP)/PM30, PM10, and PM2.5

W = average weight (tons) of vehicles traveling the road

sL = road surface silt loading for particle size range of interest (assumed similar to a quarry).

P = number of days with at least 0.01 inches of rain (140 from Figure 13.2.1-2)

N = 365 days per year for annual emissions

Control efficiencies of 16% calculated for all locations due to the majority of road emissions are off-site. (80% control x 20% onsite)

Construction Material Deliveries are assumed to occur three times per day for 52 weeks @ 40 miles round trip.

WPAFB - EA to Implement the Integrated Natural Resources Management Plan
Calculation of Project Air Pollutant Emissions
Construction Equipment Engine Emissions

Equipment	Load Factor (%)	Operating Hours hours/day	HP hp	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2
				lb/ 1,000 hp-hr						
Diesel Tractors/Loaders/Backhoes	0.21	8	150	3.42	14.64	15.61	2.36	2.27	1.01	1,472.77
Diesel Bore/Drill Rigs	0.43	8	50	1.32	5.49	15.37	1.06	1.01	0.84	1,199.00

Notes:

Emission factors from Table 4-1 of Air Emissions Guide for Air Force Mobile Sources, October 2014.

Assumed Values for Operating Hours and specific HP of equipment based on engineering judgment.

Assumed Duration Days includes the total number of each equipment type used during the project.

Proposed Action, Contract to Plant New Trees

Equipment	Days	Hours	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2
Diesel Tractors/Loaders/Backhoes	10	80	41.04	175.68	187.32	28.32	27.24	12.12	17,673.24
Diesel Bore/Drill Rigs	10	80	5.28	21.96	61.48	4.24	4.04	3.36	4,796.00
Total Emissions (lb)			**46.32**	**197.64**	**248.80**	**32.56**	**31.28**	**15.48**	**22,469.24**
Total Emissions (ton)			**0.0232**	**0.0988**	**0.1244**	**0.0163**	**0.0156**	**0.0077**	**11.23**

WPAFB - EA to Implement the Integrated Natural Resources Management Plan
Calculation of Project Air Pollutant Emissions
Construction Area Fugitive Emissions

CONSTRUCTION AREA EMISSIONS

Area Description	Area		Project Duration	Emission Factor	Control Efficiency	Estimated Emissions	Estimated Emissions
	A		T	EM_{FAC}	CE	E_{lb}	E_{TON}
	A = L * W			†1	†2		
	($ft.^2$)	(acre)	(months)	(ton/acre/month)	(%)	(lb)	(ton)
Proposed Action							
Contract to Plant New Trees	217,800	5.0	0.5	1.2	80%	1,200.00	0.60
Totals	-	-	-	-	-	PM/PM-10	0.60
						PM-2.5 †3	0.15

Notes:

$E_{lb} = E_{TON}$ x 2,000

$E_{TON} = A * T * EM_{FAC} * (1 - CE)$

†1 Note: Emission factor Section 13.2.3 "Heavy Construction Operations" (dated 1/95), of AP-42, "Compilation of Air Pollutant Emission Factors", 5th Edition, U.S. EPA, Research Triangle Park, NC, 1998.

†2 Note: Assumed control efficiency for primarily vegitative cover.

†3 Note: Emission Factor Section 13.2.1-1 "Particle Size Multipliers for Paved Roads", of AP-42, states PM-2.5 to be 25% of PM-10.

Appendix C

Noise Terminology and Analysis Methodology

This Appendix presents a detailed discussion of noise and its effects on people and the environment. An assessment of aircraft noise requires a general understanding of how sound is measured and how it affects people in the natural environment. The purpose of this appendix is to address public concerns regarding aircraft noise impacts.

Section C.1 is a general discussion on the properties of noise. Section C.2 summarizes the noise metrics discussed throughout this Environmental Assessment (EA). Section C.3 provides Federal land use compatibility guidelines that are used in applying aircraft noise impacts to land use planning in the airport environment.

C.1 GENERAL

Noise, often defined as unwanted sound, is one of the most common environmental issues associated with aircraft operations. Of course, aircraft are not the only source of noise in an urban or suburban surrounding, where interstate and local roadway traffic, rail, industrial, and neighborhood sources also intrude on the everyday quality of life. Nevertheless, aircraft are readily identifiable to those affected by their noise, and typically are singled out for special attention and criticism. Consequently, aircraft noise problems often dominate analyses of environmental impacts.

Sound is a physical phenomenon, and consists of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Whether that sound is interpreted as pleasant or unpleasant depends largely on the listener's current activity, past experience, and attitude toward the source of that sound. It is often true that one person's music is another person's noise.

The measurement and human perception of sound involves two basic physical characteristics, intensity and frequency. The intensity is a measure of the strength or amplitude of the sound vibrations and is expressed in terms of sound pressure. The higher the sound pressure, the more energy carried by the sound and the louder is the perception of that sound. The second important physical characteristic is sound frequency which is the number of times per second the air vibrates or oscillates. Low-frequency sounds are characterized as rumbles or roars, while high-frequency sounds are typified by sirens or screeches.

The loudest sounds which can be detected comfortably by the human ear have intensities which are 1,000,000,000,000 times larger than those of sounds which can just be detected. Because of this vast range, any attempt to represent the intensity of sound using a linear scale becomes very unwieldy. As a result, a logarithmic unit known as the decibel (dB) is used to represent the intensity of a sound. Such a representation is called a sound level.

Because of the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. However, some simple rules of thumb are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. For example:

$$60 \text{ dB} + 60 \text{ dB} = 63 \text{ dB}, \text{ and}$$

$$80 \text{ dB} + 80 \text{ dB} = 83 \text{ dB}$$

The total sound level produced by two sounds of different levels is usually only slightly more than the higher of the two. For example:

$$60.0 \text{ dB} + 70.0 \text{ dB} = 70.4 \text{ dB}$$

Because the addition of sound levels behaves differently than that of ordinary numbers, such addition is often referred to as "decibel addition" or "energy addition." The latter term arises from the fact that what we are really doing when we add decibel values is first converting each decibel value to its corresponding acoustic energy, then adding the energies using the normal rules of addition, and finally converting the total energy back to its decibel equivalent.

An important facet of decibel addition arises later when the concept of time-average sound levels is introduced to explain Day-Night Average Sound Level (DNL). Because of the logarithmic units, the time-average sound level is dominated by the louder levels that occur during the averaging period. As a simple example, consider a sound level which is 100 dB and lasts for 30 seconds, followed by a sound level of 50 dB which also lasts for 30 seconds. The time-average sound level over the total 60-second period is 97 dB, not 75 dB.

A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above about 120 dB begin to be felt inside the human ear as discomfort and eventually pain at still higher levels.

The minimum change in the time-average sound level of individual events which an average human ear can detect is about 3 dB. A change in sound level of about 10 dB is usually perceived by the average person as a doubling (or halving) of the sound's loudness, and this relation holds true for loud sounds and for quieter sounds.

Sound frequency is pitch measured in terms of hertz (Hz). The normal human ear can detect sounds which range in frequency from about 20 Hz to about 15,000 Hz. All sounds in this wide range of frequencies, however, are not heard equally well by the human ear, which is most sensitive to frequencies in the 1,000 to 4,000 Hz range. To account for the varied frequency sensitivity of people, we use the A-weighted scale that approximates the average, healthy human ear. The A-weighting de-emphasizes the low and high frequency portion of the noise signal and emphasizes the mid-frequency portion. Sound levels measured using A-weighting are most properly called A-weighted sound levels while sound levels measured without any frequency weighting are most properly called sound levels. However, since most environmental impact analysis documents deal only with A-weighted sound levels, the adjective "A-weighted" is often omitted, and A-weighted sound levels are referred to simply as sound levels. In some instances, the author will indicate that the levels have been A-weighted by using the abbreviation dBA or dB(A), rather than the abbreviation dB, for decibel. As long as the use of A-weighting is understood to be used, there is no difference implied by the terms "sound level" and "A-weighted sound level" or by the units dB, dBA, and dB(A). The A-weighting function de-emphasizes higher and especially lower frequencies to which humans are less sensitive. Because the A-weighting is closely related to human hearing characteristics, it is appropriate to use A-weighted sound levels when assessing potential noise effects on humans and many terrestrial wildlife species. In this document, all sound levels are A-weighted and are reported in dB.

Sound levels do not represent instantaneous measurements but rather averages over short periods of time. Two measurement time periods are most common: 1 second and 1/8 of a second. A measured

sound level averaged over 1 second is called a slow response sound level; one averaged over 1/8 of a second is called a fast response sound level. Most environmental noise studies use slow response measurements, and the adjective "slow response" is usually omitted. It is easy to understand why the proper descriptor "slow response A-weighted sound level" is usually shortened to "sound level" in environmental impact analysis documents.

C.2 NOISE METRICS

A "metric" is defined as something "of, involving, or used in measurement." As used in environmental noise analyses, a metric refers to the unit or quantity that measures or represents the effect of noise on people. Noise measurements typically have involved a confusing proliferation of noise metrics as individual researchers have attempted to understand and represent the effects of noise. As a result, past literature describing environmental noise or environmental noise abatement has included many different metrics. Recently, however, various Federal agencies involved in environmental noise mitigation have agreed on common metrics for environmental impact analyses documents, and both the Department of Defense (DOD) and the Federal Aviation Administration (FAA) have specified those which should be used for Federal aviation noise assessments. These metrics are as follows.

C.2.1 Maximum Sound Level

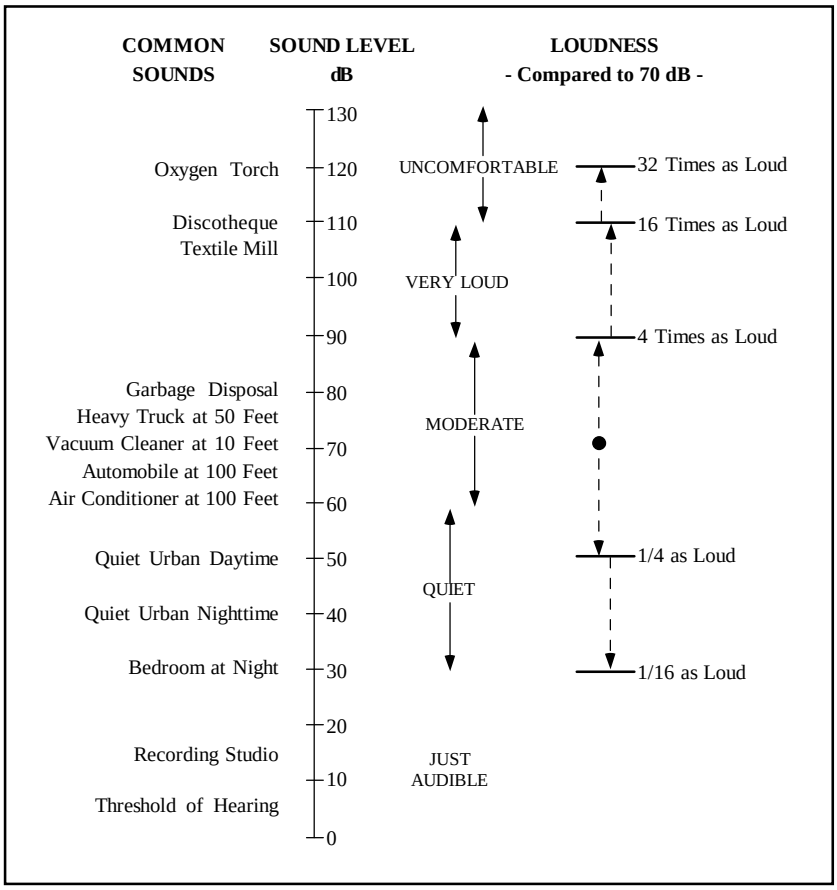
The highest A-weighted sound level measured during a single event in which the sound level changes value as time goes on (e.g., an aircraft overflight) is called the maximum A-weighted sound level or maximum sound level, for short. It is usually abbreviated by ALM, L_{max}, or L_{Amax}. The typical A-weighted levels of common sounds are shown in Figure C-1. The maximum sound level is important in judging the interference caused by a noise event with conversation, TV or radio listening, sleep, or other common activities.

C.2.2 Sound Exposure Level

Individual time-varying noise events have two main characteristics: (1) a sound level which changes throughout the event, and (2) a period of time during which the event is heard. Although the maximum sound level, described above, provides some measure of the intrusiveness of the event, it alone does not completely describe the total event. The period of time during which the sound is heard is also significant. The sound exposure level (abbreviated SEL or LAE) combines both of these characteristics into a single metric.

Sound exposure level is a logarithmic measure of the total acoustic energy transmitted to the listener during the event. Mathematically, it represents the sound level of the constant sound that would, in one second, generate the same acoustic energy as did the actual time-varying noise event. Since aircraft overflights usually last longer than one second, the SEL of an overflight is usually greater than the maximum sound level of the overflight.

Sound exposure level is a composite metric which represents both the intensity of a sound and its duration. It does not directly represent the sound level heard at any given time, but rather provides a measure of the net impact of the entire acoustic event. It has been well established in the scientific community that SEL measures this impact much more reliably than just the maximum sound level. Because the SEL and the maximum sound level are both A-weighted sound levels expressed in dBs, there is sometimes confusion between the two, so the specific metric used should be clearly stated.



Source: Harris 1979

Figure C-1. Typical A-Weighted Sound Levels of Common Sounds

Day-Night Average Sound Level

Time-average sound levels are the measurements of sound levels which are averaged over a specified length of time. These levels provide a measure of the average sound energy during the measurement period.

For the evaluation of community noise effects, and particularly aircraft noise effects, the day-night average sound level (abbreviated DNL or L_{dn}) is used. Day-night average sound level averages aircraft sound levels at a location over a complete 24-hour period, with a 10-dB adjustment added to those noise events which take place between 10:00 p.m. and 7:00 a.m. (local time) the following morning. This 10 dB "penalty" represents the added intrusiveness of sounds which occur during normal sleeping hours, both because of the increased sensitivity to noise during those hours and because ambient sound levels during nighttime are typically about 10 dB lower than during daytime hours.

Ignoring the 10 dB nighttime adjustment for the moment, DNL may be thought of as the continuous A-weighted sound level which would be present if all of the variations in sound level which occur over a 24-hour period were smoothed out so as to contain the same total sound energy.

DNL provides a single measure of overall noise impact, but does not provide specific information on the number of noise events or the individual sound levels which occur during the day. For example, a DNL of 65 dB could result from a very few noisy events, or a large number of quieter events.

As noted earlier for SEL, DNL does not represent the sound level heard at any particular time, but rather represents the total sound exposure. Scientific studies and social surveys which have been conducted to appraise community annoyance to all types of environmental noise have found the DNL to be the best measure of that annoyance. Its use is endorsed by the scientific community (American National Standards Institute [ANSI] 1980, 1988; U.S. Environmental Protection Agency [USEPA] 1974; Federal Interagency Committee on Urban Noise [FICUN] 1980; Federal Interagency Committee on Noise [FICON] 1992).

There is, in fact, a remarkable consistency in the results of attitudinal surveys about aircraft noise conducted in different countries to find the percentages of groups of people who express various degrees of annoyance when exposed to different levels of DNL. This is illustrated in Figure C-2, which summarizes the results of a large number of social surveys relating community responses to various types of noises, measured in DNL.

Figure C-2 is taken from Schultz (1978) and shows the original curve fit. A more recent study has reaffirmed this relationship (Fidell et al. 1991). Figure C-3 shows an updated form of the curve fit in comparison with the original (Finegold et al. 1992). The updated fit, which does not differ substantially from the original, is the current preferred form. In general, correlation coefficients of 0.85 to 0.95 are found between the percentages of groups of people highly annoyed and the level of average noise exposure. The correlation coefficients for the annoyance of individuals are relatively low, however, on the order of 0.5 or less. This is not surprising, considering the varying personal factors which influence the manner in which individuals react to noise. Nevertheless, findings substantiate that community annoyance to aircraft noise is represented quite reliably using DNL.

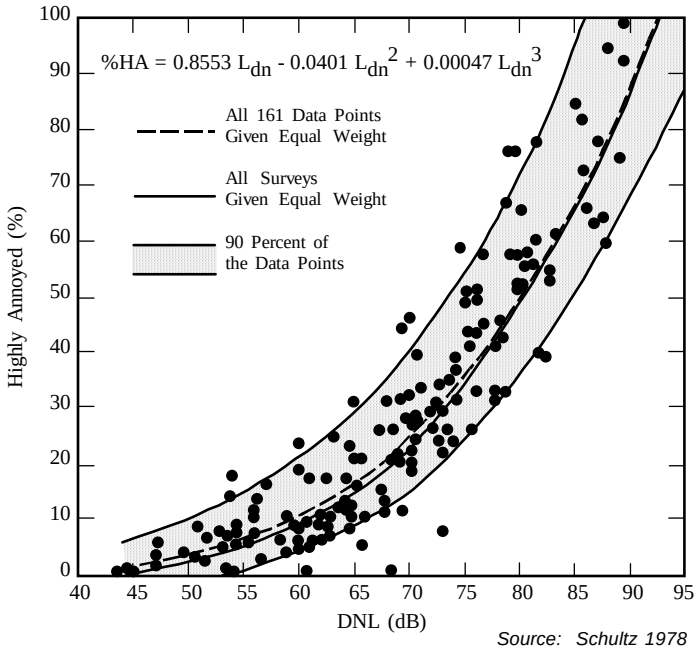
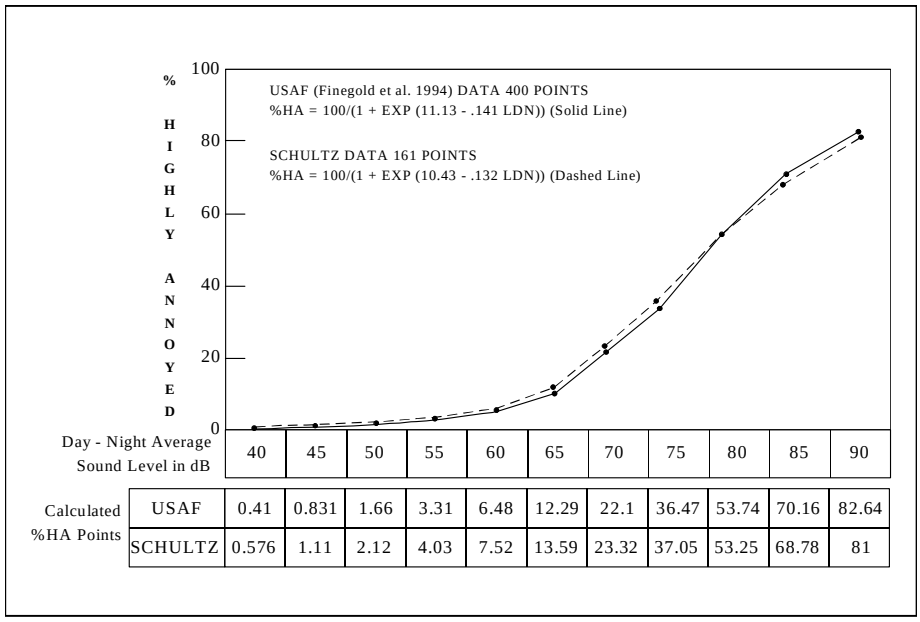


Figure C-2. Community Surveys of Noise Annoyance



Day - Night Average Sound Level in dB		40	45	50	55	60	65	70	75	80	85	90
Calculated %HA Points	USAF	0.41	0.831	1.66	3.31	6.48	12.29	22.1	36.47	53.74	70.16	82.64
	SCHULTZ	0.576	1.11	2.12	4.03	7.52	13.59	23.32	37.05	53.25	68.78	81

Sources: Schultz 1978 and Finegold et al. 1994

Figure C-3. Response of Communities to Noise and Comparison of Original Schultz 1978 and Current USAF Curve Fits

This relation between community annoyance and time-average sound level has been confirmed, even for infrequent aircraft noise events. A National Aeronautics and Space Administration (NASA) study reported the reactions of individuals in a community to daily helicopter overflights, ranging from 1 to 32 per day (Fields and Powell 1985). The stated reactions to infrequent helicopter overflights correlated quite well with the daily time-average sound levels over this range of numbers of daily noise events.

The use of DNL has been criticized recently as not accurately representing community annoyance and land-use compatibility with aircraft noise. Much of that criticism stems from a lack of understanding of the basis for the measurement or calculation of DNL. One frequent criticism is based on the inherent feeling that people react more to single noise events and not as much to "meaningless" time-average sound levels.

Time-average noise metric, such as DNL, takes into account both the noise levels of all individual events which occur during a 24-hour period and the number of times those events occur. As described briefly above, the logarithmic nature of the decibel unit causes the noise levels of the loudest events to control the 24-hour average.

As a simple example of this characteristic, consider a case in which only one aircraft overflight occurs in daytime during a 24-hour period, creating a sound level of 100 dB for 30 seconds. During the remaining 23 hours, 59 minutes, and 30 seconds of the day, the ambient sound level is 50 dB. The DNL for this 24-hour period is 65.5 dB. Assume, as a second example that 10 such 30-second overflights occur in daytime hours during the next 24-hour period, with the same ambient sound level of 50 dB during the remaining 23 hours and 55 minutes of the day. The DNL for this 24-hour period is 75.4 dB. Clearly, the averaging of noise over a 24-hour period does not ignore the louder single events and tends to emphasize both the sound levels and number of events. This is the basic concept of a time-average sound metric, and specifically the DNL.

C.3 LAND-USE COMPATIBILITY

As noted above, the inherent variability between individuals makes it impossible to predict accurately how any individual will react to a given noise event. Nevertheless, when a community is considered as a whole, its overall reaction to noise can be represented with a high degree of confidence. As described above, the best noise exposure metric for this correlation is the DNL. In June 1980, an ad hoc FICUN published guidelines for considering noise in land use planning (FICUN 1980). These guidelines related DNL to compatible land uses in urban areas. The committee was composed of representatives from the DOD, Department of Transportation, Department of Housing and Urban Development; USEPA; and the Veterans Administration. Since the issuance of these guidelines, Federal agencies have generally adopted these guidelines to make recommendations to the local communities on land use compatibilities.

The FAA included the committee's guidelines in the Federal Aviation Regulations (USDOT 1984). These guidelines are reprinted in Table C-1, along with the explanatory notes included in the regulation. Although these guidelines are not mandatory (see Notes in Table C-1), they provide the best means for evaluating noise impact in airport communities. In general, residential land uses normally are not compatible with outdoor DNL (L_{dn} values) above 65 dB, and the extent of land areas and populations exposed to DNL of 65 dB and higher provides the best means for assessing the noise impacts of alternative aircraft actions.

In 1990, the FICON was formed to review the manner in which aviation noise effects are assessed and presented. This group released its report in 1992 and reaffirmed the use of DNL as the best metric for this purpose (FICON 1992).

Analyses of aircraft noise impacts and compatible land uses around DOD facilities are normally made using NOISEMAP (Moulton 1992). This computer-based program calculates DNL at many points on the ground around an airfield and draws contours of equal levels for overlay onto land-use maps of the same scale. The program mathematically calculates the DNL of all aircraft operations for a 24-hour period, taking into consideration the number and types of aircraft, their flight paths and engine thrust settings, and the time of day (daytime or nighttime) that each operation occurs.

Day-night average sound levels may also be measured directly around an airfield, rather than calculated with NOISEMAP; however, the direct measurement of annualized DNL is difficult and costly since it requires year-round monitoring or careful seasonal sampling. NOISEMAP provides an accurate projection of aircraft noise around airfields.

NOISEMAP also has the flexibility of calculating sound levels at any specified ground location so that noise levels at representative points under flight paths can be ascertained. NOISEMAP is most accurate for comparing "before and after" noise impacts which would result from proposed airfield changes or alternative noise control actions, so long as the various impacts are calculated in a consistent manner.

Table C-1. Land Use Compatibility Guidelines with Yearly

LAND USE	YEARLY DAY-NIGHT AVERAGE SOUND LEVELS IN DECIBELS					
	BELOW 65	65-70	70-75	75-80	80-85	OVER 85
Residential						
Residential, other than mobile homes and transient lodgings	*Y*	*N(1)*	*N(1)*	*N*	*N*	*N*
Mobile home parks	*Y*	*N*	*N*	*N*	*N*	*N*
Transient lodgings	*Y*	*N(1)*	*N(1)*	*N(1)*	*N*	*N*
Public Use						
Schools	*Y*	*N(1)*	*N(1)*	*N*	*N*	*N*
Hospitals & nursing homes	*Y*	*25*	*30*	*N*	*N*	*N*
Churches, auditoria, & concert halls	*Y*	*25*	*30*	*N*	*N*	*N*
Government services	*Y*	*Y*	*25*	*30*	*N*	*N*
Transportation	*Y*	*Y*	*Y(2)*	*Y(3)*	*Y(4)*	*Y(4)*
Parking	*Y*	*Y*	*Y(2)*	*Y(3)*	*Y(4)*	*N*
Commercial Use						
Offices, business, & professional	*Y*	*Y*	*25*	*30*	*N*	*N*
Wholesale & retail-building materials, hardware, and farm equipment	*Y*	*Y*	*Y(2)*	*Y(3)*	*Y(4)*	*N*
Retail trade-general	*Y*	*Y*	*25*	*30*	*N*	*N*
Utilities	*Y*	*Y*	*Y(2)*	*Y(3)*	*Y(4)*	*N*
Communication	*Y*	*Y*	*25*	*30*	*N*	*N*
Manufacturing and Production						
Manufacturing, general	*Y*	*Y*	*Y(2)*	*Y(3)*	*Y(4)*	*N*
Photographic & optical	*Y*	*Y*	*25*	*30*	*N*	*N*
Agriculture (except livestock) & forestry	*Y*	*Y(6)*	*Y(7)*	*Y(8)*	*Y(8)*	*Y(8)*
Livestock farming & breeding	*Y*	*Y(6)*	*Y(7)*	*N*	*N*	*N*
Mining & fishing, resource production & extraction	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*
Recreational						
Outdoor sports arenas & spectator sports	*Y*	*Y(5)*	*Y(5)*	*N*	*N*	*N*
Outdoor music shells, amphitheaters	*Y*	*N*	*N*	*N*	*N*	*N*
Nature exhibits & zoos	*Y*	*Y*	*N*	*N*	*N*	*N*
Amusements, parks, resorts, & camps	*Y*	*Y*	*Y*	*N*	*N*	*N*
Golf courses, riding stables, & water recreation	*Y*	*Y*	*25*	*30*	*N*	*N*

Key:
Y (Yes) = Land use and related structures compatible without restrictions.
N (No) = Land use and related structures are not compatible and should be prohibited.
NLR = Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25 or 30 = Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structures.
Notes:
(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor NLR of at least 25 and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide an NLR of 20 dB; thus, the reduction requirements often are stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problems.
(2) Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
(3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
(4) Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal level is low.
(5) Land-use compatible, provided special sound reinforcement systems are installed.
(6) Residential buildings require an NLR of 25 dB.
(7) Residential buildings require an NLR of 30 dB.
(8) Residential buildings not permitted.

Source: FAA 1985 and USDOT 1984

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