Department of the Air Force

Integrated Natural Resources Management Plan

Scott_INRMP

Installation Supplement

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ABOUT THIS PLAN

This installation-specific Environmental Management Plan (EMP) is based on the United States Air Force's (USAF) standardized Integrated Natural Resources Management Plan (INRMP) template. This INRMP has been developed in cooperation with applicable stakeholders, which includes Sikes Act cooperating agencies and/or local equivalents, to document how natural resources will be managed. Where applicable, external resources, including Air Force Instructions (AFIs); Department of Defense Instructions (DoDIs); USAF Playbooks; federal, state, and local requirements; Biological Opinions; and permits are referenced.

Certain sections of this INRMP begin with standardized, USAF-wide "common text" language that address USAF and Department of Defense (DoD) policy and federal requirements. This common text language is restricted from editing to ensure that it remains standard throughout all plans. Immediately following the USAF-wide common text sections are installation sections. The installation sections contain installation-specific content to address local and/or installation-specific requirements. Installation sections are unrestricted and are maintained and updated by the approved plan owner.

NOTE: The terms "Natural Resources Manager," "NRM," and "NRM/POC" are used throughout this document to refer to the installation person responsible for the natural resources program, regardless of whether this person meets the qualifications within the definition of a natural resources management professional in DoDI 4715.03, Natural Resources Conservation Program.

DOCUMENT CONTROL

Standardized INRMP Template

In accordance with (IAW) the Air Force Civil Engineer Center (AFCEC) Environmental Directorate (CZ) Business Rule (BR) 08, *EMP Review, Update, and Maintenance*, the standard content in this INRMP template is reviewed periodically, updated as appropriate, and approved by the Natural Resources Subject Matter Expert (SME).

This version of the template is current as of 06/26/2020 and supersedes the 2018 version.

NOTE: Installations are not required to update their INRMPs every time this template is updated. When it is time for installations to update their INRMPs, they should adopt the most recent version of this template available in the Plan Tool.

Installation INRMP

Record of Review – The INRMP is updated no less than annually, or as changes to natural resource management and conservation practices occur, including those driven by changes in applicable regulations. IAW the Sikes Act and AFMAN 32-7003, *Environmental Conservation*, the INRMP is required to be reviewed for operation and effect no less than every five years. An INRMP is considered compliant with the Sikes Act if it has been approved in writing by the appropriate representative from each cooperating agency within the past five years. Approval of a new or revised INRMP is documented by signature on a signature page signed by the Installation Commander (or designee), and a designated representative of the United States Fish and Wildlife Service (USFWS), state fish and wildlife agency, and National Oceanic and Atmospheric Administration (NOAA) Fisheries when applicable (AFMAN 32-7003).

Annual reviews and updates are accomplished by the installation Natural Resources Manager (NRM), and/or a Section Natural Resources Media Manager. The installation shall establish and maintain regular communications with the appropriate federal and state agencies. At a minimum, the installation NRM (with assistance as appropriate from the Section Natural Resources Media Manager) conducts an annual review of the INRMP in coordination with internal stakeholders and local representatives of USFWS, state fish and wildlife agency, and NOAA Fisheries, where applicable, and accomplishes pertinent updates. Installations will document the findings of the annual review in an Annual INRMP Review Summary. By signing the Annual INRMP Review Summary, the collaborating agency representative asserts concurrence with the findings. Any agreed updates are then made to the document, at a minimum updating the work plans.

INRMP APPROVAL/SIGNATURE PAGES

Installation Supplement

Integrated Natural Resources Management Plan for Scott Air Force Base, Illinois

Signature Page

This Integrated Natural Resources Management Plan (INRMP) has been prepared in accordance with regulations, standards, and procedures of the Department of Defense and the U.S. Air Force in cooperation with the U.S. Fish and Wildlife Service and the Illinois Department of Natural Resources, Division of Wildlife. This Plan complies with the requirements of the Sikes Act, 16 USC 670 et seq, "Conservation Programs on Military Reservations." The signatures below indicate the mutual agreement of the parties concerning the conservation, protection, and management of the fish and wildlife resources presented in the Plan.

Michael J. Brunk Digitally signed by Michael J. Brunk Date: 2021.05.25 16:39:15 -05'00'

Authorized Representative,
Illinois Department of Natural Resources

25 May 2021
Date

KEVIN HAUPT Digitally signed by KEVIN HAUPT Date: 2021.05.20 15:30:34 -05'00'

Authorized Representative,
U.S. Fish and Wildlife Service

20 May 2021
Date

GLYNN.JASON.J.1187562607 Digitally signed by GLYNN.JASON.J.1187562607 Date: 2021.09.06 21:01:41 -05'00'

Designee for Installation Commander,
375 MSG/CC, Scott Air Force Base

6 September 2021
Date

[SIGNATURE]

This Integrated Natural Resources Management Plan (INRMP) is a guide for the natural resources management program at Scott Air Force Base (Scott AFB) during the five-year period from 2021 to 2026. The purpose of the INRMP is to provide a reference and planning document for managing natural resources at Scott AFB while maintaining mission readiness. This document represents a commitment by the United States Air Force to protect the integrity and value of natural resources. Management of natural resources at Scott AFB will result in no net loss of the military mission and operational capability.

The regulatory basis for natural resources management on Air Force land is the Sikes Act of 1960, which provides for cooperation by the U.S. Department of the Interior and the DoD with state agencies in planning, developing, and maintaining natural resources on military installations throughout the United States. The Air Force implements the Sikes Act through U.S. Department of Defense Instruction (DoDI) 4715.03, *Natural Resources Conservation Program*, Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*, and Air Force Manual (AFMAN) 32-7003, *Environmental Conservation*.

The Sikes Act requires military installations in the United States to prepare an INRMP that provides for the following management activities, to the extent that such activities are consistent with the use of the base for military preparedness:

- The conservation and rehabilitation of natural resources on military installations;
- The sustainable multipurpose use of the resources, to include hunting, fishing, trapping, and non-consumptive uses; and
- Public access to the installation, subject to safety requirements and military security.

Five natural resource management goals have been developed for the INRMP. These natural resource management goals reflect the vision of the future condition of Scott AFB's natural resources over the period of this plan. The goals were formulated from a comprehensive analysis of regulatory requirements, scientific evaluation of the current ecosystem conditions at the base, consideration of state, regional, and national conservation management strategies, and in consideration of the overall mission of Scott AFB. The INRMP is dynamic in that the goals and objectives defined for this 5-year plan are to be monitored on a continuous basis.

The INRMP goals for Scott AFB are:

Goal 1.*Maintain or restore upland native ecosystems present at Scott AFB where practical and consistent with the military mission.*

Goal 2.*Maximize structure, function, and native composition of wetland ecosystems where practical and consistent with the military mission.*

Goal 3.*Maintain and enhance quality habitat for the management of federal or state-listed species and other sensitive wildlife and plant species where practical and consistent with the military mission.*

Goal 4.*Increase awareness of base personnel and the general public about natural resources and their management at Scott AFB.*

Goal 5.*Remain in compliance with Federal, state, and local laws and regulations regarding natural resources.*

NEPA compliance for implementation of the INRMP is being conducted thorough the installation Development Environmental Assessment.

Sections 8 and 10 of the INRMP outline the objectives and projects that are planned to accomplish these goals during the next five years. Example projects include additional studies to determine the foraging habitat of the federally endangered Indiana Bat, projects to improve wildlife habitat and recreational opportunities with the Silver Creek Riparian Corridor, and projects to inform base personnel of natural resource related activities that are occurring on the installation. All projects were designed with the intent to protect the installation's natural resources while at the same time enabling the installation's overall mission.

1 OVERVIEW AND SCOPE

This INRMP was developed to provide for effective management and protection of natural resources. It summarizes the natural resources present on the installation and outlines strategies to adequately manage those resources. Natural resources are valuable assets of the USAF. They provide the natural infrastructure needed for testing weapons and technology, as well as for training military personnel for deployment. Sound management of natural resources increases the effectiveness of USAF adaptability in all environments. The USAF has stewardship responsibility for the physical lands on which installations are located to ensure all natural resources are properly conserved, protected, and used in sustainable ways. The primary objective of the USAF natural resources program is to sustain, restore, and modernize natural infrastructure to ensure operational capability and no net loss in the capability of USAF lands to support the military mission of the installation. The plan outlines and assigns responsibilities for the management of natural resources, discusses related concerns, and provides program management elements that will help to maintain or improve the natural resources within the context of the installation's mission. The INRMP is intended for use by all installation personnel. The Sikes Act is the legal driver for the INRMP.

1.1 Purpose and Scope

Installation Supplement

Recognizing its role as natural resource stewards, the DoD directs each military installation to develop and implement an INRMP to provide for the conservation and rehabilitation of natural resources. The purpose of the INRMP is to provide a reference and planning document for managing natural resources on military installations while maintaining mission readiness. The INRMP also assists in coordinating natural resources management with other components of the Scott Air Force Base (AFB) Installation Development Plan (IDP) (Appendix G). The INRMP is a long-term (5-year) plan. This document represents a review and update of the 2015 INRMP. Over the long-term, implementation of this INRMP and future INRMPs will help guide Scott AFB in maintaining and improving the sustainability and biological diversity of the ecosystems present at the base while supporting military readiness.

This document serves as the INRMP for Scott AFB and is intended to function as a "road map" for natural resources management at the base and relevant Georgraphically Separate Units (GSUs). Natural resources managed include forests, wetlands, water bodies, and wildlife. The INRMP establishes the framework for the implementation of a natural resources management program, provides guidance on regulatory compliance, and is an integral part of the overall land management at Scott AFB.

The INRMP also provides a centralized source of information on the status of natural resources programs and serves as a source in preparing environmental assessments or environmental impact statements for future installation actions. In addition, the INRMP identifies and prioritizes long-term budget requirements for natural resources management.

The INRMP is dynamic in that the goals and objectives defined for this 5-year plan are to be monitored on a continuous basis. The management strategies will be updated whenever there are changes in the mission requirements, adverse effects observed in the management of the natural resources, changes warranted from implementing an adaptive management process, or changes in applicable regulations governing natural resources. Development of long-term goals and objectives for natural resources management includes specific project descriptions and necessary appropriations. These have been prioritized in consideration of potential funding level changes. Resources required to implement this plan will be included in the Future Year Defense Program (FYDP).

1.2 Management Philosophy

Installation Supplement

The INRMP describes how natural resources will be managed on Air Force installations by setting long-term goals for attaining a desired land condition based on a management philosophy. The ecosystem management principles and guidelines in DoDI 4715.03, *Natural Resources Conservation Program*, and AFMAN 32-7003, *Environmental Consevation,* were used to develop a natural resources management philosophy for Scott AFB. The management philosophy is "Ensure that military lands support present and future readiness while preserving, improving, and enhancing ecosystem integrity."

At Scott AFB, military readiness equates to providing priority airlift, aeromedical evacuation, combat support, and medical expertise while ensuring an outstanding quality of life for military personnel and the base community. As described in the Scott AFB IDP (Scott AFB 2021), projects for the installation's future include facility development, transportation improvements, and airfield and utility infrastructure enhancements. These projects ensure that the installation can sustain its current and future national security operations and its mission-readiness status. As a general practice in managing future installation projects, Scott AFB seeks to avoid, where possible, disturbance activities in floodplains; wetlands; areas where sensitive species nest, roost, or raise young; and areas designated as culturally sensitive.

The INRMP utilizes an ecosystem management approach to support the natural resources management philosophy. Ecosystem management focuses on evaluating natural resources at a community or ecosystem level rather than at a single species level. Using an ecosystem management approach maintains or improves the quality, integrity, and connectivity of the ecosystem; therefore, individual species should prosper. Consideration is also given to individual rare species because these species contribute to ecosystem health and to biodiversity, and, in many instances, are provided legal protection. A key element of ecosystem management is monitoring to determine the progress being made toward the goals and objectives in this INRMP. As described by Gibb (2005), the process of conducting monitoring and linking that monitoring to management is adaptive management.

Consistent with DoDI 4715.03, Scott AFB has incorporated biodiversity-related concepts into five natural resource management goals for the INRMP. These natural resource management goals reflect the vision of the future condition of Scott AFB's natural resources over the five-year period of this plan. The goals described in this section were formulated from a comprehensive analysis of regulatory requirements, scientific evaluation of the current ecosystem conditions at the base, consideration of state, regional, and national conservation management strategies, and in consideration of the overall mission of Scott AFB.

The INRMP goals for Scott AFB are:

Goal 1.*Maintain or restore upland native ecosystems present at Scott AFB where practical and consistent with the military mission.*

Goal 2.*Maximize structure, function, and native composition of wetland ecosystems where practical and consistent with the military mission.*

Goal 3.*Maintain and enhance quality habitat for the management of federal and state-listed species and other sensitive wildlife and plant species where practical and consistent with the military mission.*

Goal 4.*Increase awareness of base personnel, and the general public about natural resources and their management at Scott AFB.*

Goal 5.*Remain in compliance with Federal, state, and local laws and regulations regarding natural resources.*

1.3 Authority
Installation Supplement

The regulatory basis for natural resources management on Air Force land is the Sikes Act of 1960, which provides for cooperation by the U.S. Department of the Interior and the DoD with state agencies in planning, developing, and maintaining natural resources on military installations throughout the United States. The Air Force implements the Sikes Act through DoDI 4715.03, AFPD 32-70, and AFMAN 32-7003.

DoDI 4715.03 provides policies for general conservation management at military installations, including requirements for management of natural resources. This DoDI states that:

> *All DoD conservation programs shall work to guarantee continued access to our land, air, and water resources for realistic military training and testing while ensuring that the natural and cultural resources entrusted to DoD care are sustained in a healthy condition for scientific research, education, and other compatible uses by future generations.*

DoDI 4715.03 states that installations shall:

- Plan, program, and budget to achieve, monitor, and maintain compliance with all applicable federal and state natural resource regulations;
- Inventory and manage biologically or geographically significant or sensitive natural resources (e.g., wetlands, forests, floodplains) or species (e.g., threatened or endangered species, migratory birds) to protect these resources;

- Use scientifically sound conservation procedures and techniques and an ecosystem approach on land use practices and decisions;
- Evaluate DoD land for its suitability for commercial forestry and agricultural outlease purposes;
- Remove or control exotic species, and, to the extent practical, use native regional plants for landscaping and other beneficial techniques;
- Make natural resources available to the public for educational or recreational use when such access is compatible with military mission activities, ecosystem sustainability, and with other considerations such as security, safety, and fiscal soundness;
- Engage in public awareness and outreach programs to educate the public regarding the resources on military lands and regarding efforts to conserve those resources; and
- Use appropriate partnerships and volunteers to enhance conservation programs when practicable.

The Air Force implements DoDI 4715.03 through AFPD 32-70 and AFMAN 32-7003. AFPD 32-70 states:

> *The Air Force will conserve natural and cultural resources through effective environmental planning. The environmental consequences of proposed actions and reasonable alternatives will be integrated into all levels of decision making. The environmental resources under Air Force stewardship will be protected and managed in the public interest. Environmental opportunities and constraints will be the foundation of comprehensive plans for installation development.*

AFMAN 32-7003 implements DoDI 4715.03 and AFPD 32-70. This instruction provides a framework for documenting and maintaining Air Force natural resources management programs in accordance with applicable federal, state, and local laws and regulations. In accordance with AFMAN 32-7003, military installations in the United States must prepare and implement an INRMP, which is the principal tool in describing how installations will support the military's mission while managing and conserving natural resources. According to AFMAN 32-7003, the INRMP shall be prepared in cooperation with the U.S. Fish and Wildlife Service (USFWS) and the state wildlife agency [Illinois Department of Natural Resources (IDNR)].

1.4 Integration with Other Plans

Installation Supplement

The goals and objectives presented in the INRMP are supported by various plans and documents (Table 1-1) that provide data on the existing conditions of natural resources at Scott AFB and recommendations for ecosystem management. These natural resource plans include information on fish and wildlife, wetlands, endangered species, floodplains, the urban forest, the natural forest, pest management, lands and grounds, and invasive species. Links to these supporting plans are contained in the Appendix section.

The Community Planner and the NRM consult on planning projects in conjunction with the Installation Development Plan (IDP) to determine what potential effect, if any, on natural resources and the natural environment is likely. If a potential adverse effect is identified, practical alternatives are explored to ensure no or minimal net loss of natural resources while still accomplishing the mission.

The INRMP relates to the Bird/Wildlife Aircraft Strike Hazard (BASH) Plan in a number of ways. Support includes conducting periodic airfield inspections to detect possible bird and wildlife attractants, developing procedures for removal and control of bird and wildlife attractants, conducting bird and wildlife surveys and making population control recommendations, requesting corrections to environmental conditions that increase BASH potential, modifying airfield habitat consistent with runway lateral and approach zone management criteria, and obtaining appropriate depredation and take permits as needed. The BASH Plan outlines duties and responsibilities of the BASH managers and other agencies in support of the INRMP as it pertains to BASH issues and management. The NRM is a member of the Bird Hazard Working Group (BHWG) which meets regularly and reviews the BASH Plan as required.

The INRMP also supports the Air Installation Compatible Use Zone (AICUZ) Program, which promotes compatible land development in areas subject to overhead noise and accident potential due to aircraft overflight operations. Clear Zones at the end of the runways prohibit development other than for equipment necessary for aircraft operations, so these areas are composed of mostly open grassland area. Uses that would attract waterfowl and other birds and growth of vegetation that would attract mammals or insects are not allowed. These principles are addressed during BHWG meetings.

The Integrated Pest Management Plan (IPMP) supports the INRMP through the control of four categories of pests: household and nuisance pests; small mammals and birds; miscellaneous pests; and, vegetation management. The IPMP and the Pest Management staff play a key role in controlling populations of wildlife critical to a successful BASH program. The IPMP supports various INRMP goals and the Pest Management staff and the NRM consult as-needed on aspects of both plans. The NRM reviews and provides input on the IPMP annually or on an as-needed basis.

INRMP supporting plans and reports are linked to in Appendix G.

Table 1-1

Natural Resource Component Plans and Other Supporting Documents

Bird/Wildlife Aircraft Strike Hazard Plan
Golf Environmental Management (GEM) Plan
Integrated Cultural Resources Management Plan (ICRMP)
Integrated Pest Management Plan (IPMP)
Indiana Bat Management Plan
Fish and Wildlife Component Plan
Wetlands Delineation Report
Endangered Species Management Plan (ESMP)
Urban Forest Management Plan
Invasive Species Management Plan
Wetlands Delineation Report
Natural Forest Inventory Report
Floodplain Analysis Report
Wildlife Hazard Assessment
Integrated Contingency Plan (ICP)
Hazardous Waste Management Plan
Installation Development Plan (IDP)
Storm Water Pollution Prevention Plan (SWPPP)

2 INSTALLATION PROFILE

Installation Supplement

Table 2-1

Installation Profile

Office of Primary Responsibility (OPR)	The 375th Air Mobility Wing (375 AMW) has overall responsibility for implementing the natural resources management program and is the lead organization for monitoring compliance with applicable federal, state, and local regulations.
Natural Resources Manager/Point of Contact (POC)	Name: Mr. Keith Brumley Phone: 618-256-2167 Email: keith.brumley@us.af.mil
State and/or local regulatory POCs (Include agency name for Sikes Act cooperating agencies)	U.S. Fish & Wildlife Service Carterville Fish & Wildlife Conservation Office Carterville, IL Illinois Department of Natural Resources Sparta, IL
Total acreage managed by installation	3,638
Total acreage of wetlands	378
Total acreage of forested land	52
Does installation have any Biological Opinions? (If yes, list title and date, and identify where they are maintained)	No
Natural Resources Program Applicability (Place an X in the brackets "[X]" next to each program that must be implemented at the installation. Document applicability and current management practices in Section 7.0)	[x] Fish and Wildlife Management [x] Outdoor Recreation and Access to Natural Resources [x] Conservation Law Enforcement [x] Management of Threatened, Endangered, and Host Nation-Protected Species [x] Water Resource Protection [x] Wetland Protection [x] Grounds Maintenance [x] Forest Management [ ] Wildland Fire Management [ ] Agricultural Outleasing [x] Integrated Pest Management Program [x] Bird/Wildlife Aircraft Strike Hazard (BASH) [ ] Coastal Zone and Marine Resources Management [x] Cultural Resources Protection [x] Public Outreach [x] Geographic Information Systems (GIS)

2.1 Installation Overview

2.1.1 Location and Area

Installation Supplement

Scott AFB proper encompasses 3,638 acres in St. Clair County, Illinois. Air Mobility Drive/State Route (SR) 158 and SR 161 serve as the primary access roads to the base (Figure 2-1, Regional Map of Scott Air Force Base). The majority of the land (2,898 acres) is used as an active Air Force installation; an additional 740 acres outside of the boundary of the installation are held in easement (Figure 2-2, General Layout of Scott Air Force Base). Individuals from Active Duty, National Guard, and Reserve forces for the Air Force, Army, Navy, Marines, and Coast Guard all work at Scott AFB. Scott AFB serves over 45,000 people, including a work force of more than 13,000 personnel (Active Duty, civilians, Air National Guard and Reserves), family members, and a number of military retirees and their families. There are also a number of GSUs located both near the main installation and in Missouri. Table 2-3 lists these GSUs along with basic information on their status, and Figure 2-3, Locations of Scott GSUs, shows the locations of owned properties relative to Scott AFB. Several are either very small or entirely developed and thus do not contain habitat that is suitable for conserving and managing wildlife. These GSUs qualify as Category II and will not be discussed further within this INRMP. This INRMP applies to all Scott AFB real property (except installations closed through Base Realignment and Closure for which portion are still on the Scott AFB real property records as the host installation for HQ AMC) that are not addressed in a separate document or that qualify as Category II.

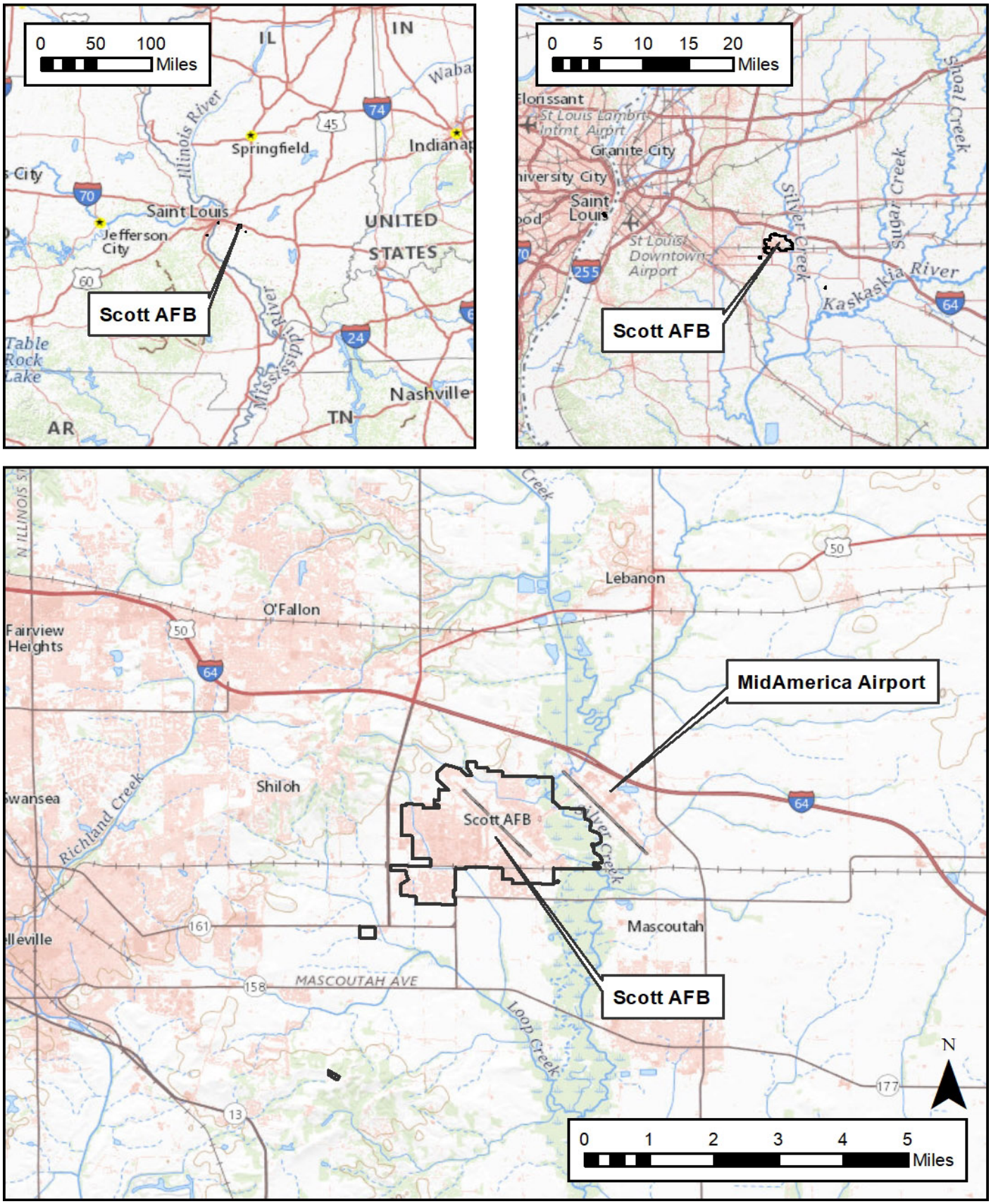

Figure 2-1. Regional Map of Scott Air Force Base

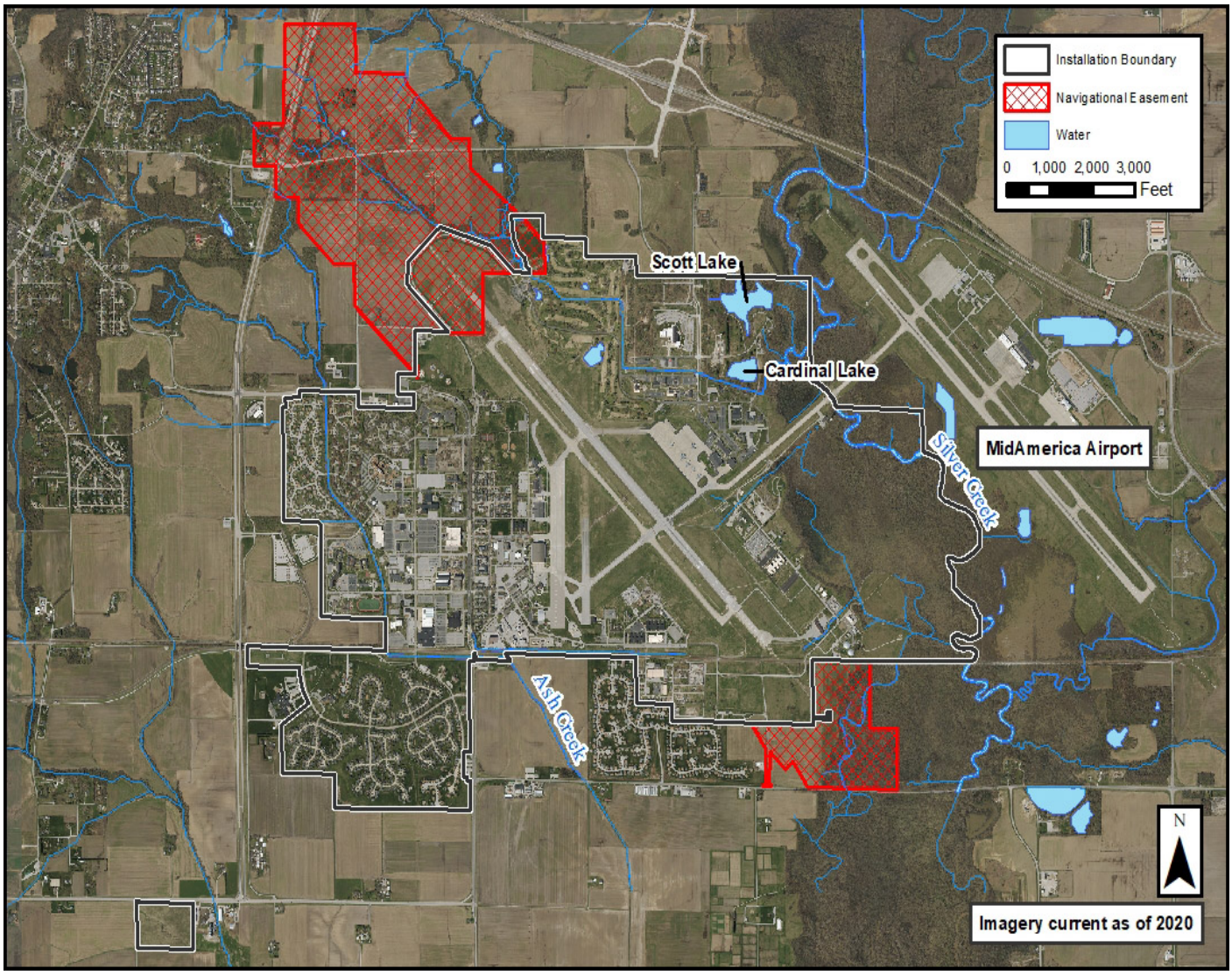

Figure 2-2. General Layout of Scott Air Force Base

The Scott AFB land has been divided into geographic areas to assist in both the collection and analysis of data and the presentation of various plans. Major geographical areas of the base are shown on Figure 2-3, Geographic Area and Surface Water Features of Scott AFB, and include the Administration Area; the Community and Housing Area; the Historic District and Civil Engineering Area; the Flightline Support Area; the Guard, Reserve, and Cardinal Creek Area; and the Warehouse and Storage Area (Scott AFB 2005c).

In accordance with AFMAN 32-7003, grounds maintenance land-use categories are used to indicate scope and intensity of land management. These land-use categories are also used to identify and discuss management plans for natural resources at Scott AFB. The land-use categories include improved, semi-improved, and unimproved grounds. Figure 2-5, Ground Maintenance Designations at Scott AFB, shows the identification of these land use areas, and a summary of acreage in each land-use category is provided in Table 2-2.

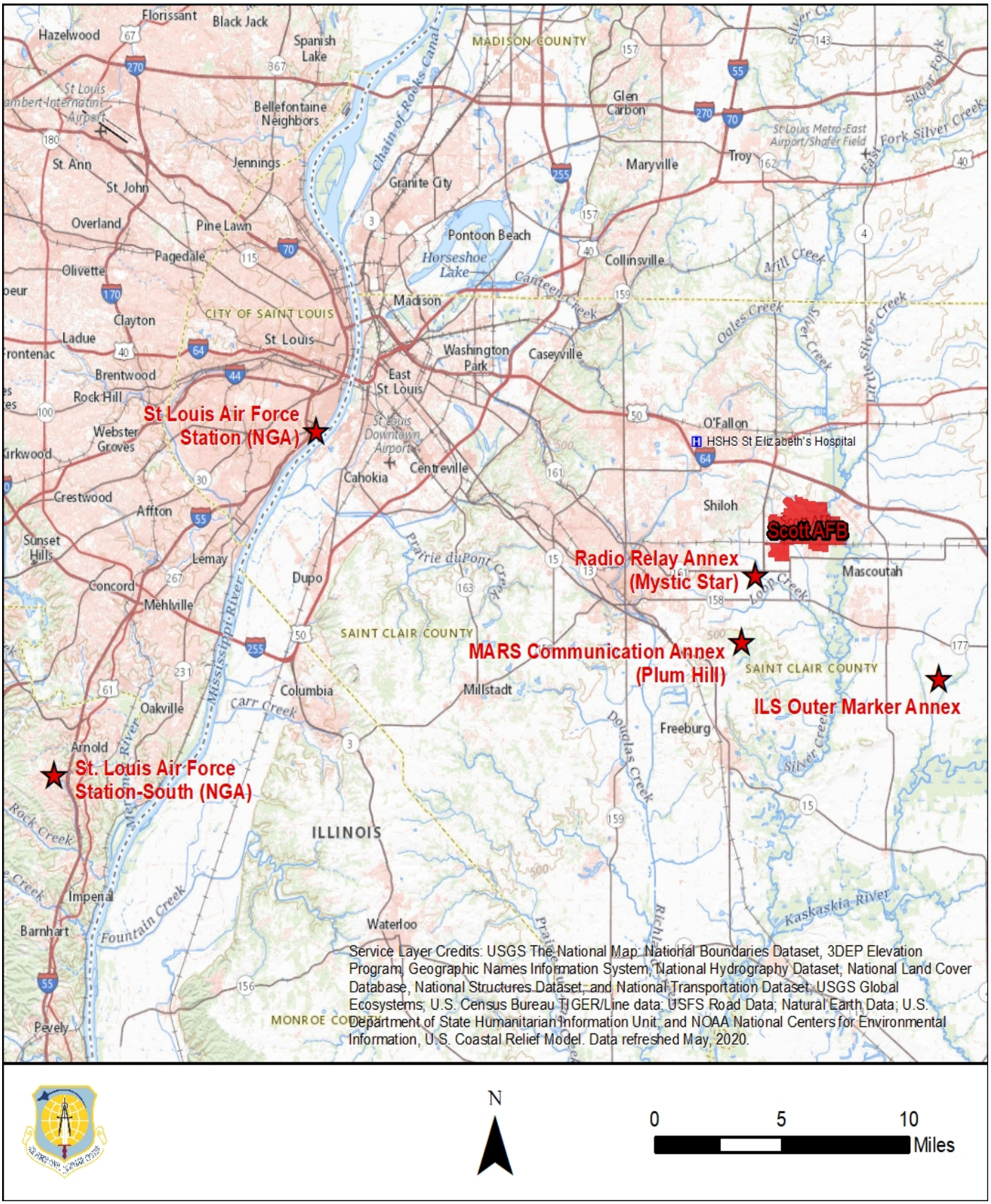

Figure 2-3. Locations of Scott GSUs

Table 2-2

Land Classes and Acreage

Class	Acres
Improved Lands	
Mowed and maintained as lawn including housing areas, athletic fields, and the golf course. Land under facilities (including airfield pavements)	635 967
Semi-improved Lands	
Periodically mowed areas such as areas adjacent to runways, taxiways, and aprons; runway clear zones; rifle ranges; picnic areas; antenna facilities; and golf course roughs.	768
Unimproved Lands	
No maintenance areas such as bottomland forests and vegetation on landfill caps	528
Easement	740
Installation Total	3,638

The development of the base since 1917 has converted much of the agricultural land to improved land areas. Improved grounds include approximately 1,602 acres of land occupied by buildings and other permanent structures, including the administrative and support facilities, the airfield and hangars, community housing, the athletic fields and golf course, as well as lawns and landscape plantings in these areas. INRMP activities in improved areas include urban forest management, grounds maintenance, and pest management.

Semi-improved grounds are areas where periodic maintenance is performed primarily for operational reasons, such as erosion and dust control, bird control, and visual clear zones. This land use classification includes areas adjacent to runways, taxiways, and aprons; runway clear zones; lateral safety zones; picnic areas; and antenna facilities. These areas total approximately 768 acres. INRMP activities in semi-improved areas include water resource management, grounds maintenance, and BASH management.

Unimproved grounds include forest lands, lakes, ponds, and wetlands, and any areas where natural vegetation is allowed to grow unimpeded by maintenance activities. This includes the wooded wetlands and bottomland forests of Silver Creek, and the Cardinal Creek Area (Figure 2-5). Approximately 528 acres are unimproved grounds. Natural resources that are managed under the INRMP are primarily associated with unimproved grounds at Scott AFB. The management programs include fish and wildlife management, management of the endangered Indiana Bat, water resource management, wetland protection, and forest management.

The remaining acreage (740 acres) is held in a navigational easement, which limits certain types of development. This land is owned by St. Clair County, and the land use is generally agricultural. Because the land is not owned by the Air Force, no INRMP management is conducted in these areas.

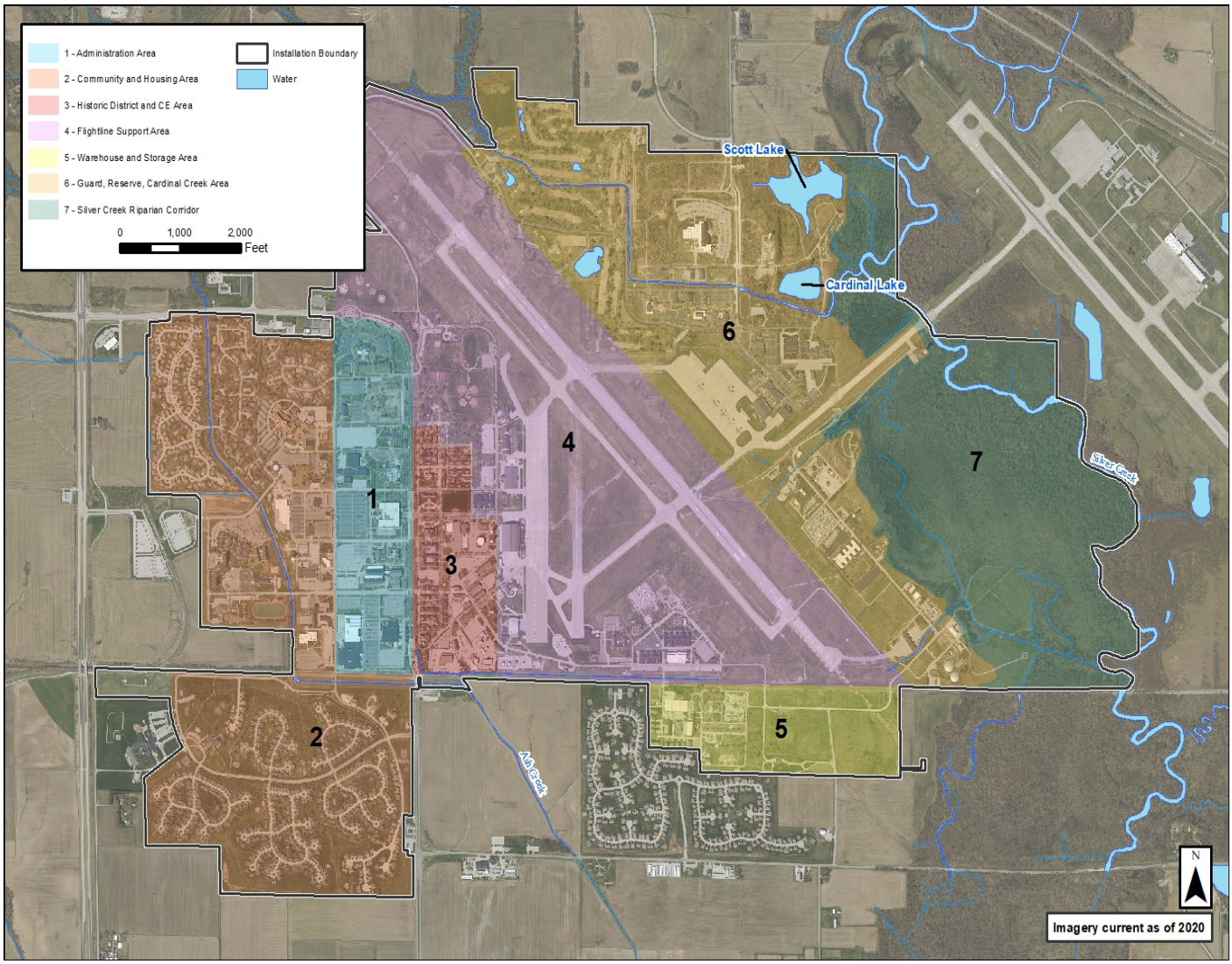

Figure 2-4. Geographic Area and Surface Water Features of Scott AFB

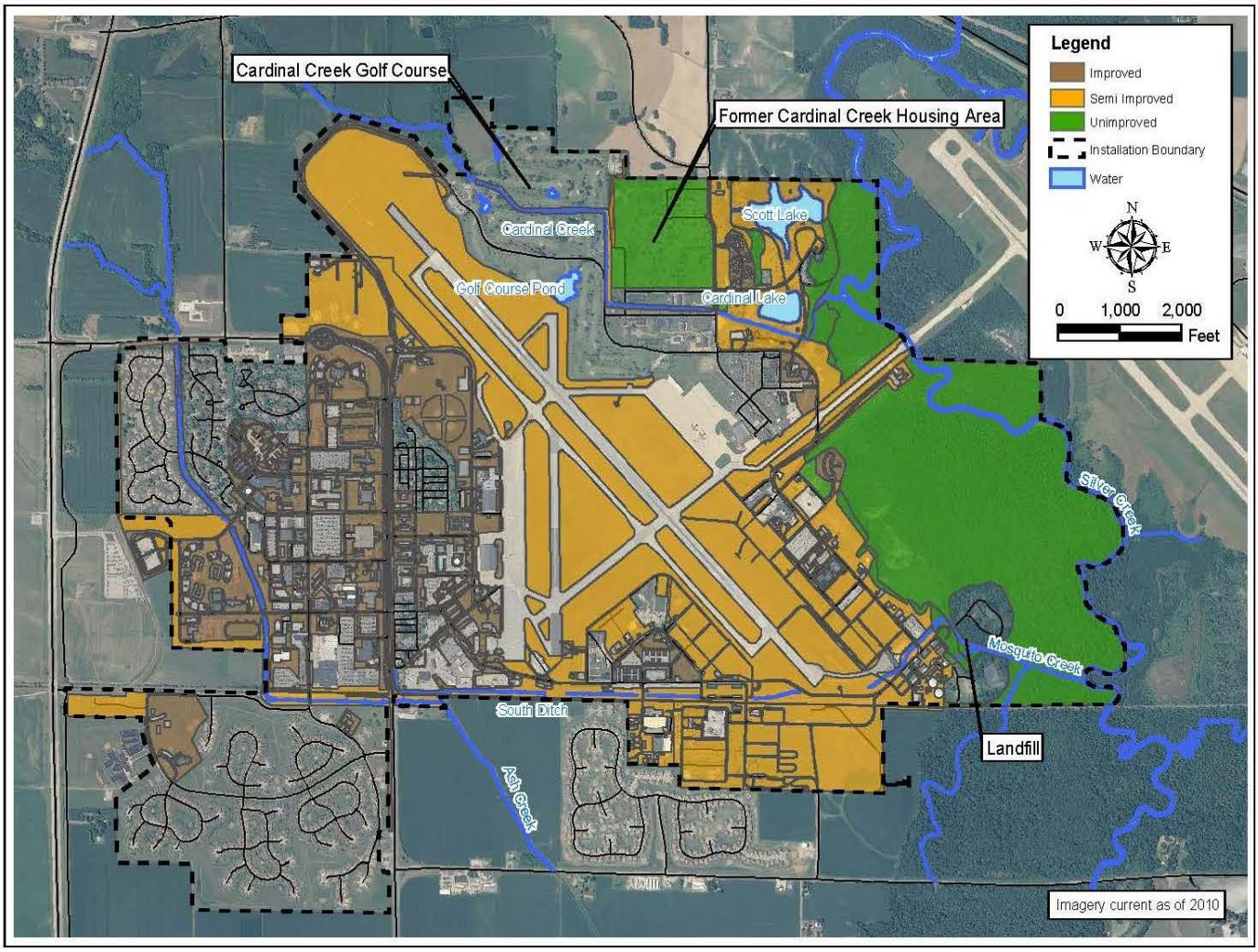

Figure 2-5. Ground Maintenance Designations at Scott AFB

Table 2-3

Installation/GSU Location and Area Descriptions

Installation/ Geographically Separated Unit (GSU)	Main Use/Mission	Acreage	Addressed in INRMP?	Describe Natural Resource Implications
St. Louis Air Force Station	National Geospatial-Intelligence Agency	25	N	Insignificant resources, fully developed – Cat II
Scott MARS Communication Annex (Plum Hill)	None currently; abandoned bldg. in open grassy area	6.3	Y	None
St. Elizabeth's Hospital OB/GYN Clinic	Administrative, leased		N	Insignificant resources, fully developed – Cat II

St. Louis AFS Annex South	NGA-South; partially developed with grassy area and small pond (<1 ac)	34.4	N	Insignificant resources - Cat II Managed by NGA
Scott ILS Outer Marker Annex	Airfield approach lighting	0.87	N	Insignificant resources
Scott Radio Relay Annex (Mystic Star)	Open field (being excessed), env cleanup issues	29.82	Y	None

2.1.2 Installation History

Installation Supplement

Initially constructed in 1917 on 624 acres in rural St. Clair County, Scott AFB is one of the oldest continuous service Air Force installations. The field was named Scott Field after Corporal Frank S. Scott, who, on 28 September 1912, became the first enlisted person killed in an aviation crash. Scott Field was established as an Army Aviation station with the primary mission of training pilots and ground crews. Following World War I, the War Department purchased Scott Field and in 1921 established Scott Field as a "lighter than air" (LTA) station for airships and balloons. In 1937, LTA operations ended when a change in Air Corps policy required the replacement of airships and balloons by airplanes. During World War II, the primary mission was the training of radio operator-mechanics. In 1948, Military Air Transport Service (MATS) was given responsibility for airlifting all military and other authorized government medical patients. That same year, Scott Field was redesignated as Scott AFB and a year later HQ Air Training Command (ATC) relocated to Scott AFB. The 40-year era as a major training base ended in 1957 when Scott AFB was transferred from ATC into the HQ MATS jurisdiction. As the host unit at Scott AFB, the 1405th Aeromedical Transport Wing (1405 ATW) was tasked with patient airlift in the United States. In 1966, the 1405 ATW was deactivated and the 375th Aeromedical Airlift Wing absorbed its mission and resources. Reorganization changed the 375th from the Aeromedical Airlift Wing to the Military Airlift Wing, and then to the 375th Airlift Wing (375 AW). The 375 AW had three primary missions; support aeromedical evacuation within the United States, provide operational support airlift for government officials; and offer direct security for our community and nation. In 2009, the 375 AW was redesignated as the 375 AMW.

2.1.3 Military Missions

Installation Supplement

Today, Scott AFB sustains three major HQ Commands; Air Mobility Command (AMC), United States Transportation Command (USTRANSCOM), and Surface Deployment Distribution Command (SDDC). Created in June 1992, AMC absorbed former components of the Strategic Air Command and the Military Airlift Command. AMC supports airlift, aerial refueling, and aeromedical evacuation for the U.S. Armed Forces. USTRANSCOM provides capability for the world-wide movement of troops, equipment, and supplies using airlift, sealift, and overland-lift. SDDC provides expeditionary and sustained end-to-end deployment and distribution to meet the nation's objectives. As shown in Table 2-4, other tenants on the installation include the 18th Air Force, Air Force Global Logistics Support Center, Air Force Network Integration Center, and Defense Information System Agency. The host wing for Scott AFB is the 375 AMW. The 375 AMW supports domestic aeromedical evacuations and is also host to more than 30 tenant units, including the 932nd Airlift Wing (an Air Force Reserves unit) and the 126th Air Refueling Wing (an Air National Guard unit).

Table 2-4

Listing of Major Tenants and Natural Resources Responsibility

Tenant Organization	Organization with Natural Resources Responsibility
Air Mobility Command	375 AMW
United States Transportation Command	375 AMW
Surface Deployment Distribution Command	375 AMW

18th Air Force	375 AMW
635th Supply Chain Operations Wing	375 AMW
Headquarters Cyberspace Capabilites Center	375 AMW
Defense Information System Agency	375 AMW

2.1.4 Natural Resources Needed to Support the Military Mission
Installation Supplement

The natural landscapes present at Scott AFB provide aesthetic enjoyment and recreational opportunities for military personnel. Proactive management of endangered species and wetlands within the natural areas of the base ensure regulatory compliance so negative mission impacts do not occur. Except for areas impacted by flooding, current natural resources available at Scott AFB are sufficient to continue to provide mission support.

2.1.5 Surrounding Communities
Installation Supplement

Land use surrounding Scott AFB is primarily agriculture with several small and large communities (Figure 2-2). Land that is adjacent to the base is used for agricultural crops, with the exception of the eastern border. MidAmerica Airport is located east of the base and includes a 10,000-foot runway and a 7,000-foot taxiway that connects Scott AFB to MidAmerica and is jointly utilized for military and commercial flights. An air traffic control tower staffed by Air Force personnel is located between the two runways. The area immediately north of the base is owned by St. Clair County and serves as a buffer for MidAmerica Airport. In order to prevent encroachment and land-use conflicts with the airport, development within this area is not permitted (Scott AFB 2011a). St. Clair County's Future Land Use Plan has designated the area surrounding the base, encompassed by I-64, Air Mobility Drive, Illinois Route 161, and Illinois Route 4, as the Scott-Joint Use Area. Land uses in this area, outside of the airport and military-owned lands, are compatible with military and civilian airfield operations (Scott AFB 2011a).

Several small and large communities are located in St. Clair County near Scott AFB. The community of Mascoutah is located southeast of the base; to the west are Belleville and Shiloh, to the northwest is O'Fallon, and to the northeast is the community of Lebanon (Figure 2-1). Mascoutah, southeast of Scott AFB, has a population of 7,483 residents and is home to MidAmerica Airport. Residential development south of the base has occurred on the northern edge of Mascoutah, toward MidAmerica Airport, and near Illinois Routes 4 and 161 (Scott AFB 2011a).

The community of Shiloh is located west of the base, and, of all the municipalities located in and around the study area, Shiloh has experienced the greatest percentage increase in population (2000 to 2010). The population during that 10-year period increased from 7,643 to 12,651 persons (U.S. Census Bureau, 2011). Residential development is occurring near the base, including the Shiloh Road corridor south of I-64 between O'Fallon and Belleville, the area near Air Mobility Drive directly adjacent to Scott AFB's western boundary, and the area north of the base along U.S. 50 (Figure 2-1). One of the reasons for its tremendous growth may be due to the fact that Shiloh is ideally situated to accommodate residents who commute to St. Louis, given its proximity to I-64. Shiloh is also situated in proximity to Scott AFB and may provide housing to support staff that work at the base.

Lebanon is a quiet residential community of approximately 4,418 residents and is located seven miles (11 km) northeast of Scott AFB. Lebanon is home to many military and civilian personnel who work at the base.

Belleville, located about four miles (6 km) from Scott AFB, is the largest local community near the base, with approximately 44,748 residents. O'Fallon lies northwest of Scott AFB and is one of the fastest growing communities in southwestern Illinois. The 2010 Census population of O'Fallon was 28,281 (U.S. Census Bureau 2011).

Regional Land Use

Scott AFB is located approximately 20 miles (32 km) east of the City of St. Louis. St. Clair County is adjacent to but separated from the City of St. Louis by the Mississippi River. The City of St. Louis is the largest metropolitan area in the region. St. Clair County forms part of the semi-rural, sparsely populated eastern portion of the Greater St. Louis Metropolitan Area. The Greater St. Louis Metropolitan Area was the 18th largest Metropolitan Statistical Area in the United States as of the 1 July 2009 U.S. Census estimate, with approximately 2,828,990 people (U.S. Census Bureau 2009a).

St. Clair County occupies 674 square miles [1,746 square kilometers (km^2)], of which 664-square miles (1,719 km^2) is land and 10-square miles (26 km^2) is water. The incorporated communities within the county account for roughly 25 percent of the county's land area. The other 75 percent remains unincorporated. Countywide, nearly 70 percent of all land remains in agricultural production; 12 percent is in residential use; approximately four percent is in commercial/industrial; four percent is in government land; and four percent is in parks and open space. The remaining six percent of land is designated to other categories such as transportation and rights-of-way (St. Clair County 2008).

Historical records show that the population for St. Clair County has been relatively steady since the 1980 Census. The U.S. Census indicated a county population of 256,082 in 2000. St. Clair County had a 2009 population estimate of 261,268 with annual average growth of less than one percent (U.S. Census Bureau 2009b). Long-range county and regional level population projections are a modest 8.1 percent from 2000 to 2025 (St. Clair County 2008).

From 2005 to 2010, the leading industries in St. Clair County were educational and health services (22 percent); trade, transportation, and utilities (22 percent); and manufacturing (11 percent) (St. Louis RCGA 2010). Some of the largest employment and education centers in the southwestern portion of Illinois are located in St. Clair County, including Scott AFB (14,150 employees), Memorial Hospital in Belleville (2,400 employees), and St. Elizabeth's Hospital in Belleville (1,660 employees) (St. Louis RCGA 2010). Southwestern Illinois College, located in Belleville, is the sixth-largest community college in the state of Illinois, with three campuses and 26 off-campus sites. It employs 1,475 people and provides educational opportunities for more than 25,000 students each year (St. Louis RCGA 2010).

2.1.6 Local and Regional Natural Areas

Installation Supplement

The natural areas of St. Clair County are characterized by the broad American Bottom floodplain of the Mississippi River on the west, upland areas to the north, and expansive agricultural fields to the south and east. The landscape is marked with several large creeks and their associated watersheds, including Silver, Richland, and Prairie du Pont, as well as the sinkhole plain in southwestern St. Clair County and remnant coal strip mines to the south (St. Clair County 2008).

Local Natural Areas

As part of the U.S. Army Corps of Engineers (USACE) Section 404 permit for the construction of the MidAmerica St. Louis Airport, St. Clair County agreed to mitigate wetland impacts through the restoration and creation of wetland areas. These areas are located east of Scott AFB, adjacent to Silver Creek, and consist primarily of former wetlands that had been converted to agricultural use. In total, approximately 330 acres of airport property have been designated as wetland mitigation areas. These areas are protected by a permanent conservation easement and cannot be disturbed or used for future development (Ricondo & Associates, Inc. 2007).

Silver Creek Preserve is located approximately five miles (8 km) southeast of Scott AFB and is a 500-acre preserve owned by St. Clair County (Figure 2-6, Regional Natural Areas). The site is located at the southern edge of publically owned lands that include Scott AFB, St. Clair County property utilized by Scott AFB for navigational easements, and other county-owned property. The site contains reconstructed wetlands, large tree plantings, a small prairie, and is a good representation of mature bottomland forest. A one-mile (1.6-km) paved loop trail provides site access (Kaskaskia Valley Audubon Society 2008).

Regional Natural Areas

Parks and open space comprise nearly 16,000 acres of St. Clair County and include such areas as Cahokia Mounds State Historic Site, Frank Holten State Park, Kaskaskia State Fish and Wildlife Area (SFWA), Stemler Cave Woods Nature Preserve, county and municipal parks, and golf courses (Figure 2-6). Several state-recognized natural areas and nature preserves (Stemler Cave Woods and Julius J. Knobeloch Woods), and federal, state, and local public preserves and open spaces are located within the County.

The Julius J. Knobeloch Woods Nature Preserve is a 35-acre site owned by the IDNR and is located approximately nine miles (14 km) to the south of Scott AFB (Figure 2-6). Knobeloch Woods contains dry-mesic upland and wet floodplain forest communities and is dominated by white oak (*Quercus alba*) and hickory (*Carya* spp.). The floodplain forest lies in the floodplain of a tributary to Hazel Creek. The location of this preserve provides educational opportunities to the community (IDNR 2010).

The Cahokia Mounds State Historic Site is a 2,200-acre tract, located approximately 14 miles (23 km) to the northwest of Scott AFB, near Collinsville, Illinois (Figure 2-6). The United Nations Educational, Scientific, and Cultural Organization (UNESCO), designated Cahokia Mounds a World Heritage Site for its importance to our understanding of the prehistory of North America. Cahokia Mounds has also been recognized as a U.S. National Historic Landmark. Cahokia Mounds is managed by the Illinois Historic Preservation Agency as a State Historic Site.

The Stemler Cave Woods Nature Preserve is a 120-acre preserve owned by the IDNR and is located approximately 25 miles (40 km) to the southwest of Scott AFB near Columbia, Illinois (Figure 2-6). This preserve is an old growth forest remnant that is located on a sinkhole plain near the entrance.

The two main waterways in St. Clair County are the Mississippi River and the Kaskaskia River (Figure 2-6). The Mississippi River extends for 11.25 miles (18.1 km) along the County's western boundary, which separates Illinois from Missouri. The Kaskaskia River extends approximately 26.7 miles (42.9 km) through the southeast part of the County. The upper portion of the river is characteristically meandering with a well-vegetated floodplain, while the lower portion is a channelized, commercially-navigable waterway (IDNR 2001). One of the smaller waterways that impacts St. Clair County is Silver Creek. Silver Creek extends for 31 miles (50 km) through the eastern portion of the county, through mostly agricultural areas, and forms the eastern boundary of Scott AFB. A large portion of the County's wetlands, floodplains, and vegetated areas are located adjacent to Silver Creek. Silver Creek converges with the Kaskaskia River south of the base near New Athens, Illinois.

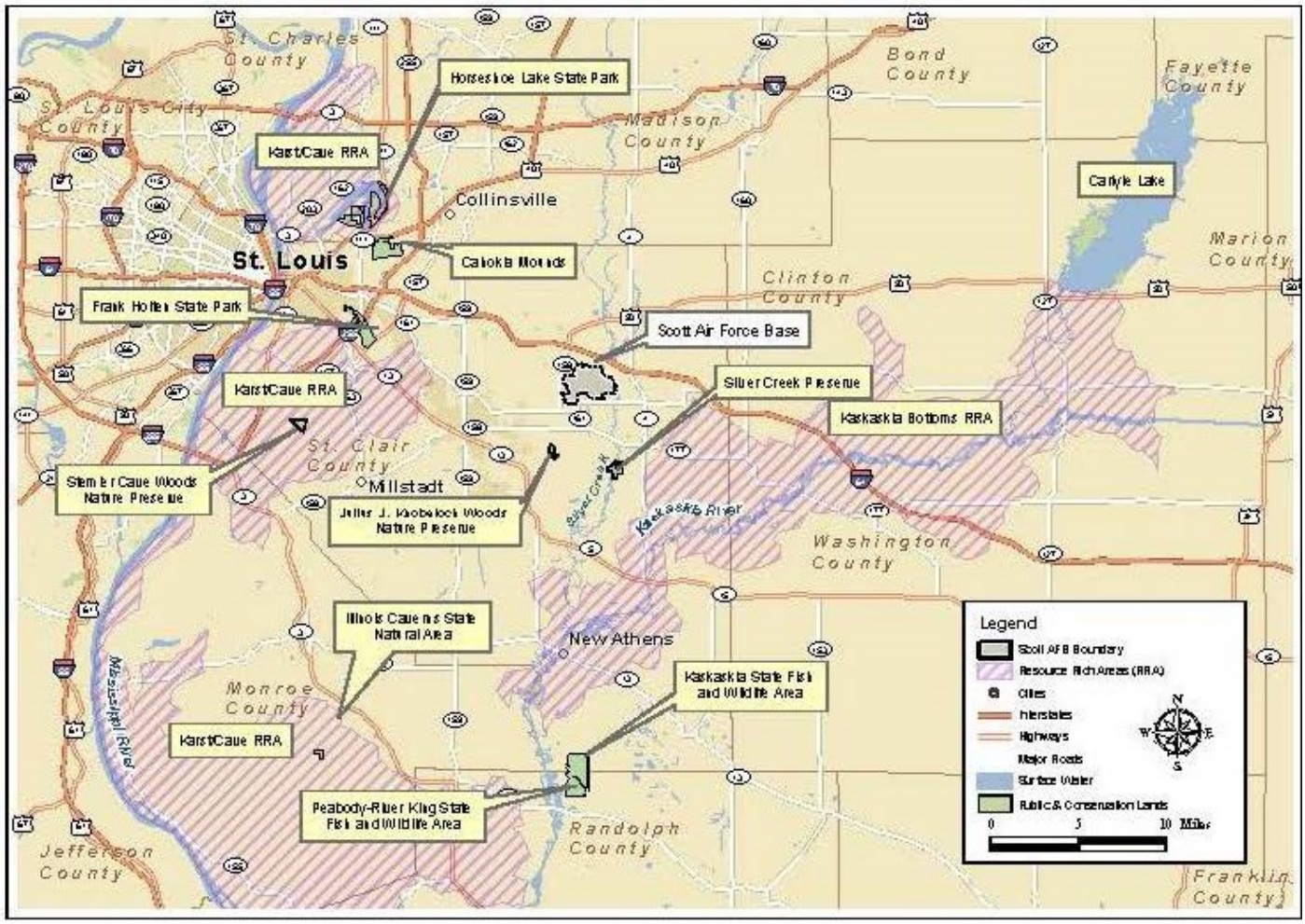

Figure 2-6. Regional Natural Areas

Carlyle Lake is the largest man-made lake in Illinois, with more than 26,000 acres of water and 11,000 acres of land. Located approximately 32 miles (51 km) east of Scott AFB, Carlyle Lake is a 26,000-acre multipurpose lake administered by the USACE (Figure 2-6). The IDNR has a 25-year lease on part of the USACE's property to conduct a variety of habitat management measures aimed at increasing food, shelter, and nesting areas for numerous wildlife species.

The State of Illinois maintains five major outdoor recreation sites in the region, which attract approximately 850,000 visitors a year. The most popular is Frank Holten State Park, a golf course and picnicking area located near East St. Louis (Figure 2-6). Three others, Horseshoe Lake State Park, Kaskaskia River SFWA, and Peabody-River King SFWA, are directed toward fishing and hunting enthusiasts (Figure 2-6). Horseshoe Lake State Park is a 2,850-acre site in southwestern Madison County. The park features a 1,200-acre lake for boat fishing, waterfowl hunting, and dove and pheasant hunting. The largest of these state-owned recreational areas is the 20,000-acre Kaskaskia River SFWA, which extends along 36 miles (58 km) of the Kaskaskia River and drains into the Mississippi River. Within the Kaskaskia SFWA is Baldwin Lake, a 2,018-acre reservoir lake built by the Illinois Power Company and leased to the IDNR for recreational purposes. The reservoir has an excellent bluegill, white bass, catfish, and largemouth bass fishery (IDNR 2001). Peabody-King SFWA is a 2,000-acre site adjacent to the Kaskaskia SFWA. About 90 percent of the site is reclaimed strip mine land donated to the state. The site has 20 lakes and ponds and offers hunting for upland game such as doves (IDNR 2001).

Two Resource Rich Areas (RRAs), as defined by the Illinois Natural History Survey (INHS), are found in St. Clair County (Southwestern Illinois RC&D, Inc. 2005). The Karst/Cave RRA is located in northeast St. Clair County, approximately eight miles (13 km) west of Scott AFB. The Karst/Cave RRA includes 27 specific natural areas, 4 nature preserves, and 92 heritage sites (IDNR 2010).

The Kaskaskia Bottoms RRA, located approximately seven miles (11 km) south of Scott AFB, encompasses an area of 197,654 acres [309 square miles (800 km2)] and generally follows the Kaskaskia River and Shoal Creek in Clinton, Monroe, St. Clair, and Washington counties (Figure 2-6). The predominant natural feature noted here is the significant (18 percent of land area) bottomland hardwood forest. The state's largest contiguous block of forest (7,000 acres) is found at the Kaskaskia Bottoms RRA, in addition to three additional large forest blocks (500 or more contiguous acres) (Southwestern Illinois RC&D, Inc. 2005). The Nature Conservancy has identified a priority protection area within the RRA, including the main stem of the Kaskaskia River from its confluence with the Mississippi River to Carlyle Lake. This priority area also includes portions of Crooked Creek, Silver Creek, and Shoal Creek located south of Scott AFB (Southwestern Illinois RC&D, Inc. 2005). Although Scott AFB is not located within this RRA, the natural habitat found at Scott AFB is similar to that found in the RRA, including the bottomland hardwood forest found within the Silver Creek Riparian Corridor.

2.2 Physical Environment

2.2.1 Climate

Installation Supplement

Scott AFB is located in southwestern Illinois, in a continental climate characterized by relatively hot, humid summers and moderately cold winters. Temperatures can range from -10 degrees Fahrenheit (°F) to 100°F, with an annual mean temperature of 56.0°F. The average annual growing season is approximately 200 days, extending from early April to late October. The average annual precipitation for the area is approximately 43.1 inches per year, with most of the precipitation occurring during the months of March through July. Mean annual snowfall is approximately 12 inches (noaa.gov, 2019). Average monthly temperatures and precipitation data are shown in Table 2-5.

Table 2-5

Average Monthly Climate Data for Scott AFB[1]

Month	Average Low Temperature (^{O}F)	Average High Temperature (^{O}F)	Average Precipitation
January	23°	41°	2.36"
February	25°	45°	1.98"
March	35°	56°	3.05"
April	45°	67°	6.49"
May	56°	77°	4.22"

June	65°	86°	4.53"
July	69°	89°	3.41"
August	66°	87°	4.67"
September	59°	82°	2.97"
October	46°	69°	3.22"
November	34°	55°	3.17"
December	28°	46°	2.99"

1 Climate data recorded 2011-2020 at Scott AFB by 375th weather operations

Climate Change

AFMAN 32-7003, Section 3.10.3, states that INRMPs must take into account future potential climate change impacts to installation natural resources and the management of them. AFCEC engaged the Colorado State University Center for Environmental Management of Military Lands (CSU CEMML) to help USAF installations meet the requirement for inclusion of Climate Change in INRMPs. The draft project report for Scott AFB was produced in March 2021. Text taken from the report and included in this Plan is enclosed within quotation marks.

The following text from the CSU CEMML project draft report (CSU CEMML, 2021 and Appendix L) describes the methodology utilized to create the climate change model and summzarizes the potential future climate changes at Scott AFB resulting from the model.

"CSU CEMML developed site-level climate projections for Scott AFB using the US National Center for Atmospheric Research (NCAR) Community Climate System Model (CCSM) simulations prepared for the IPCC- 5th Assessment Report (AR5) (Gent et al., 2011; Hurrell et al., 2013; Moss et al., 2008, 2010). These simulations were generated for two Representative Concentration Pathway (RCP) scenarios: a moderate emissions scenario (RCP 4.5) and a higher emissions scenario (RCP 8.5). We used the RCP 4.5 and RCP 8.5 emission scenarios to produce a time series of daily climate values for the decades centered around 2030 (2026-2035) and 2050 (2046-2055). We then ran CCSM simulations across all scenarios, then downscaled to a 6 km spatial resolution (Pierce et al., 2014). Daily values were then averaged over each of the 10-year timeframes for each variable and RCP scenario to produce annual averages, which we compared to weather station data from a 30-year historical period (1976-2005).

Climate projections for Scott AFB (Table 2-1) indicate that minimum and maximum temperatures will increase over time under both emissions scenarios. For the 2030 timeframe, both scenarios project increases in annual average temperature (TAVE) over the historical average with an increase of 2.0 °F for RCP 4.5 and 2.7 °F for RCP 8.5. The two emission scenario projections show higher warming by 2050, with RCP 4.5 projecting a warming of 3.1 °F and RCP 8.5 projecting a warming of 4.7 °F above the historical average for this timeframe. Annual average precipitation (PRECIP) varies between emission scenarios and over time due to larger interconnected ocean-atmosphere dynamics associated with the NCAR CCSM model. For the 2030 timeframe, the RCP 4.5 scenario projects a 9.7% increase in PRECIP while the RCP 8.5 scenario shows only a 0.8% increase in PRECIP relative to the historical average. For the 2050 timeframe, RCP 4.5 projects an 8.9% increase in PRECIP while RCP 8.5 shows a decrease of 5.4% relative to the historical average.

Table 2-1. Summary of climate data

Variable	**Historical**	**RCP 4.5**		**RCP 8.5**	
		2030	**2050**	**2030**	**2050**
PRECIP (inches)	37.0	40.6	40.3	37.3	35.0
TMIN (°F)	45.3	46.7	48.1	47.2	49.5
TMAX (°F)	67.1	69.7	70.6	70.6	72.3

TAVE (°F)	56.2	58.2	59.3	58.9	60.9
GDD	4442	4777	4959	4868	5264
HOTDAYS	41.7	68.2	76.7	76.2	96.2
COLDDAYS	96.0	86.1	80.4	86.4	74.6
WETDAYS	0.8	1.0	0.5	0.8	0.4
DRYDAYS	283.2	275.6	276.3	283.1	285.8
FTDAYS	50.2	47.0	42.5	50.8	39.4

Notes: TAVE (°F) = annual average temperature; TMAX (°F) = annual average maximum temperature; TMIN (°F) = annual average minimum temperature; PRECIP (inches) = annual average precipitation; GDD = average annual accumulated growing degree days with a base temperature of 50 °F; HOTDAYS (average # of days per year) = average number of days exceeding 90 °F; COLDDAYS (average # of days per year) = average annual number of days below 32 °F; WETDAYS (average # of days per year) = average annual number of days with precipitation exceeding 2 inches in a day; DRYDAYS (average # of days per year) = average annual number of days with precipitation below 0.1 inches in a day; FTDAYS (average # of days per year) = average annual number of freeze-thaw days with maximum temperature exceeding 34.1 °F and minimum below 28.0 °F.					

Among the scenarios, there is a general trend of increasing TAVE and PRECIP. The increases in temperature happen relatively uniformly from the months of June through October with few outliers among both timeframes and emission scenarios. The months of November through May exhibit higher variation in rate of increasing temperature. Although annual averages are projected to increase under RCP 8.5 for both timeframes, the average temperature in May 2030 is expected to decrease slightly.

PRECIP increases relative to the historic average in all scenarios except RCP 8.5 2050. Changes in precipitation throughout the months tend to be variable, with some scenarios and timeframes predicting increases, and others predicting decreases for the same month.

The humid subtropical climate that observes hot, humid summers and mild to cold winters will continue, but with warmer winters and hotter summers. The system-wide impacts of these changes will be highly dependent on the ability of the flora and fauna to adapt to changing seasons, temperate extremes and more rapid temperature variation."

Section-specific content including adaptation strategies and management recommendations has been included in subsequent sections of this Plan. Should additional relevant content be included in the final report, it will be added to the appropriate Plan sections during the next Annual Review process.

2.2.2 Landforms

Installation Supplement

Bordered by the Mississippi River on the west and the Wabash and Ohio Rivers on the southeast and south, the landscape of Illinois can be grouped into four main physiographic regions. About 90 percent of Illinois, including Scott AFB, is covered by the Central Lowlands Physiographic Province. The Central Lowlands is a gently rolling plain of glacial till dissected by streams and drainages. These gently rolling fertile plains were carved and leveled by glaciers during the Illinoian glaciation of the Pleistocene Ice Age (McClain 2009). Scott AFB is located within Springfield Plain subdivision of the Till Plains, a division of the Central Lowlands. The Till Plains is an area of fertile soil that helps make Illinois one of the leading agricultural states in the nation.

The base is located on the west end of the Silver Creek Valley basin that is characterized by generally flat to gently rolling hills. The base land surface is generally level. The maximum surface elevation is 510 feet above mean sea level (MSL) at a till ridge just north of the base boundary. The lowest surface elevation is approximately 420 feet MSL along the eastern boundary of the base within the Silver Creek Riparian Corridor. The elevation of Silver Creek east of the base is about 405 feet MSL (Figure 2-7, Topographical Overlay of Scott AFB).

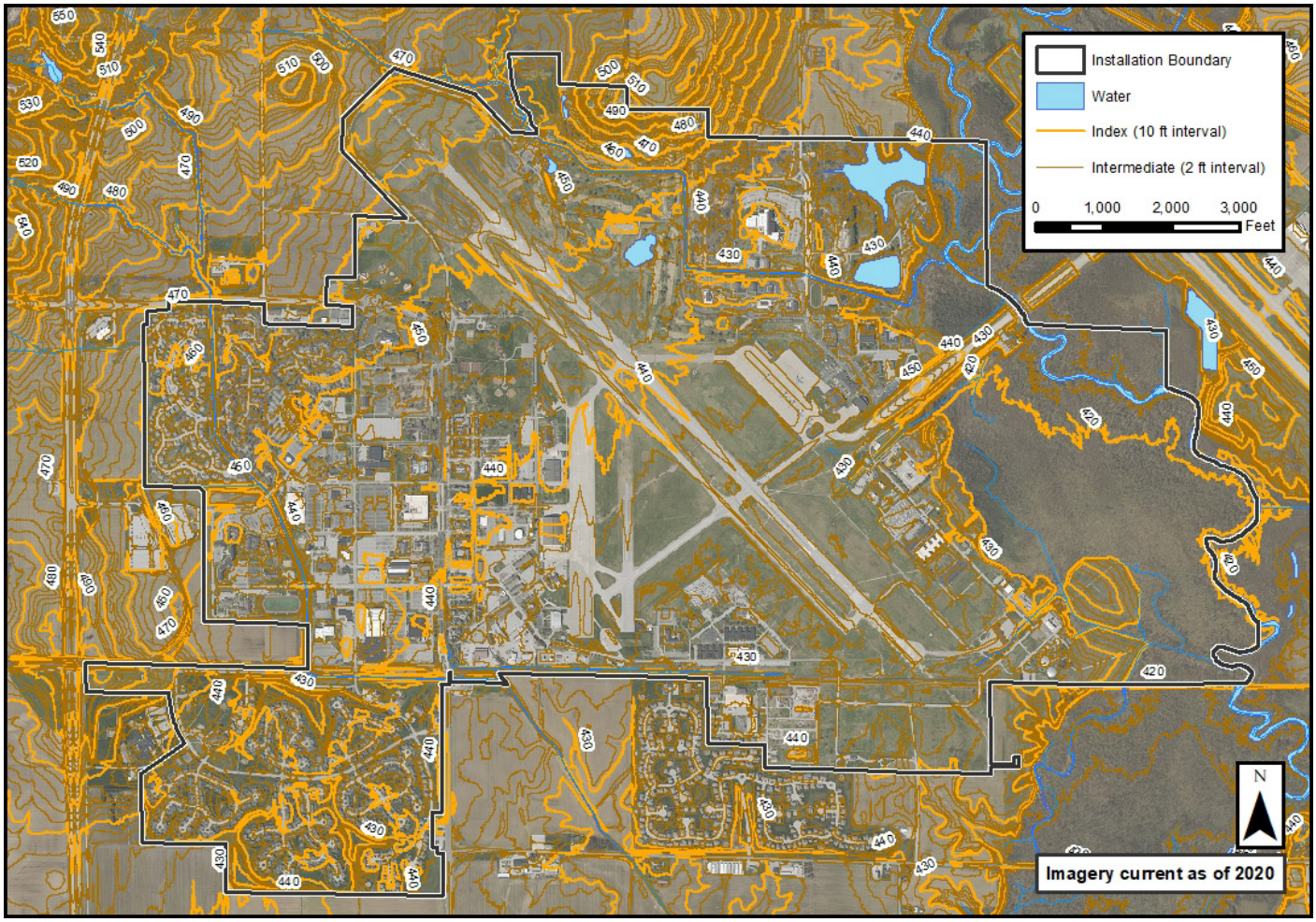

Figure 2-7. Topographical Overlay of Scott AFB

2.2.3 Geology and Soils

Installation Supplement

Geology

Scott AFB is located in the Springfield Plain Division of the Dissected Till Plains Section of the Central Lowland Physiographic Province, on the western edge of the Illinois Basin. The stratigraphic sequence in the region consists of approximately 50- to 100-foot-thick deposits of Cenozoic (Quaternary) unconsolidated sediments overlying Paleozoic sedimentary bedrock. The Cenozoic unconsolidated materials consist of eolian, alluvial, and glacial deposits (Parsons Engineering Science, Inc. 1995). The underlying bedrock consists primarily of low permeability, Pennsylvanian-age shale with thin, discontinuous beds of sandstone and limestone. The bedrock surface ranges from a high of approximately 400 feet MSL in the northwestern corner of the base to a low of approximately 350 feet MSL in the southwest portion of the base (MWH Americas, Inc. 2002).

Scott AFB lies within Seismic Zone IX, which contains the New Madrid Fault Zone. This fault zone extends from Cairo, Illinois, on the Ohio River, southward through New Madrid, Missouri; it is the most active seismic area east of the Rocky Mountains. The last major earthquake along this fault was in 1812, with a quake measuring more than 8.0 on the Richter scale. Almost weekly tremors and, on rare occasions, small quakes measuring 3.0 to 4.0 or more, occur along the New Madrid Fault. The most recent significant earthquake in Southern Illinois occurred in April 2008 and measured 5.4 on the Richter scale (USGS 2010). The epicenter was approximately 110 miles (177 km) east of Scott AFB.

Soils

The predominant soil types at Scott AFB are silt loam and silty clay loam occurring to a depth of 16 inches. They have a moderately high water holding capacity, moderate to high shrink to swell ratio, and moderate to high corrosive potential. The topsoil is moderately permeable. These soils are fertile and productive because of their development from tall prairie grass and mixed hardwood forest. The pH varies from 5 to 7.3. Due to the nearly level topography, native soils have undergone only slight alteration due to grading, fill, or excavation with construction of Scott AFB.

The six major soil series at Scott AFB, in order of acreage, are Mascoutah silty clay loam, Edwardsville silt loam, Wakeland silt loam, Bethalto silt loam, Petrolia silty clay loam, and Caseyville silt loam (Figure 2-8, Distribution of Major Soil Units at Scott AFB). The majority of the base located south and west of the flightline has been constructed on Mascoutah soils, including most of the parking apron and the central portion of the flightline. The Mascoutah series consists of very deep and poorly-drained soils that are moderately permeable and formed in loess. The Edwardsville series consists of deep and poorly-drained soils that are moderately permeable and formed in loess on till plains. Most of the acreage of this soil is found in the improved areas of the base and at the golf course. The Wakeland series consists of deep and poorly-drained soils that are moderately permeable and formed in silty alluvium. Wakeland soils are found in the bottomland forest adjacent to Silver Creek. The Bethalto series consists of deep, poorly-drained, moderately permeable soils and are formed in loess on till plains. Most of these soils are mapped in the airfield and in developed areas. The Petrolia series consists of very deep and poorly-drained soils. These soils are moderately slowly permeable and formed in the silty alluvium of the Silver Creek floodplain. The Caseyville series consists of deep, poorly-drained soils that are moderately permeable and formed in loess on till plains. Most of the acreage of this soil is next to the main airfield and in other nearby improved areas of the base (NRCS 2010). Other less common soil series at Scott AFB include Menfro silt loam, Downsouth silt loam, Winfield silt loam, and Orthents silty (Figure 2-8).

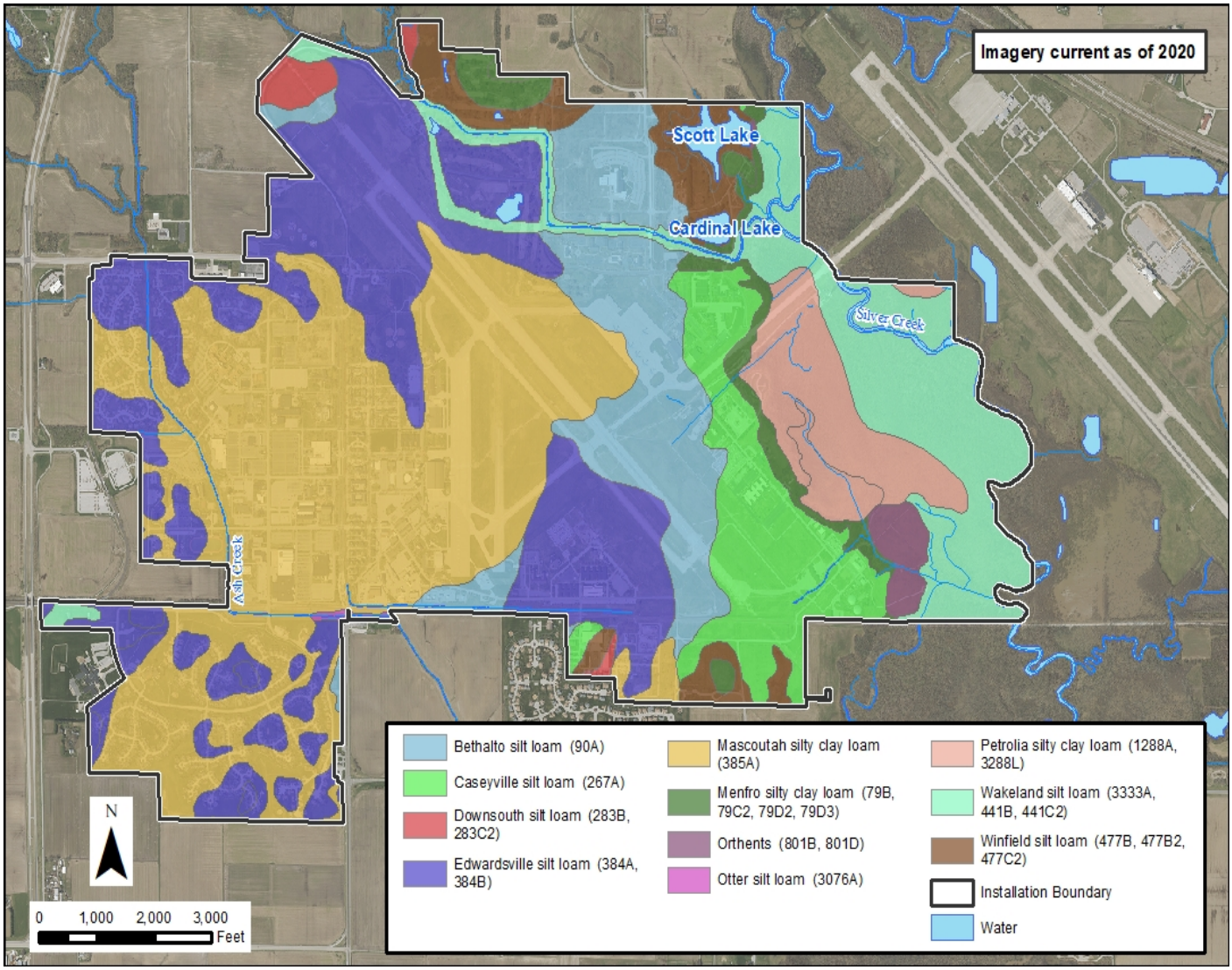

Figure 2-8. Distribution of Major Soil Units at Scott AFB

2.2.4 Hydrology
Installation Supplement

Groundwater

Scott AFB lies in an area of western Illinois that lacks aquifers of regional significance. Illinois American Water Company owns and operates the Scott AFB water distribution system; the source of the water supply is the Mississippi River. Although historical drinking water/irrigation wells are located on the base (EDR 2004), none of these water wells are in use. However, domestic and agricultural users within about 10 miles (16 km) of the base obtain a limited amount of water from shallow aquifers (Parsons Engineering Science, Inc. 1995).

The significant hydrogeologic units present in the area include alluvium containing sand and gravel lenses, sand and gravel layers within the glacial deposits, and sandstone or other permeable strata within the bedrock. Water quality varies greatly, with water from the surficial deposits usually of slightly better quality than water from the bedrock units. Precipitation is the primary source of groundwater recharge in the area (Engineering-Science 1985).

Alluvium: The sand and gravel layers of the Cahokia alluvium include deposits of poorly sorted silt, clay, and silty sand with lenses of sand and gravel. Groundwater is present in these layers at shallow depths [1 to 3 feet below ground surface (bgs)]. The thickness of the alluvium varies, but it is generally less than 50 feet. Large quantities of water can potentially be pumped from the alluvium. However, it is not widely used in the vicinity of the base because its occurrence is limited to the flood-prone lowlands and because municipal water supplies are readily available to most local consumers. The alluvium is found mainly on the eastern portions of the base along the Silver Creek Riparian Corridor lowlands (MWH Americas, Inc. 2002).

Glacial Aquifers: The sand and gravel layers in the glacial deposits are permeable, unconsolidated units that are typically thin, discontinuous, and of limited extent in the vicinity of the base. The water-bearing zones include the sand and gravel layers within the Pearl Formation and within the Vandalia Till Member of the Glasford Formation. Data from test wells installed in 1942 by the Illinois State Water Survey indicated that the discontinuous sand and gravel zones ranged in thickness from 1 to 12 feet. Groundwater occurred at depths ranging from 10 to 35 feet bgs in these wells (as measured in 1991). East of Silver Creek, small industrial and municipal wells having yields of about 20 gallons per minute may be possible in these glacial aquifers. Groundwater reportedly discharges to the underlying bedrock or to local surface water as base flow (MWH Americas, Inc. 2002).

Bedrock Aquifers: Pennsylvanian age bedrock lays approximately 85 feet bgs in the vicinity of the base and is approximately 265 feet thick. The strata consist of low permeability shale with thin, discontinuous beds of sandstone and limestone. The sandstone and limestone can yield small quantities of water to domestic supplies, with recharge occurring from the overlying unconsolidated materials. Groundwater flow through these strata is generally to the southeast toward deeper parts of the Illinois Basin. Water-bearing fractures are most likely to occur in the upper 50 feet of the bedrock. Underlying the Pennsylvanian strata is Chesterian Series (Mississippian Age) bedrock, which includes permeable sandstones. The reported yield of wells completed in these sandstones ranges from 20 to 50 gallons per minute, with drawdowns varying from 175 to 300 feet (MWH Americas, Inc. 2002).

Surface Water

Scott AFB is located within the lower reach of the Kaskaskia River Watershed which drains 5,810 square miles (15,048 km2) of central and southwestern Illinois (Figure 2-1). The Kaskaskia River begins in Champaign County, Illinois, passes through all, or part of 22 counties, flows southwest 292 miles (470 km) and empties into the Mississippi River in Randolph County, Illinois (Heartlands Conservancy, 2018). Silver Creek is one of five major streams that comprise the Lower Kaskaskia River Watershed.

There are three primary creeks that flow through Scott AFB; Silver Creek, which forms the eastern boundary of the base, Ash Creek, which drains the western portion of the base, and Cardinal Creek in the northern portion of the base (Figure 2-9, Watershed Map of Scott AFB). Other creeks and drainages located on the base include the South Ditch and Mosquito Creek. The South Ditch originates on base and extends west along the southern perimeter road. Mosquito Creek, also called the Silver Creek Taxiway Ditch, is located south of Control Tower Road and conveys stormwater east and south between the landfill cells and into Silver Creek. An unnamed tributary to Mosquito Creek is located in the southeast corner of the base. Typical flow within this drainage is north into Mosquito Creek; however, during flooding of Silver Creek flow is conveyed south underneath the railroad bridge at the base boundary.

A 2.5-mile (4-km) segment of Silver Creek is located on the eastern edge of Scott AFB and drains approximately 60 percent of the base (Figure 2-9). Silver Creek drains approximately 197 square miles (510 km2) in its watershed (Table 2-6, Watershed Drainage Areas at Scott AFB). The Illinois Environmental Protection Agency (IEPA) classifies Silver Creek as a "General Use" stream. This classification allows the following uses: agriculture, primary and secondary contact recreation, aquatic life propagation, and most industrial uses. Silver Creek surface water quality in the vicinity of Scott AFB is rated as fair by the IEPA, with nutrients and siltation from agriculture being the main non-point sources of pollution (IEPA 2010). The IEPA lists Silver Creek pollutants as manganese, sedimentation/siltation, and phosphorous. The primary causes of the pollution are animal feeding operations, crop production, and municipal point source discharges (IEPA 2010).

Table 2-6

Watershed Drainage Areas at Scott AFB

Stream	Watershed Area[1]
Silver Creek	197 square miles (510 km^2)
Ash Creek	5.4 square miles (13.9 km^2)
Cardinal Creek	1.9 square miles (4.9 km^2)

Source: Heartlands Conservancy 2018

[1] Watershed area includes areas outside of Scott AFB.

The remaining portions of Scott AFB drain into two minor drainage channels, Ash Creek and Cardinal Creek, which eventually drain into Silver Creek (Figure 2-9). Ash Creek is a natural stream located on the western edge of the base and has been channelized throughout most of its length. Ash Creek originates approximately one mile (1.6 km) northwest of the base near Shiloh, Illinois. The watershed of Ash Creek is approximately 5.4 square miles (13.9 km2) (Table 2-6) and consists primarily of agricultural land. The western portion of Scott AFB drains, or is pumped from storm water pump stations, into Ash Creek. Ash Creek flows through the Community Housing Area on the west side of Scott AFB and exits at the southern boundary of the base. Ash Creek joins Loop Creek, a Silver Creek tributary, approximately 2.5 miles (4 km) south of the base.

Cardinal Creek drains much of the northern portion of the base, with a watershed area of 1.9 square miles (4.9 km2) (Table 2-6). Cardinal Creek is a natural stream north of the base that has been channelized through Scott AFB. Cardinal Creek flows in an east-southeast direction and joins Silver Creek just north of the taxiway.

Drainage from the base administrative and industrial areas is directed to the South Ditch, which flows to Mosquito Creek. Mosquito Creek joins Silver Creek within the southeastern corner of the base. Runoff flowing from the central and southern parts of the airfield is directed to the runway drainage ditch and ultimately to Silver Creek. Runoff from the southeast corner of the base flows to Mosquito Creek and then to Silver Creek. Mosquito Creek also serves as the receiving stream for the discharge of the base wastewater treatment facility.

Surface water impoundments on Scott AFB include Scott Lake (15 acres), Cardinal Lake (6.5 acres), the golf course pond (3 acres), and other small man-made water hazards at the golf course (Figure 2-7). Both Scott and Cardinal Lakes are fed by natural surface drainage, although Cardinal Lake was designed to receive make up water from the wastewater treatment plant or Silver Creek. Scott Lake is used for outdoor recreational activities by the Scott AFB community, and both Scott and Cardinal Lakes are used for fishing. The golf course pond routinely receives treated wastewater, which is used in golf course irrigation.

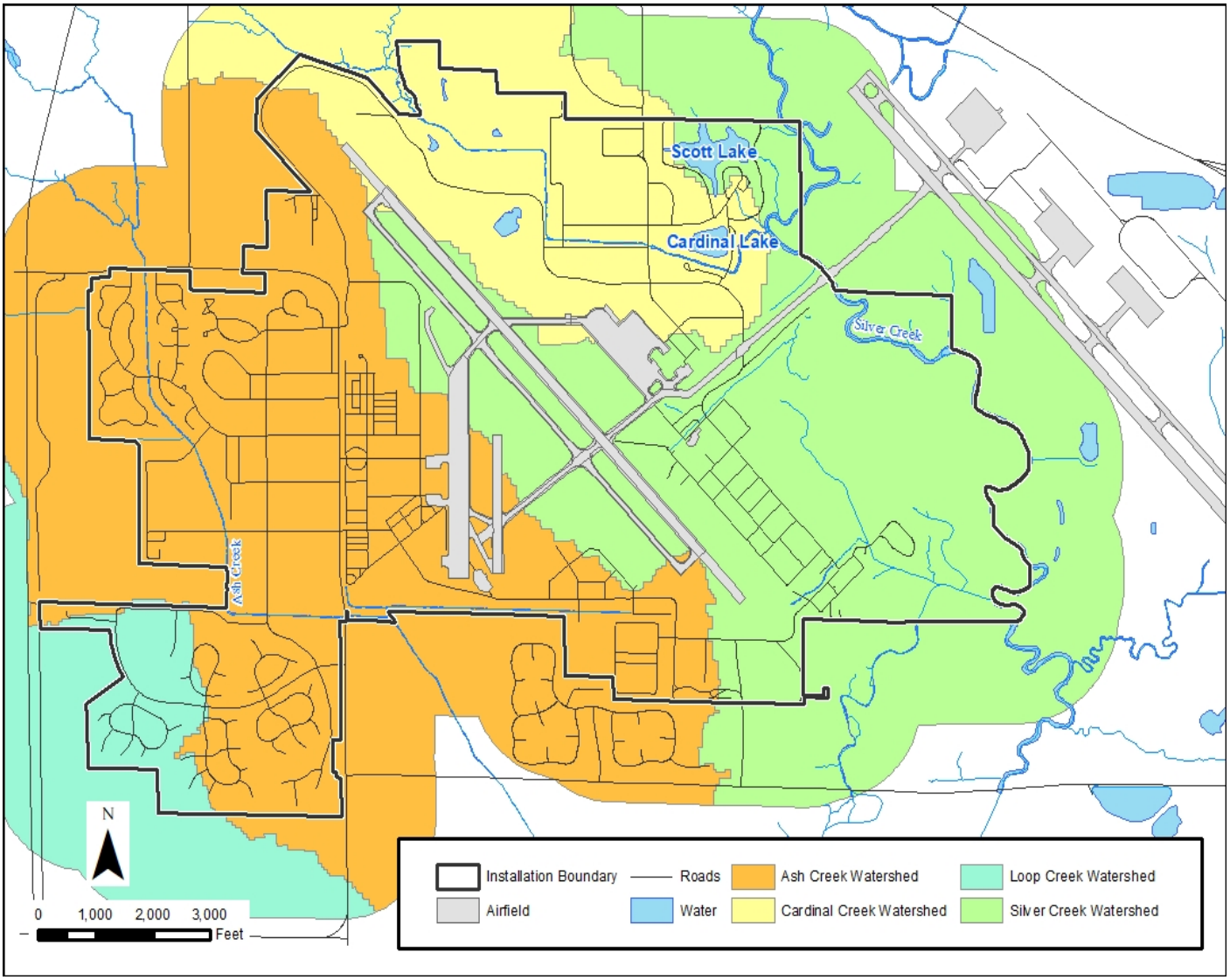

Figure 2-9. Watershed Map of Scott AFB

Climate Change

The following text from the CSU CEMML project report describes future potential hydrologic changes at Scott AFB due to climate change (CSU CEMML, 2021).

"The continental climate of the central Midwestern US exhibits a high degree of climatological variance, recording sharp increases and/or decreases in water amounts over relatively short historical periods. An analysis of Illinois annual precipitation data shows a linearly increasing trend of 11% over the historical period of 1895-2017 (Angel et al., 2020). Heavy rainfall events of short and long durations are also common in Illinois. Precipitation variability is expected to continue into the future and be intensified by a changing climate; a greater frequency of extreme events are already occurring, especially since the 1990's (Barros et al., 2014; Frankson et al., 2017). Increasing and more extreme precipitation can contribute to increased streamflows, though attributing these patterns to a changing climate is complicated (Barros et al., 2014). Increasing temperatures are also driving increased evapotranspiration. This greater evapotranspiration could result in climate-related drought and reduced streamflows under certain scenarios despite some areas receiving the same amount or even greater amounts of precipitation (Alizadeh et al., 2020).

The mid-sized hydroclimatic events evaluated here have an annual exceedance probability of 0.1, or 10%. However, they may vary from 4-5 up to 20-30 years between events; 10 years is an average determined through statistical analyses of the annual maximum precipitation values for the period of record. Here, total precipitation depth for the modeled design storms slightly increased from the baseline event for the RCP 4.5 2030 climate scenario. However small decreases in event precipitation were shown for the RCP 4.5 2050 and the RCP 8.5 2030 and 2050 events. Similarly, a modest increase in modeled peak streamflow occurred in the RCP 4.5 2030 scenario as compared to the baseline, but decreases were modeled for the other climate scenarios. Peak flows for those events (RCP 4.5 2050 and RCP 8.5 2030 and 2050) were shown to reduce by close to half of the baseline peak flows. Interestingly, the respective increase (RCP 4.5 2030) or reductions (RCP 4.5 2030, RCP 8.5 2030 and 2050) in inundated acreages for the climate scenarios as compared to the baseline scenario are quite small. This is in part a function of the area being inundated. The Silver Creek floodplain in the modeled area is somewhat constricted and much lower lying than the surrounding embankments and other installation infrastructure. Historical imagery (Google, 2021) analyzed along with contemporaneous hydroclimatological data suggests that events with even a relatively small return interval and peak flow can inundate much, if not all of the model area. Therefore, even with decreasing peak flows and flood volumes, the Silver Creek floodplain in this area may still be regularly inundated to a degree similar to the modeled baseline 10-year frequency and 24-hour duration precipitation (and resulting streamflow) event."

2.3 Ecosystems and the Biotic Environment

2.3.1 Ecosystem Classification

Installation Supplement

Scott AFB is located within the Central Till Plains, Oak-Hickory Section of the Eastern Broadleaf Forest Province (Figure 2-10, Natural Divisions and Ecoregions of Illinois) (Bailey 1995). The majority of the Central Till Plains, Oak-Hickory Section is located in south-central Illinois and is characterized by relatively flat topography marked by shallow drainages. The topography is largely due to deposits of thick glacial till that cover the underlying bedrock. Soils on uplands are light colored and were developed from thin loess and glacial till. Historically, these soils supported forest and prairie vegetation.

The IDNR developed an ecosystem classification system for the State of Illinois based on geographic regions having similar topography, soils, bedrock, plants, and animals. The IDNR uses this system for organizing regional needs, objectives, and strategies as outlined in the Comprehensive Wildlife Conservation Plan/Strategy (IDNR 2005). Scott AFB is located within the Southern Till Plain Natural Division. This natural division roughly corresponds to the Central Till Plains, Oak-Hickory Section.

Figures for Bailey's ecoregions and the IDNR classification system are shown below:

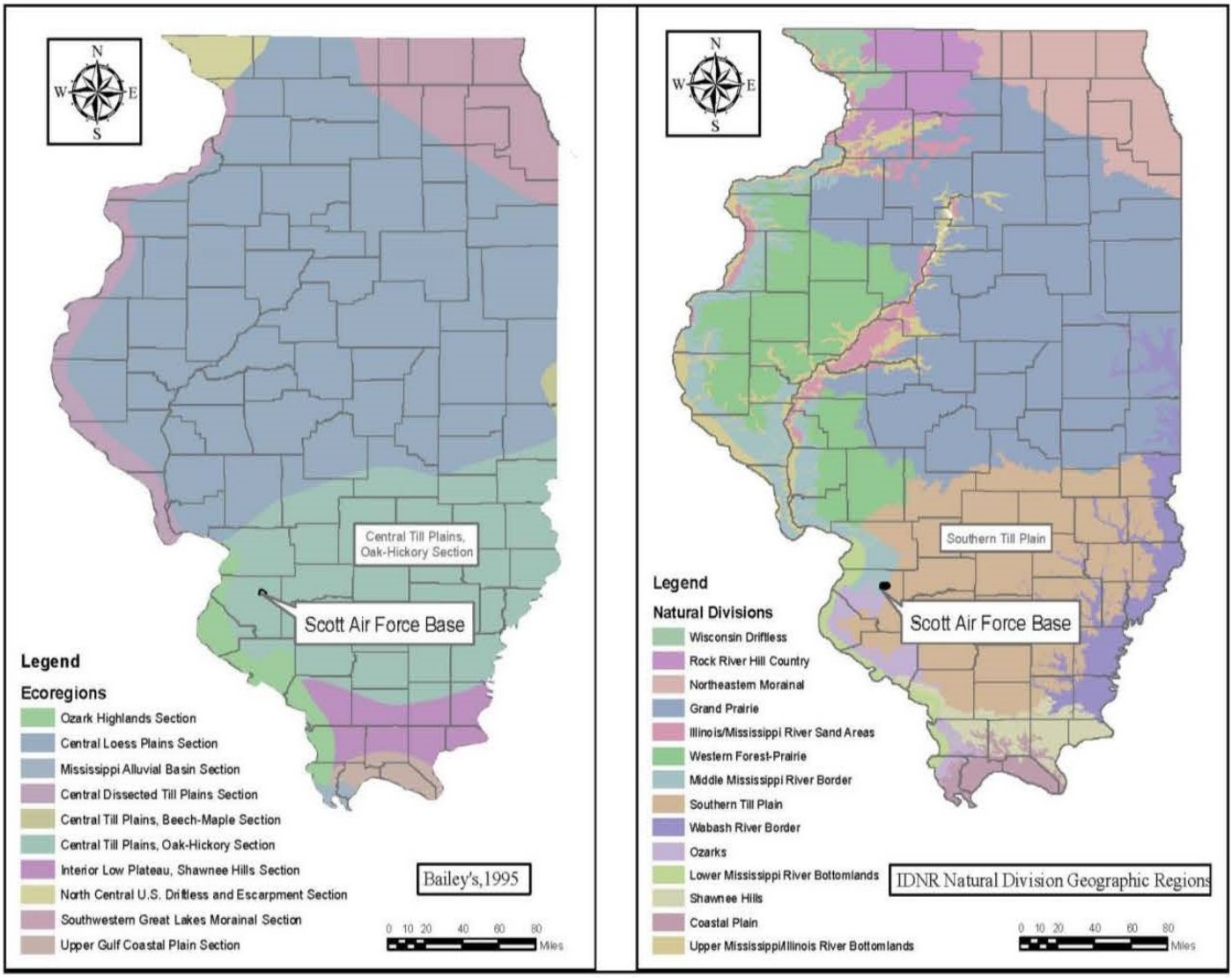

Figure 2-10. Natural Divisions and Ecoregions of Illinois

Climate Change

The following text from the CSU CEMML project report describes potential future ecosystem impacts at Scott AFB due to climate change (CSU CEMML, 2021).

"We assessed baseline characteristics of ecosystems at each installation by combining literature review, available Geographic Information Systems (GIS) data, and descriptions, analyses, and maps in the INRMP and/or provided by the installation. We then assessed potential impacts of projected conditions on ecosystems under the climate scenarios. We determined vulnerability using the Habitat Climate Change Vulnerability Index (HCCVI) (Comer et al., 2012, 2018a, 2018b, 2019). This index uses quantitative and qualitative approaches to analyze climate change exposure and ecological resilience for each ecosystem type. Once we identified vulnerable ecosystems, we recommended possible actions and advised possible changes in vegetation to anticipate on the installation. These recommendations were based on available literature and the climate, hydrology, and fire assessments from this report.

Scott AFB is located within the Humid Temperate Domain, Hot Continental Division, Eastern Broadleaf Forest (Continental) Province, Central Till Plains, Oak-Hickory Section (Bailey 2014). According to bioclimatic variables from climate model projections, the climate at Scott AFB is expected to become warmer with more HOTDAYS (days > 90 °F; Section 3.0). We are currently waiting for data from a third party to complete the HCCVI calculations, so the table showing the ecological systems vulnerability assessment and associated analysis will be delivered with the final draft report."

2.3.2 Vegetation
Installation Supplement

Prior to European settlement, approximately 40 percent of the well-drained upland areas in the Central Till Plains, Oak-Hickory Section consisted of mesic tall-grass prairie. According to the IDNR, these upland prairies were highly interspersed in the region and many were quite open due to the influence of fire (IDNR 2005). Dominant vegetation in the mesic tall-grass prairie included big bluestem (*Andropogon gerardii*), Indian grass (*Sorghastrum nutans*), prairie dropseed (*Sporobolus heterolepis*), switch grass (*Panicum virgatum*), and little bluestem (*Schizachyrium scoparium*).

The remaining upland areas were covered by scattered trees, groves, and forests (Schwegman 1973), with upland forests consisting of black oak (*Quercus velutina*), shingle oak (*Quercus imbricaria*), and shagbark hickory (*Carya ovata*). Large forested areas were present along streams and included upland areas as well as forested wetlands. Upland forests that were poorly-drained included post oak (*Quercus stellata*), blackjack (*Quercus marilandica*), and pin oak (*Quercus palustris*). Broad bottomland forests such as those along the Kaskaskia River include dominants such as silver maple (*Acer saccharinum*), black willow (*Salix nigra*), sycamore (*Platanus occidentalis*), and American elm (*Ulmus americana*). Some wet prairies occurred along the major rivers in the section. Bottomland floodplain forests, such as those found along smaller streams like Silver Creek, included pin oak and shingle oak with white oak (*Quercus alba*), red oak (*Quercus rubra*), hickories, black walnut (*Juglans nigra*), river birch (*Betula nigra*), and eastern cottonwood (*Populus deltoides*) (Woods 2006, Vestal 1931, Schwegman 1973).

2.3.2.1 Historic Vegetation Cover
Installation Supplement

St. Clair County was one of the first counties to be settled in Illinois, and several settlements had already been established by the early 1800s. According to both written historical accounts and the government land office surveys, St. Clair County was in the transition zone between the heavily forested areas of southern Illinois and the large prairie region to the north. As shown in Figure 2-11, Presettlement Vegetation, Scott AFB is located in an area that was surrounded by prairie mixed with the forested bottomlands of Silver Creek. A traveler coming west across St. Clair County in 1841 described the area as follows:

> *A few miles further on we entered on a branch of Looking Glass Prairie, Bond County [now St. Clair County], where long reaches of green undulating prairie stretched away until they became lost in the haze of distance; and, within a few hours of sunset, we emerged from a grove [and the prairie] lay stretched out before us like an ocean. In the direction which the track we were following took, we could just distinguish the forest [Silver Creek] like a low bank of cloud, whilst on our right the prairie stretched away, one vast plain, uninterrupted by tree or bush, as far as the eye could reach (Oliver 1841).*

Moore's prairie, whose eastern edge would have extended into the current boundaries of Scott AFB, was described less dramatically as a prairie approximately five miles (8 km) wide with tolerably level, good soil, and covered with fine farms (Peck 1837).

With the settlement of St. Clair County, many of the prairies and forests were quickly converted to agricultural use. One historian wrote in 1881:

> *The county of St. Clair represents the characteristics of both a timber and a prairie country. Few spectacles are so inspiringly beautiful as a grand prairie at certain seasons of the year, and yet the luxuriant vegetation, which at first view seems so various, comprises but few species of plants. Upon the flora of this county civilization has produced its inevitable effects. As the Indian and the buffalo have disappeared before the white man, so have some of the native grasses been vanquished by the white clover and blue grass (Brink et al. 1881).*

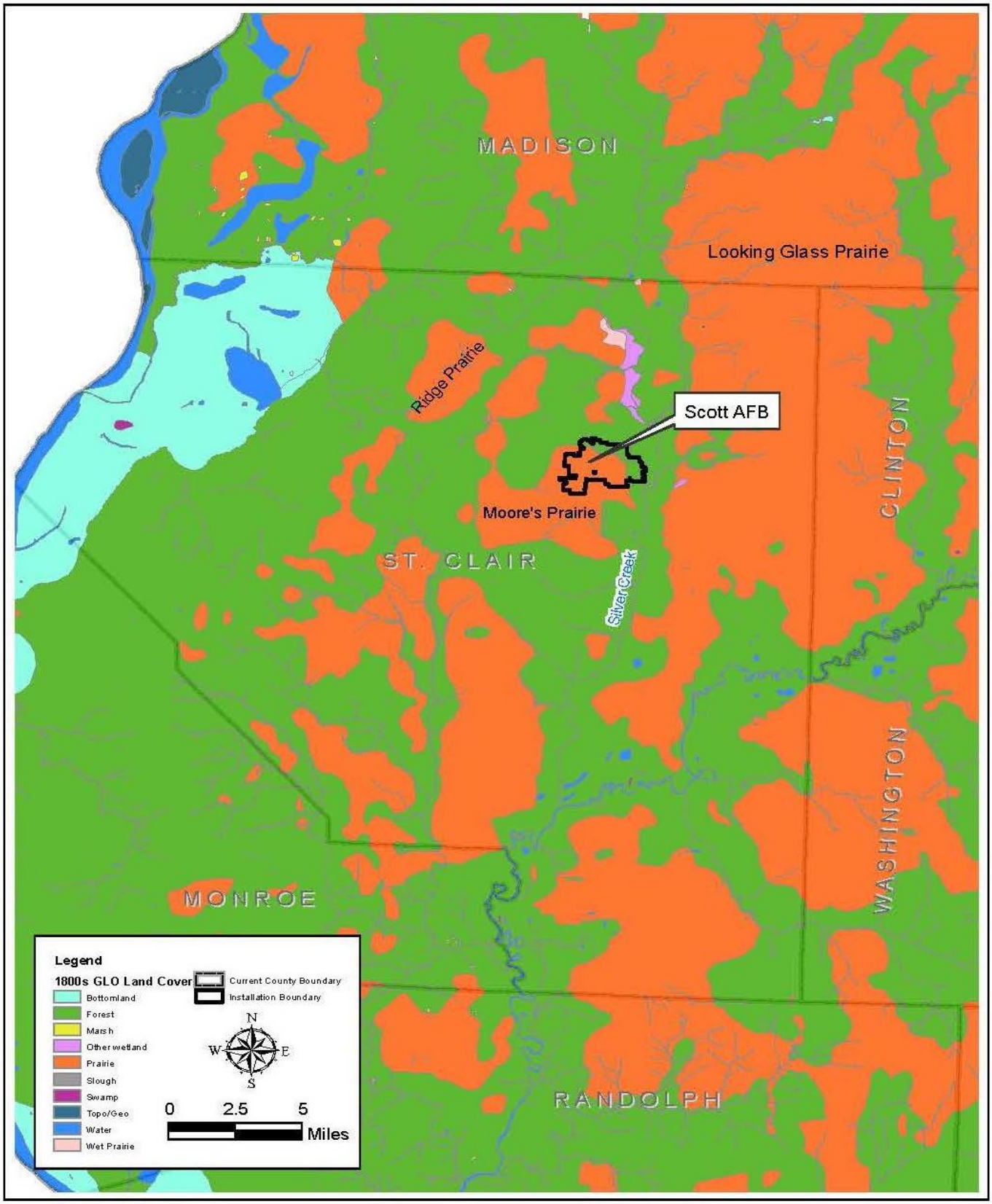

Figure 2-11. Presettlement Vegetation

2.3.2.2 Current Vegetation Cover
Installation Supplement

Natural vegetative communities currently found at Scott AFB are confined to the eastern portion of the base. These include the bottomland forest communities located within the floodplain of Silver Creek, and the highly disturbed upland forest community located north of Scott Lake and along the western edges of the bottomland forest (Figure 2-12, Current Vegetation Cover). The remaining 85 percent of the base is improved and semi-improved areas consisting of turf and landscape vegetation that is intensely managed. A complete list of plant species known to occur at Scott AFB is included in Appendix H.

Bottomland Forest

The bottomland forests at Scott AFB are excellent representations of Cottonwood-Elm-Ash hardwood forests of the north-central United States. This forest type is dependent on hydrological connections to adjacent or associated river systems (U.S. Forest Service Northern Research Station 2008). At Scott AFB, the dominant tree species in this forest include box elder (*Acer negundo*), silver maple (*Acer saccharinum*), green ash (*Fraxinus pennsylvanica*), and American elm. Cottonwoods are common but are not one of the dominant species. Dominant vines include trumpet creeper (*Campsis radicans*) and Virginia creeper (*Parthenocissus quinquefolia*). Pawpaw (*Asimina triloba*) and rough-leaved dogwood (*Cornus drummondii*) are locally abundant in portions of the bottomland forest. Dominant herbs include Ontario aster (*Aster ontarionis*), various sedges (*Carex* spp.), honewort (*Cryptotaenia canadensis*), wood nettle (*Laportea canadensis*), clearweed (*Pilea pumila*), and swamp buttercup (*Ranunculus septentrionalis*). Dominant grasses include wild rye (*Elymus virginicus*), southern cutgrass (*Leersia hexandra*), and Virginia cutgrass (*Leersia virginica*). The uncommon pink turtlehead (*Chelone oblique*) is noted in the higher quality areas of the wetlands (Martin et al. 2002, Scott AFB 2010b).

A 2001 botanical inventory (Martin et al. 2002) evaluated the habitat found within the forests in the Silver Creek Riparian Corridor. To assess the quality of the vegetation of a given habitat with native species, each area considered to have potentially significant natural vegetation received a grade that varied from A to D, following the methods described by White (1978) and by White and Madany (1978). Seven botanical sites within six forest stands were established; Table 2-7 presents a summary of the seven sites and their characteristics and Figure 2-13, Natural Forest Stands, Silver Creek Riparian Corridor, shows the locations of the stands (Martin et al. 2002). Two of the seven sites (Stand 2 and 2a) were considered to be of high quality significance (B or B-), and both were considered to be regionally significant. The plant communities were of a relatively large size and generally less disturbed remnants of communities that once extended throughout the riverine floodplains of west-central Illinois, including the Mississippi River floodplain. Four of the seven botanical sites distinguished in this report were of sufficiently high natural quality to be assessed as quality C or C- sites. The single remaining botanical site, Stand 6, was classified as an upland forest and is described in Section Upland Forest. More complete descriptions of these sites are available in Martin et al. 2002.

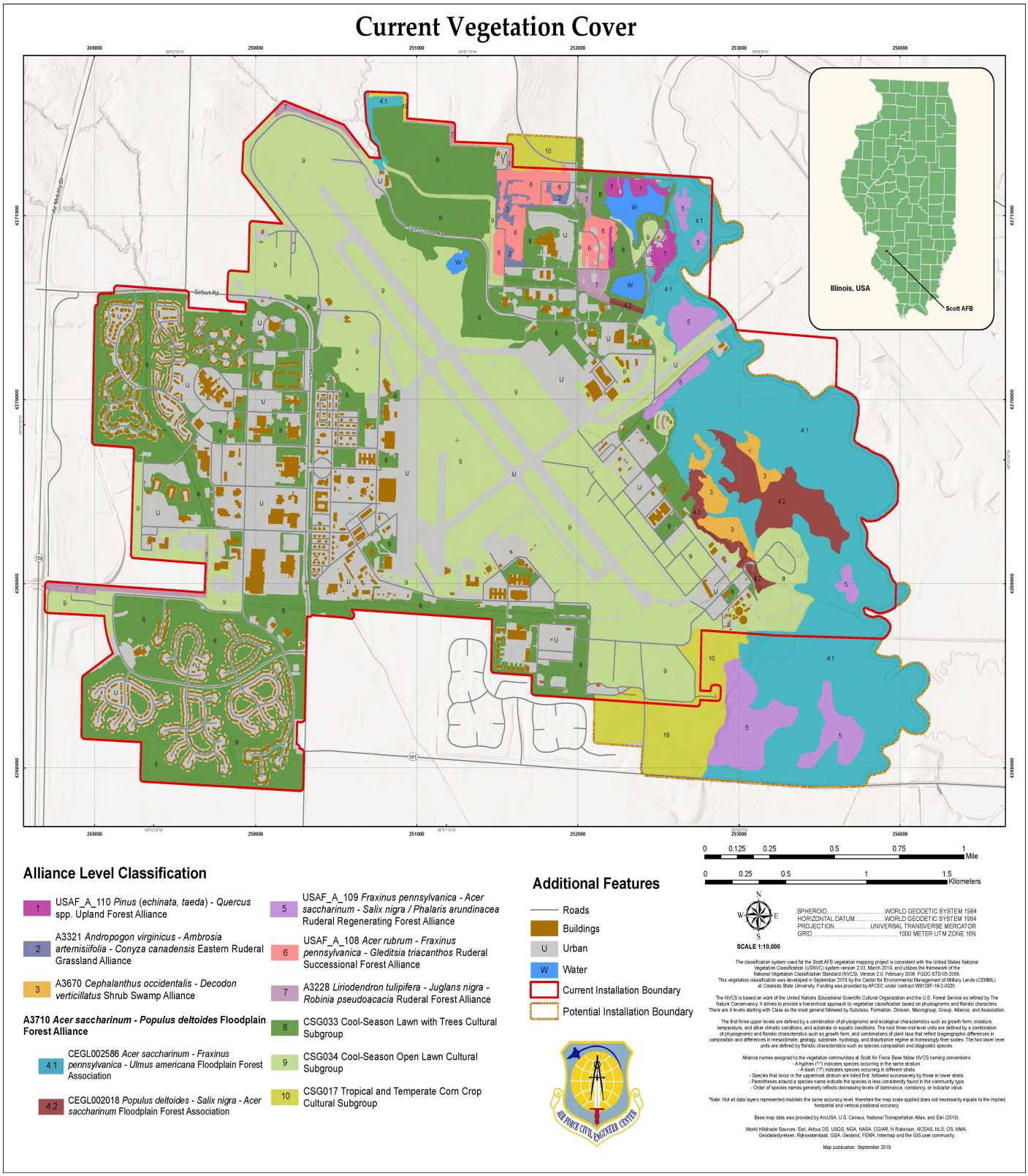

Figure 2-12. Current Vegetation Cover

Habitat assessments were also conducted at Scott AFB and MidAmerica Airport in the early 1990's. Summaries of these studies are presented in the Ecological Monitoring Report for MidAmerica Airport (TAMS 1995). These surveys included the use of the Habitat Suitability Index for bottomland hardwood communities (Schroeder et al 1992) to evaluate the wildlife habitat of the bottomland forests in the Silver Creek riparian corridor prior to the construction of the taxiway connecting MidAmerica Airport with Scott AFB. The Wildlife Habitat Appraisal Guide was also used to supplement information collected for the Habitat Suitability Index. The data collected for these reports was intended to be used for future evaluations of changing conditions at Scott AFB and MidAmerica Airport and was collected using detailed survey protocols with repeatable scientific methods. These studies could therefore be repeated to evaluate habitat changes within the Silver Creek riparian corridor in the last thirty years.

Table 2-7

Summary of 2001 Botanical Inventory of the Forests at Scott Air Force Base

Stand	Plant Community	Grade	Significance
1	Floodplain Forest	C-	Moderate disturbance, lower diversity, few exotics, moderate area, little threatened and endangered (T&E) species potential
2	Floodplain Forest	B-	Little disturbance (except management), high diversity, older growth, large area, significant T&E potential
2a	Swamp	B	Little disturbance, high diversity, few exotics, small area, significant T&E potential
3	Floodplain Forest	C-	Moderate disturbance, few exotics, moderate area, some T&E potential
4	Floodplain Forest	C-	Moderate disturbance, few exotics, small area, little T&E potential
5	Floodplain Forest	C	Little disturbance, good diversity, few exotics, small area, some T&E potential
6	Wet-mesic Upland Forest	D+	Significant disturbance, moderate diversity, exotics common, very small area, little T&E potential

Source: Martin et al. 2002

Upland Forest

Upland forest at Scott AFB is limited to a small, approximately 5-acre site located south of the recreational campground and a slightly larger (8-acre) site located north of Scott Lake (Figure 2-12). According to the 2001 biological inventory (Martin et al. 2002), the small, 5-acre portion of the upland forest (Stand 6) is a degraded community with a large number of exotic plants.

Dominant tree species include box elder, hackberry (*Celtis occidentalis*), white mulberry (*Morus alba*), wild black cherry (*Prunus serotina*), black locust (*Robinia pseudoacacia*), and American elm. Shrubs include shrub honeysuckle (*Lonicera* spp.) and multiflora rose (*Rosa multiflora*). Vines include Japanese honeysuckle (*Lonicera japonica*) and Virginia creeper. Dominant herbs include Indian strawberry (*Duchesnea indica*), white snakeroot (*Ageratina altissima*), and common goldenrod (*Solidago* spp.) (Martin et al. 2002, Scott AFB 2011b).

The larger upland forest area north of Scott Lake is dominated by pine (*Pinus* sp.), green ash, American elm, and pin oak. Shrub species are limited to the invasive bush honeysuckle. Vine species observed include Japanese honeysuckle and winter creeper (*Euonymus fortunei*) (Scott AFB 2010c, Scott AFB 2011b).

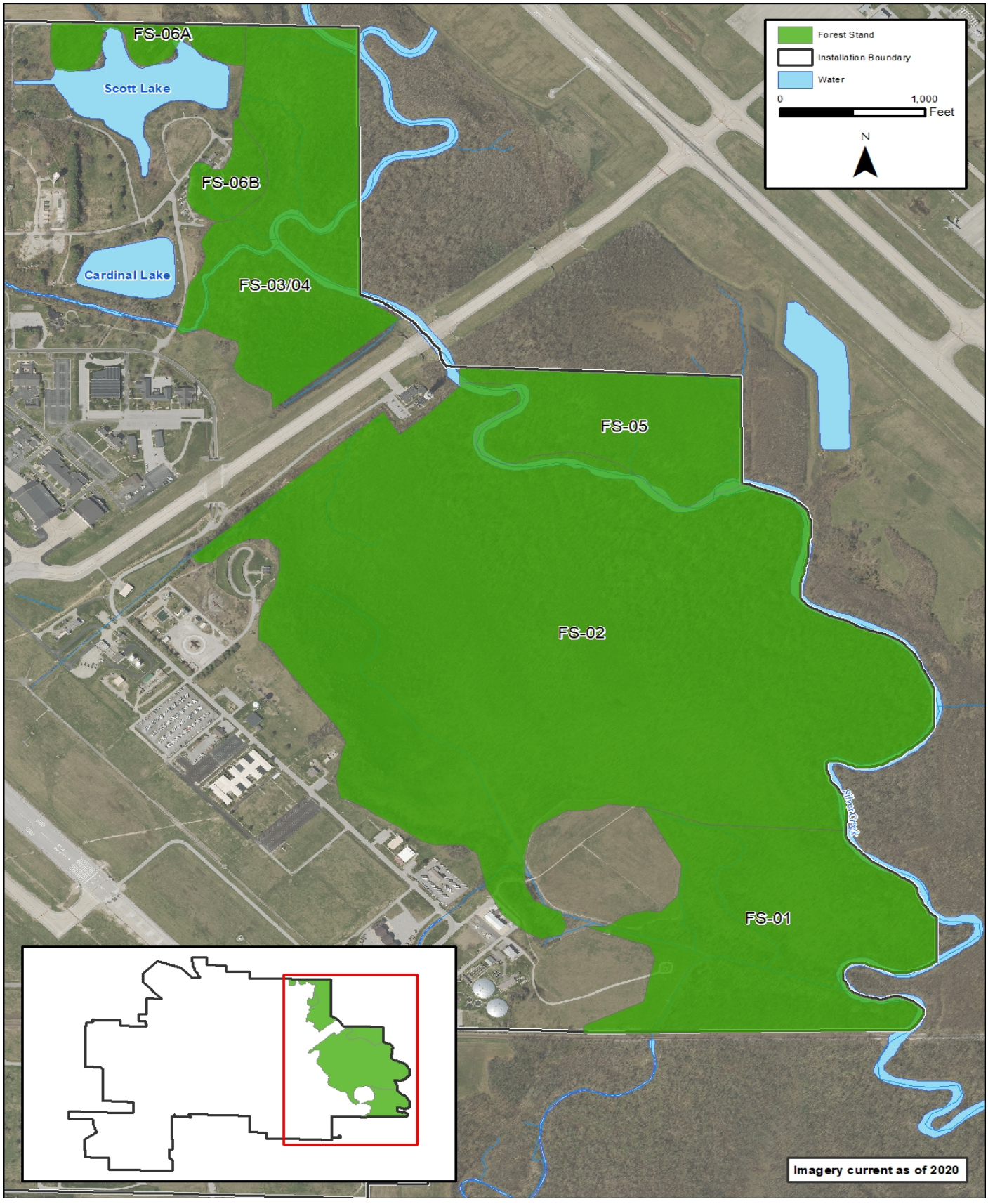

Figure 2-13. Natural Forest Stands, Silver Creek Riparian Corridor

Scrub-Shrub/Early Successional Habitat

The Cardinal Creek Area, located in the north-central portion of the base, represents the only scrub-shrub/early successional habitat at Scott AFB. It originally covered approximately 84 acres. The area was developed for base housing in 1955. In 1999 the housing was vacated and then demolished. In 2003, the building foundations were removed and covered with clean fill. In subsequent years, chlordane-contaminated soil was removed. The new, Defense Information Systems Agency (DISA) Global Operations Command complex was constructed on part of the site and began operations in 2016. Presently, approximately 31% of the Cardinal Creek area is impervious area consisting of buildings and pavement and the remaining approximately 51-acres is undeveloped/vegetated. Aside from the placement of informative signs, there has been no active natural resource management at this area.

The area is gradually succeeding to a scrub-shrub habitat. The portions of the site with landscape trees have become islands of invasive trees and shrubs such as black locust, bush honeysuckle (*Lonicera* spp.), and autumn olive (*Elaeagnus* spp.). Japanese honeysuckle and multiflora rose are common in these areas. These islands are gradually increasing in size and without management will eventually become the dominant habitat type at this location. The large areas of lawn and open space that were left after the demolition of housing and the removal of contaminated soil have become infested with invasive species common to grasslands, such as common ragweed (*Ambrosia artemisiifolia*), giant ragweed (*Ambrosia trifida*), musk or nodding thistle (*Carduus nutans*), Canada thistle (*Cirsium arvense*), Chinese lespedeza (*Lespedeza cuneata*), and Johnson grass (Scott AFB 2011b).

Due to the lack of open scrub-shrub/early successional habitat in other portions of Scott AFB, this area provides beneficial wildlife habitat and is inhabited by a variety of reptile and mammal species. White-tailed deer have been observed utilizing the area for cover habitat. The area would provide a greater benefit to wildlife if the number of invasive species observed at this location could be reduced (Scott AFB 2011b). To that end, discussion has occurred between USFWS biologists working at Scott AFB and the NRM regarding planting native prairie-scrub-shrub mixtures in areas where invasive species have been removed. This would create favorable edge habitat for bobwhite quail (Andersen, 2021).

2.3.2.3 Future Vegetation Cover
Installation Supplement

Climate Change

The following text from the CSU CEMML project report describes potential changes to future vegetation cover at Scott AFB due to climate change (CSU CEMML, 2021).

"There are three dominant ecological systems at Scott AFB located within the floodplain of Silver Creek and near Scott Lake. Projected changes in temperature and precipitation could alter the composition, distribution, and abundance of plant species in these systems. The extent of changes will also depend on the frequency and intensity of wildland fire that is realized on the installation in the future (Section 8.0).

Since each vegetation type at Scott AFB could respond to each climate scenario differently and fire and flooding regime shifts are not linear, managers should be aware of a range of potential changes at the installation. The best way to prepare for this range of possibilities will be to support the resilience of natural vegetation types and healthy communities.

Prolonged flooding during the growing season may stop reproduction and reduce the growth of larger trees. In contrast, flooding during the dormant season is not detrimental to trees and may even benefit species in bottomland forest (i.e., Silver Maple, Green Ash, and Sycamore Floodplain Forest). All species in bottomland hardwood forests are very susceptible to fire damage. Ground fires readily kill saplings and seedlings and wound larger trees, and vines and weeds often replace these trees after fire. Ground fires also deteriorate the habitat by destroying organic matter. Therefore, prescribed fire should not be used as a management tool for bottomland hardwoods. Flooding and timber removal are essential processes for bottomland hardwood forest establishment and maintenance (Myers and Buchman 1984), so mechanical removal of damaged, suppressed, and slow growing trees is the best means for controlling potential damage.

Permanent to semi-permanent flooding is important for establishing and maintaining stands in Eastern North American freshwater marsh. However, strong storms may create especially strong waves or currents that can break up marsh vegetation. Extended drought or water table reduction may lead to soil exposure and invasion by wet meadow plant species. Conversely, continued increases in the water level may favor submergent or floating-leaved vegetation (NatureServe 2020*a*). Rising temperatures could increase the potential of insect and heartwood disease outbreaks such as Dutch elm disease and heartwood decay in elm-ash-cottonwood forest.

Drought, along with periodic ground and crown fire events, constitute the main natural disturbances by which North-Central Oak - Hickory Forest & Woodland vegetation maintains a more open canopy structure. These open canopies support oak regeneration, so changes in rainfall and wildfire will determine how climate change influences this vegetation type.

Overall, ecological systems on the installation and their associated vegetation are vulnerable to the rising temperatures and shifts in precipitation expected due to climate change. These changes are likely to influence the products and services supported by natural resources at the installation. To help support the resilience of these systems, natural resource managers could focus on monitoring vegetation for indications of climate stress. Managers could also conduct restoration activities, including restoring native species diversity, maintaining the soil moisture regime (e.g., irrigation/drainage of natural communities), and evaluating needs for species (e.g., pollinators) and habitat characteristics (e.g., soil crusts, hydrology) that will restore essential functions to the system. Managers should also consider using localized wildfire models to restore fire regimes where they have been severely altered due to removal of herbivores, wildfire suppression, or invasive plant introductions. Finally, we recommend that managers monitor for invasive plant expansion, including shrub invasion (Comer et al. 2018)."

2.3.2.4 Turf and Landscaped Areas
Installation Supplement

Approximately 85 percent of Scott AFB is developed or managed (i.e. improved areas). Turf grass and landscape vegetation occur largely in association with the improved areas, such as lawns, gardens, golf course fairways, ponds, bare ground, and recreational fields. Semi-improved areas such as the runway borders, the runway infield, and approach clear zones are planted with turf grass.

Historically, Scott AFB has used a typical turf grass mix of bluegrass, tall fescue, and rye for the majority of turf plantings in both semi-improved and improved areas. The golf course generally uses a mix of perennial ryegrasses (*Lolium* sp.), bluegrass (*Poa pratensis*), zoysia (*Zoysia* sp.), and creeping bent grass (*Agrostis palustris*). Other common naturalized grasses observed in the semi-improved portions of the base include foxtail barley (*Hordeum jubatum*), foxtail (*Setaria glauca*), and smooth brome (*Bromus inermis*). The invasive Johnson grass (*Sorghum halepense*) is also abundant on the installation.

Common landscape shrubs used across the installation include hollies (*Ilex* spp.), viburnums (*Viburnum* spp.), yew (*Taxus* spp.), juniper (*Juniperus* spp.), American arborvitae (*Thuja occidentalis*), burning bush (*Euonymus atropurpureus*), and forsythia (*Forsythia forsythia*). Common large landscape trees include red maple, eastern white pine (*Pinus strobus*), green ash, Norway maple (*Acer platanoides*), and red oak. Small-to-medium landscape trees include juniper, crab apple (*Malus* spp.), hawthorns (*Crataegus* spp.), eastern redbud (*Cercis canadensis*), and Bradford pear (*Pyrus calleryana*) (Scott AFB 2010c).

2.3.3 Fish and Wildlife
Installation Supplement

Various wildlife studies and observations indicate that Scott AFB supports a diversity of wildlife species. These studies have identified 210 species of birds, 24 mammal species, 25 species of amphibians and reptiles, 45 fish species, and a large number of aquatic macroinvertebrates. Appendix H includes a list of fauna observed on base with scientific names for each of the corresponding common names used below.

Birds

The first known bird surveys at Scott AFB were conducted in association with the construction of MidAmerica Airport by St. Clair County. The first of these surveys was conducted in 1988 prior to the construction of the new airport (U.S. Air Force 1991) and established initial transects for future studies. Thirty-nine species of birds were observed during this initial survey. Post-construction monitoring surveys began in 1994 and continued in 1996, 1997, 1998-1999, 2001-2002, 2004, 2006, and 2008 (Earthtech 2006, Volkert 2009). These surveys identified approximately 200 species of birds at Scott AFB and MidAmerica Airport. The surveys also provide most of the information known about breeding birds at Scott AFB. Results of these surveys are summarized in Appendix H.

In 1999-2000 the World Bird Sanctuary conducted a survey for avian occurrence along the runway at Scott AFB (Cooke and Zeloski 2001). The focus of this survey was to evaluate bird presence and behavior along the runway on a bi-monthly schedule from October 1999 to September 2000. Results of this study indicate that birds prefer the long grass areas of the runway over short grass areas and that the majority of birds impinging on the runway at an elevation of approximately 300 feet were starlings, grackles, and red-winged blackbirds. Cannons had no effect on birds in the grass or birds overflying the airfield. The greatest potential for bird strikes exists from non-resident birds flying over the airfield from November through March.

In 2001, and again in 2009, Scott AFB performed migratory bird surveys within the different habitat types at Scott AFB (Martin et al. 2002, Scott AFB 2012). The most recent survey conducted in 2009 was conducted over a one-week period from 19 April to 23 April. Fourteen point count locations were sampled (morning and evening). The results of these surveys are summarized in Appendix H.

Between June of 2012 and May of 2013, USDA Wildlife Services accomplished avian surveys over an area including both Scott AFB and MidAmerica Airport as part of a Wildlife Hazard Assessment (USDA-APHIS-WS, 2013). These surveys were performed approximately four times per month (fewer during winter due to inclement weather) at ninteteen permanent observation stations located on and near Scott AFB and MidAmerica Airport (Figure 2-14, USDA-APHIS Avian Survey Monitoring Stations). The focus of these surveys was to identify strike hazards, but all observed species were recorded. The highest mean number of birds observed was in February, followed by March, November, and June; with migrating birds accounting for the increases in February and November. An inventory of the species observed is at Appendix H.

In 2013/2014, avian and aquatic organism surveys were conducted at MidAmerica Airport as part of wetland mitigation and monitoring. The avian survey transects included land bordering on and overlapping the eastern section of Scott AFB. Results of the avian survey include the observation of over 112 different species, many of which exhibited breeding and nesting behavior. Overall findings indicated that the mitigation plan was a success. As a result, MidAmerica Airport was released by U.S. Army Corps of Engineers from further bird monitoring requirements after this study (Volkert, 2014).

A survey of breeding birds was conducted by USFWS biologists in mid-June of 2017. The survey time period was chosen based on data taken from ebird.org, which showed a bimodal peak of bird use in St. Clair County during that time, and breeding bird territories were assumed to be well established during that period. Twenty survey points were randomly within the forested areas at Scott AFB. Each point was surveyed by a team of 2-3 biologists twice, once in the morning and once in the evening. Any birds observed or heard were recorded. Survey results showed a total of 63 different bird species observed and identified and one unknown bird observed (USFWS 2018a).

According to the surveys conducted at Scott AFB, the largest number of bird species observed at the base are associated with the forest in the Silver Creek Riparian Corridor. Forest species that are routinely observed at Scott AFB include tufted titmouse, blue jay, red-bellied woodpecker, brown-headed cowbird, downy woodpecker, brown thrasher, eastern towhee, eastern phoebe, and white-breasted nuthatch. Other interior woodland species that have been observed at Scott AFB include pileated woodpecker, yellow-throated vireo, mourning warbler, American redstart, brown creeper, and least flycatcher (Appendix H).

Birds associated with open water communities, such as Scott and Cardinal Lakes, include the Canada goose, little blue heron, great blue heron, and cattle egret. While grassland bird habitat is not common at Scott AFB, several grassland species have been observed occasionally within the Scott AFB boundaries or at MidAmerica Airport, including the bobolink, savannah sparrow, eastern meadowlark, grasshopper sparrow, and sedge wren. Commonly observed grassland birds include Northern bobwhite, red-winged blackbird, American goldfinch, field sparrow, dickcissel, and common yellowthroat (Appendix H).

Red-tailed hawk, red-shouldered hawk, American kestrel, Cooper's hawk, turkey vulture, great-horned owl, and barred owl are raptors frequently observed at Scott AFB. Broad-winged hawk, sharp-shinned hawk, rough-legged hawk, and screech owl have also been observed at the installation (Scott AFB 2012).

The next bird survey project at Scott AFB is scheduled for fiscal year 2025, as indicated in Chapter 10.

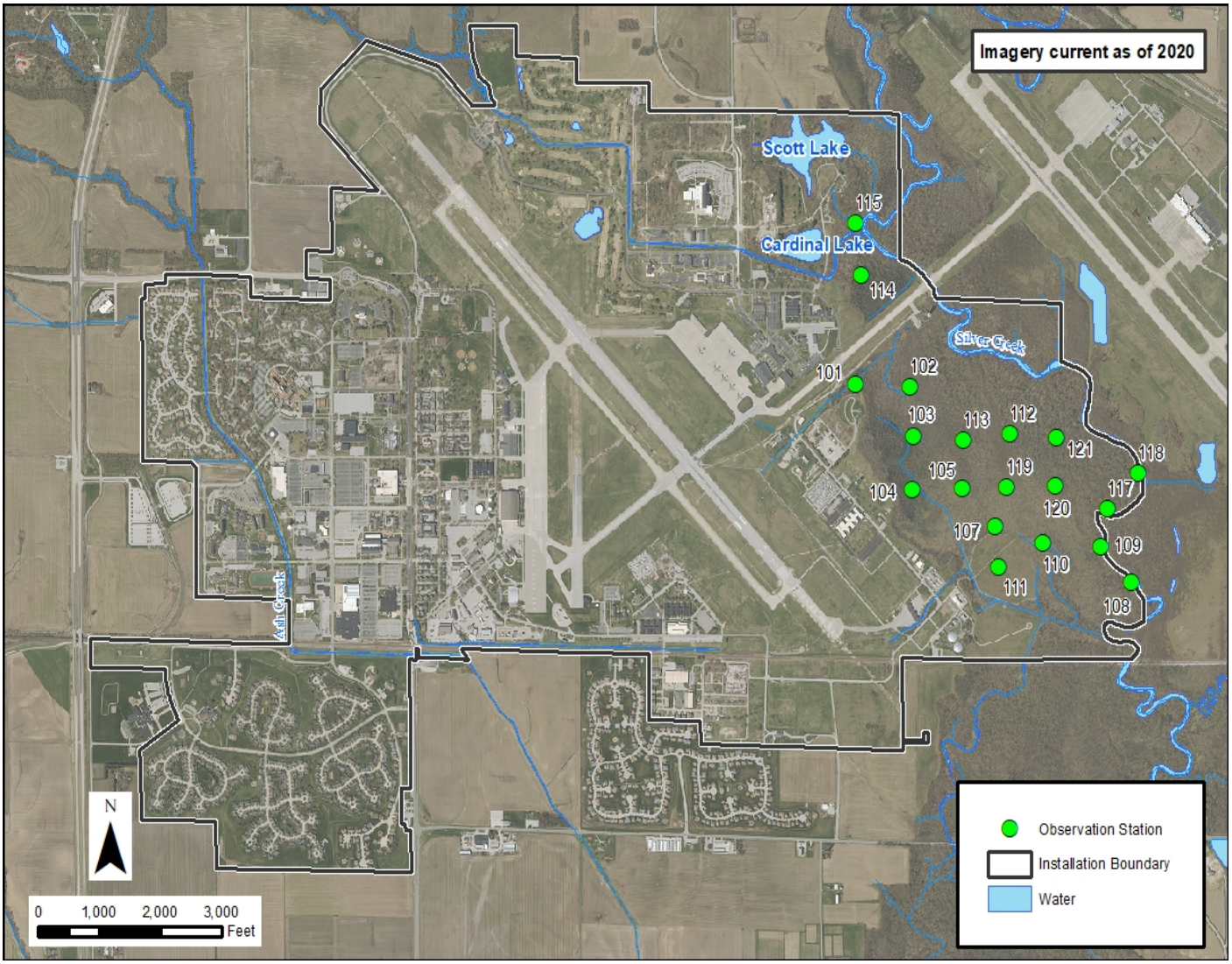

Figure 2-14. USDA-APHIS 2013 Avian Survey Monitoring Stations

Mammals

A small mammal survey was conducted at Scott AFB from 2017-2018 and it identified a number of mammal species (USFWS, 2018b). Incidental observations during other base surveys have identified 24 mammal species at Scott AFB. Large- and medium-sized mammals commonly observed include white-tailed deer, raccoon, beaver, fox, and opossum. Small mammals include gray and fox squirrels, southern flying squirrel, and eastern cottontail (Appendix H). Several inventories have been conducted at Scott AFB for bats and have documented eight different bat species utilizing the bottomland forest habitat at Scott AFB. Examples of species observed include the Indiana Bat, Northern long-eared bat (NLEB), red bat, hoary bat, eastern pipestrille, and evening bat (Appendix H). Section 2.3.4 includes a history of bat surveys conducted in the vicinity of Scott AFB.

Reptiles and Amphibians

Two reptile and amphibian surveys have been conducted at Scott AFB. The first and most comprehensive series of surveys were conducted by Kenneth Mierzwa and John Palis prior to construction of MidAmerica Airport (from 1991-1993) and then during the construction from 1995-1997 (Mierzwa et al. 1998). These surveys documented 23 of the 25 species of reptiles and amphibians known to occur in the vicinity of Scott AFB. The second reptile and amphibian survey was conducted by Thomas Anton in 2004. The primary purpose of this study was to assess habitat requirements at Scott AFB for the eastern massasauga rattlesnake (*Sistrurus catenatus*); however, observations of other reptiles and amphibians were recorded. This survey resulted in the identification of two species [cricket frog (*Acris blanchardi*) and green frog (*Rana calamitans*)] that had not previously been documented at Scott AFB (Scott AFB 2005b, Anton 2010).

Fourteen species of reptiles have been documented at the installation, including broadhead skink, brown snake, common gartersnake, diamondback watersnake, common snapping turtle, and red-eared slider (Appendix H). Eleven species of amphibians have been observed, including smallmouth salamander, bullfrog, American toad, cricket frog, southern leopard frog, and western chorus frog (Scott AFB 2012).

Fish

Fish surveys in Silver Creek were conducted as part of the MidAmerica Airport construction mitigation. These surveys occurred in 1982, 1987, 1988, 1992-1995, 1996-2002, 2004, 2006, and 2008 (TAMS 1996, Earth Tech 2006). These surveys have identified over 40 fish species, including bigmouth buffalo, blackstripe topminnow, bowfin, freshwater drum, Johnny darter, and numerous species of sunfish, minnows, and shiners (Appendix H).

Scott AFB has partnered with the USFWS Carterville Fish and Wildlife Conservation Office since 1980 to monitor the health of the Scott Lake fisheries. Cardinal Lake was included in this agreement after it was constructed in 1995. Since 1995, the Carterville Fish and Wildlife Office has conducted annual fish surveys to determine the overall health of the fisheries and to make management recommendations. These surveys have identified numerous fish species at Scott and Cardinal Lakes including largemouth bass, channel catfish, and bluegill (USFWS 2017a).

Climate Change

The following text from the CSU CEMML project report describes potential changes to fish and wildlife at Scott AFB due to climate change (CSU CEMML, 2021).

"Given the model projections for Scott AFB, wildlife communities in the region are likely to be moderately impacted by climate change. A substantial proportion of vegetation on Scott AFB is managed as "improved" or "semi-improved", providing little ecosystem function. As such, fish and wildlife communities that rely on native vegetation may have limited available refugia and limited ability to alter their distribution within the installation and be more vulnerable to the predicted changes in climate.

Projected increases in temperature and decreases in precipitation are not likely to impose direct threats to a majority of wildlife species found on Scott AFB, but do raise concerns for indirect threats. For example, migrating birds may be indirectly vulnerable to rising temperatures because they time their migration routes to coincide with the springtime emergence of insects. If rising temperatures prompt insects to emerge earlier, birds migrating to or through the installation could miss a major feeding opportunity (Both et al., 2010). Additionally, the changing climate could indirectly impact fish and wildlife populations by altering vegetation communities, especially for specialist species that depend on native plant communities for their survival (Dukes & Mooney, 1999).

Climate change may also create open niches for non-native invasive species (Hellmann et al., 2008). This trend is a global one, but it is expected to be especially significant in wetland and riparian ecosystems like those found on the installation. Rising temperatures and increased drought severity and frequency could also increase the potential for infectious disease outbreaks such as white-nosed syndrome (WNS) and West Nile virus, which could negatively impact wildlife and be transmitted to humans (Baylis, 2017; Langwig et al., 2015; Petersen & Hayes, 2008).

Warmer air temperatures could negatively impact fish and wildlife communities via reductions in water quality, particularly in lentic systems. As water temperatures rise in lentic systems, dissolved oxygen content decreases. This reduction in dissolved oxygen would impair habitat quality, especially for larval amphibians and aquatic macroinvertebrates. Furthermore, warmer water temperatures could increase the chances of algal blooms occurring, further depleting dissolved oxygen content and degrading habitat quality (Paerl et al., 2011)."

2.3.4 Threatened and Endangered Species and Species of Concern

Installation Supplement

Federally Listed Species

The Endangered Species Act (ESA) provides for the conservation and protection of threatened and endangered (T&E) species. The law requires federal agencies, in consultation with the USFWS, to ensure that their actions do not jeopardize the continued existence of any listed species. The endangered Indiana bat and threatened NLEB are the only federally listed species known to occur at Scott AFB. Over the course of the last 18 years, several bat surveys have been conducted at Scott AFB and descriptions of these surveys are included below.

The first documented Indiana bat survey at Scott AFB was conducted by the INHS in 1991. This survey was conducted as part of a larger statewide distribution study to determine the status of Indiana bats throughout Illinois. Although 15 bats were captured during this survey, no Indiana bats were captured. In 1993, the U.S. Army Engineer Waterways Experiment Station conducted a survey for T&E species on Scott AFB. No Indiana bats were observed (Hofmann 1993 in Martin et al. 2002). In 2001, the INHS conducted an environmental survey of selected fauna and their habitats at Scott AFB (Martin et al. 2002). Mist netting occurred along Silver Creek, Cardinal Creek, and an old roadway following the bank of Silver Creek. Five species, including a single female Indiana bat, were captured during the 2001 sampling. In 2007, a bat survey was conducted at Scott AFB (Scott AFB 2007a) to assess the status of the Indiana bat population at the installation. Twelve mist nets were set up at five different sites in the Silver Creek Riparian Corridor. Twenty mist-net sampling nights were completed during this study, and thirty bats of six different species were documented, including seven Indiana bats. The results of this study indicated that the Silver Creek Riparian Corridor appeared to provide adequate roosting and foraging habitat for a number of bat species, including the Indiana bat.

A bat survey was completed in the summer of 2009 (Scott AFB 2010e). The primary objective of the 2009 survey was to identify Indiana bat roosting locations. Seven mist nets were set up for three-and-a-half hours, and 14 bats from five species were captured, including six Indiana bats. Of the six captured Indiana bats, one was a juvenile male, four were documented as reproductive females, and one was documented as a juvenile female. Five of the six Indiana bats were radio-tagged and tracked to five different roost trees on Scott AFB. Roost trees were observed for four consecutive evenings. An average of 57 bats was observed emerging from the monitored roost trees. The 2009 survey resulted in the completion of an Indiana bat habitat map highlighting the known roosting areas and identifying potential future roosting areas at Scott AFB (Figure 2-15, Potential and Known Roosting Areas of the Indiana Bat).

Since the completion of the 2009 study, Indiana bat populations across the country have been impacted by white nose syndrome (a fungal disease that kills winter cave dwelling bats) and the status of this endangered species has become less certain. A recent DoD memorandum on white nose syndrome encouraged installations with known Indiana bat populations to evaluate the impact of the disease on bat populations and consider the potential mission impacts of this disease. White nose syndrome also has the potential to impact other cave dwelling bat species that are known to occur at Scott AFB (NLEB and Little brown bat) that are or may soon be under consideration for federal listing.

In the summer/fall months of 2014, USFWS conducted a survey of the bat population and habitat conditions at Scott AFB (USFWS 2015a). The purpose of the survey was to conduct mist-netting, radio-telemetry, acoustic surveys, and habitat assessments, specifically pertaining to the Indiana bat and other bat species of concern. Mist-netting yielded a total of five bats, four adult female Indiana bats and one Eastern red bat. Acoustic data indicated that ten bat species were likely to occur at Scott AFB, including the Indiana bat and the NLEB. Overall bat activity was highest in the northern section of the forest. Management recommendations for Scott AFB included continuation of bat surveys to monitor the status of the population and protection and enhancement of the maternity colony habitat and foraging areas.

A survey of the bat population at Scott AFB was conducted in the summer of 2016 by USFWS (USFWS 2016). The purpose of the survey was similar to that of the 2014 survey and utilized mist-netting, radio-telemetry, and acoustic surveys, targeting the Indiana bat, the NLEB, and other bat species of concern. Mist-netting yielded a total of nine bats, one Eastern red bat, four evening bats, one eastern pipistrelle, and three big brown bats. No Indiana bats or NLEB were captured; therefore, radio tracking and emergency surveys were not conducted. Acoustic data analysis indicated that eight bat species were likely to occur on the installation, including the Indiana bat and the NLEB. Overall bat activity was highest in the southern section of the forest. Management recommendations were the same as those made following the 2014 survey.

Another bat survey was completed in the summer of 2017 (USFWS 2018c). The purpose of the survey was to conduct acoustic and roost tree monitoring on Scott AFB in order to update the status of the Indiana bat, NLEB and other protected species previously documented on the Scott AFB and to document Indiana bat and NLEB use of Scott AFB. The acoustic survey documented 7 species as potentially occurring on Scott AFB, including the Indiana bat, NLEB, and 5 other species that have previously been documented at Scott AFB. Overall bat activity and Myotis sp. activity were distributed throughout Scott AFB although the highest numbers were documented in the southern half of the forested area. Based on these results, Indiana bats and NLEB continue to occupy Scott AFB along with several other species of forest bats. Management recommendations for Scott AFB included continuation of bat surveys to monitor the status of the population, protection and enhancement of previously identified maternity colony habitat and foraging areas, and implementation of the Endangered Species Management Plan (ESMP) (Department of the Air Force, 2010).

The most recent bat survey was completed in the summer of 2019 (Carver, 2021). The survey was conducted by Tennessee Tech University (TTU) under contract to AFCEC. Multiple midwest Air Force bases were surveyed, including Scott AFB. In the summer of 2019, a team from TTU deployed full-spectrum bat detectors at 23 Midwest US Air Force installations. Deployment was modeled after USFWS range-wide Indiana bat survey guidelines, with a minimum of 4 detector-nights (a detector-night is one detector active for one night) per 123 acres (50 hectares) of forested habitat. Automated analyses of recorded echolocation calls identified 9 bat species at Scott AFB. The installation falls within the known range of each species. However, one of the species documented by identification software, the gray bat, was not verified after manual identification. Indiana bats were cautiously supported as present based on a single call sequence.

Other Federal Species

Previous inventories at Scott AFB have indicated that the only other federally listed T&E species that have the potential to occur at Scott AFB are the decurrent false aster and the eastern massasauga rattlesnake (Scott AFB 2005b, Martin et al 2002).

Decurrent False Aster

No comprehensive vegetative surveys are known to have occurred at Scott AFB. Limited single season surveys were conducted in 2001 and 2005 (Martin et al. 2002, Scott AFB 2005b). These surveys were limited to one season or a single day. While these surveys have not identified any federally-listed plant species at Scott AFB, habitat for the federally threatened decurrent false aster was identified during the 2001 study (Martin et al. 2002). This habitat was identified as the annually disturbed mudflats along Silver Creek. A sensitive plants survey has been funded by AFCEC and is scheduled to be conducted over several months in 2021-2022. Should this study indicate the presence of decurrent false aster or any other T&E plant species, appropriate management recommendations will be implemented.

Eastern Massasauga Rattlesnake

In September 2004, the USFWS identified the eastern massasauga rattlesnake, a federal candidate species, as potentially occurring at Scott AFB (Scott AFB 2005b). This species occurs in wet areas, including wet prairies, marshes, and low areas along rivers and lakes. In response, Scott AFB performed a habitat reconnaissance and survey for the rattlesnake. The survey was conducted by Mr. Thomas Anton of the Field Museum of Natural History in Chicago on 14 and 15 September 2004 and included surveys of roads and the bottomland forest habitat adjacent to Silver Creek (Scott AFB 2005b, Anton 2010). No eastern massasauga rattlesnakes were observed during the survey. A previous survey (Mierzwa and Palis 1998) also failed to observe this species on the base. The study conducted by Mierzwa and Palis encompassed six years using reliable survey methods. Based on the results from these studies, Scott AFB believes that the eastern massasauga rattlesnake does not occur on base. No further surveys are planned for this species.

Monarch Butterfly

In December of 2020 the USFWS announced that listing the monarch butterfly as endangered or threatened under the ESA is warranted, but precluded by higher priority listing actions. The decision was the result of an extensive status review of the monarch that compiled and assessed the monarch's current and future status. The monarch is now a candidate under the ESA; USFWS will review its status annually until a listing decision is made. Monarch butterflies have been observed at Scott AFB. A pollinator survey project (8.3.3.6), to include the monarch, has been scheduled and programmed for fiscal year 2024. Additionally, a follow-on project has been programmed for the following year, which will implement management recommendations developed from the pollinator survey.

State-listed Species

Species Known to Occur at Scott AFB

While the ESA does not provide protection for state-listed species, AFMAN 32-7003 indicates that INRMPs will provide protection for these species when practicable. A data gap is present at Scott AFB concerning state-listed avian species. Past biological surveys at Scott AFB have observed several Illinois state-listed avian species (Table 2-8). However, the majority of these sightings have been incidental observations, and it is unknown if any of these state-listed species are utilizing Scott AFB for breeding habitat. In addition to the state-listed species, Scott AFB is home to several species that are considered USFWS Birds of Conservation Concern or are listed by Partners in Flight (PIF) as having a high priority for conservation (DoD 2002). These species are identified as such in Appendix H. A comprehensive bird survey is programmed for FY25 and it is anticipated that it will eliminate avian species data gaps.

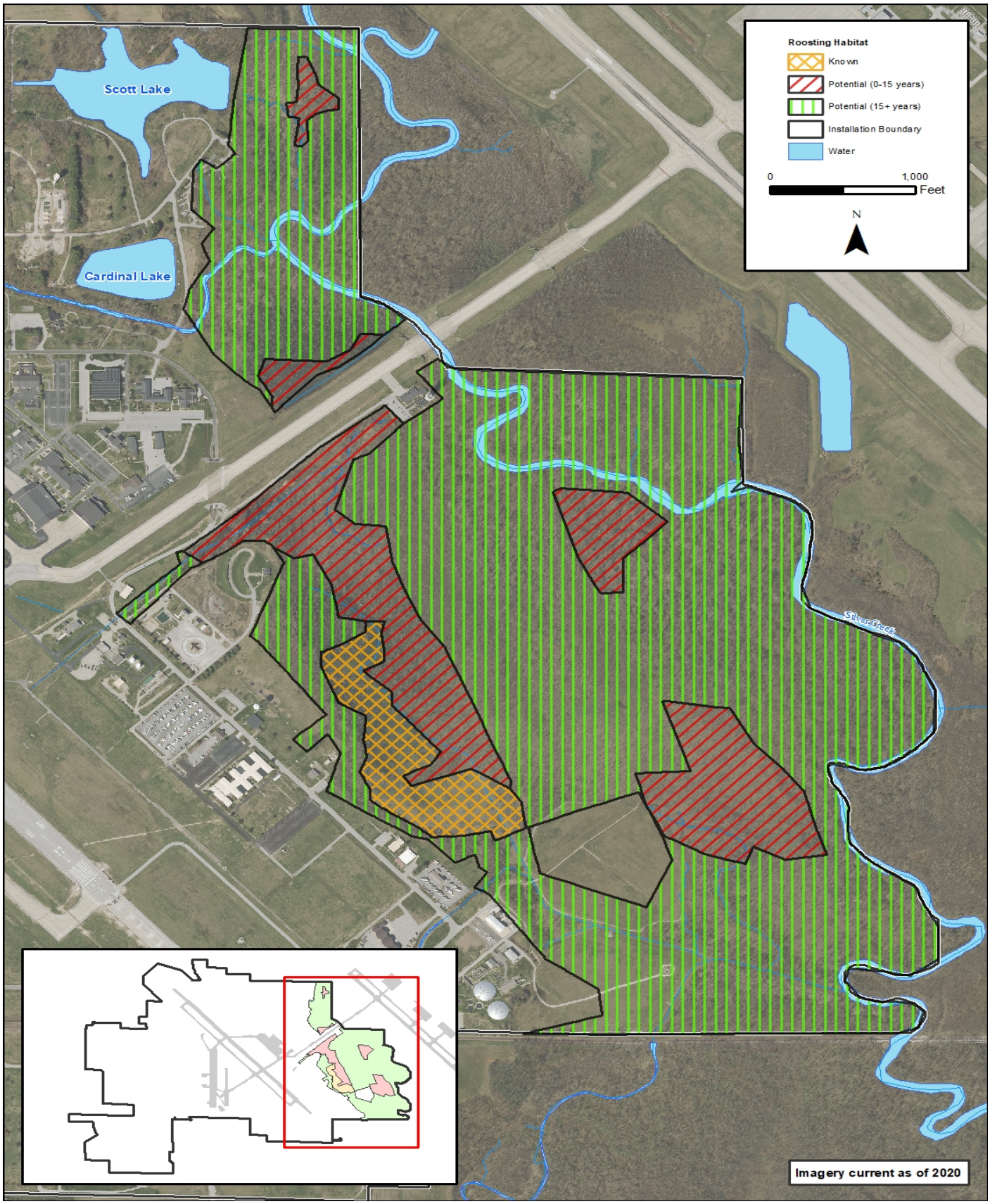

Figure 2-15. Potential and Known Roosting Areas of the Indiana Bat

Table 2-8

State-Listed Bird Species Known to Occur at Scott AFB

Common Name	Scientific Name	State Rank	Breeding Status
Black-crowned night heron	*Nycticorax nycticorax*	Endangered	Unknown
Cerulean warbler	*Dendroica cerulean*	Threatened	Possible
Little blue heron	*Egretta caerulea*	Endangered	Probable
Northern harrier	*Circus cyaneus*	Endangered	Unknown
Short-eared owl	*Asio flammeus*	Endangered	Unknown
Snowy egret	*Egretta thula*	Endangered	Unknown
Black-billed cuckoo	*Coccyzus wrythropthalmus*	Threatened	Unknown
Loggerhead shrike	*Lanius ludovicianus*	Threatened	Unknown
Osprey	*Pandion haliateus*	Endangered	Unknown
Yellow-crowned night heron	*Nyctanassa violacea*	Endangered	Unknown
Least bittern[1]	*Ixobrychus exilis*	Threatened	Unknown
Upland sandpiper[1]	*Bartramia longicauda*	Endangered	Unknown
Berwick's wren[2]	*Thryomanes bewickii*	Endangered	Unknown

Sources: Cooke and Zeloski 2001, Earth Tech 2006, Volkert 2009, Martin et al. 2002, Scott AFB 2010d

[1]Observed in Silver Creek bottomland at MidAmerica Airport (Appendix: Species Known to Occur at Scott AFB).

[2]Information on precise location unavailable (Appendix: Species Known to Occur at Scott AFB).

Species Potentially Occurring at Scott AFB

The State of Illinois (IDNR 2010) has also identified the common moorhen (*Gallinula chloropus*) as a potential state threatened species that could occur at Scott AFB. This species is known to utilize emergent wetland habitat and has been observed in St. Clair County. Since 1991, avian surveys have been regularly conducted at Scott AFB. The common moorhen has not been observed in any of these surveys. It therefore seems unlikely that this species occurs at the installation.

A data gap is present for vegetation surveys at Scott AFB. A previous survey by Handel in 1993 (cited in Martin et al. 2002) indicated that habitat for at least seven state-listed species is known to be present at Scott AFB, including blue jasmine (*Clematis crispa*), cynosciadium (*Cynosciadium digitatum*), American strawberry bush (*Euonymus americanus*), creeping loosestrife (*Lysimachia radicans*), mock bishop's weed (*Ptilimnium nuttallii*), green trillium (*Trillium viride*), and grass leaved lily (*Stenanthium gramineum*). No comprehensive surveys have been conducted during the flowering periods of these species (Martin et al. 2002). It is anticipated that the planned sensitive plants survey described above will eliminate the vegetative survey data gap.

Climate Change

The following text from the CSU CEMML project report describes potential changes to threatened and endangered species at Scott AFB due to climate change (CSU CEMML, 2021).

"In general, habitat change and disruption to food availability are two major climate-related threats to all species at Scott AFB and will therefore be important considerations for threatened and endangered (T&E) species and species of special concern (SSC) on the installation. Habitat requirements for some species, such as the need for refugia, may change as individuals employ behavioral adaptations. Changes in temperature and precipitation may also affect prey populations or forage abundance for many species. For example, seasonal cues for prey or forage emergence may change, driving a mismatch between food availability and needs. Populations of some T&E species and SSC are further imperiled by life stages that are sensitive to the temperature and precipitation changes projected in the climate scenarios.

CSU CEMML conducted risk assessments of T&E species noted in the installation's INRMP, focusing on federal and state T&E species that were known to occur on or adjacent to the installation (Table 2-5). We used the framework developed by Thomas et al. (2011) for all species' risk assessments. The assessment framework combines qualitative methodology (i.e., literature review) and quantitative methodology (i.e., calculations of climate-related impacts) to evaluate a species' potential risk to the impacts of climate change, producing an overall classification of the species' vulnerability and an associated measure of confidence.

Table 2-5. Vulnerability risk to climate change and level of confidence for focal species.

Species	Vulnerability Risk			
	Very High	High	Moderate	Low
Indiana Bat (*Myotis sodalis*)		1		
Northern Long-Eared Bat (*Myotis septentrionalis*)	2			
Eastern Massasauga Rattlesnake (*Sistrurus catenatus*)	2			
Decurrent False Aster (*Boltonia decurrens*)				1
3 = high level of confidence, 2 = moderate level of confidence, 1 = low level of confidence				

Indiana Bat (*Myotis sodalis*)

Under current climate change scenarios, Indiana bats are predicted to be significantly affected by climate change, with a conservative estimate of 30–50% decline in the next decade as a result of habitat loss, WNS, and increasing ambient temperatures (Langwig et al., 2016; Thogmartin et al., 2013). Indiana bat populations are known to roost on Scott AFB and habitat assessment analysis indicates that suitable roosting habitat exists throughout the forested areas on base. Maintaining healthy bat populations will depend on good stewardship of the forests and maintaining normal disturbance patterns, which may be achieved by timber management and selective harvesting.

Northern Long-Eared Bat (*Myotis septentrionalis*)

Northern long-eared bat (NLEB) population declines have been driven by WNS, wind power, habitat loss, pesticide use, and climate change (USFWS, 2015, 2018). Researchers have found that reproductive success of bat species was lowest in years that were hotter and drier (Adams, 2010; Hayes & Adams, 2017) and they are sensitive to environmental stressors (Jones et al., 2009; Sherwin et al., 2012). Similar to Indiana bats, the NLEB on Scott AFB utilize the forested habitat of the Silver Creek riparian corridor, although NLEB have been shown to utilize buildings for shelter more often than Indiana bats. Monitoring NLEB populations and habitat on Scott AFB in the future will be a high priority as these populations are expected to decline due to climate change and the impacts of WNS. Current management practices for NLEB on Scott AFB are the same as those for Indiana bats, which focus on conserving and maintaining existing roosting and foraging habitat.

Eastern Massasauga Rattlesnake (*Sistrurus catenatus*)

Although the direct threats to eastern massasauga rattlesnake (EMR) populations (e.g., habitat modification, road mortality, over-harvesting) are predominantly human-caused, changes in climate have altered hydrologic cycles, fire frequency, and vegetation succession and structure, all which impact EMR abundance and distribution (Hileman et al., 2017; Markle et al., 2020; Naujokaitis-Lewis et al., 2018; Pomara et al., 2014; D. R. Smith et al., 2018; Szymanski et al., 2016). As wetland areas begin to dry, vegetation succession begins to promote woody vegetation and alter the structure of preferred EMR habitat, which can be exacerbated by invasive vegetation (USFWS, 2016). Future projections for the EMR population predict an 80% decline in abundance across their range over the next 50 years (D. R. Smith et al., 2018). Although there have been no confirmed sightings on Scott AFB, it is located at the edges of their range and contains quality EMR habitat. Due to very high vulnerability of EMR to future climate change and the availability of quality EMR habitat on Scott AFB we recommend periodic EMR surveys be conducted in potential habitat areas.

Decurrent False Aster (*Boltonia decurrens*)

The major threats to the persistence of the decurrent false aster (DFA) are anthropogenic habitat destruction and modification, prolonged late season flooding, herbicide use and encroachment of woody vegetation (Schorg et al., 2019; M. Smith et al., 2005). Although there is very little information on DFA populations and even less on how climate change may affect these populations, climate change is not considered a major direct threat to the species."

2.3.5 Wetlands and Floodplains

Installation Supplement

Wetlands

The wetlands at Scott AFB are the primary natural resource feature at the installation. The most recent wetland delineation at Scott AFB occurred in 2009 and identified a total of 36 wetlands covering approximately 378 acres (Scott AFB 2010a). Approximately 375 acres are considered Section 404 jurisdictional wetlands. The majority of jurisdictional wetlands at Scott AFB are located in the Silver Creek Riparian Corridor and are classified as forested wetlands (351.36 acres) and emergent wetlands (22.78 acres). A few emergent wetlands, totaling less than one acre, are located around Scott Lake and near the golf course (Figure 2-16, Wetlands at Scott AFB).

The most common tree species identified in wetland areas include silver maple, green ash, box elder, sycamore, and eastern cottonwood. Other tree species occurring include common hackberry (*Celtis occidentalis*), bald cypress (*Taxodium distichum*), narrowleaf willow (*Salix exigua*), and pin oak. The shrub layer was sparse to absent in many of the areas surveyed. The most common species occurring in the shrub layer were saplings of the dominant tree species or vines, including riverbank grape (*Vitis riparia*) and poison ivy (*Toxicodendron radicans*). Typical herbaceous species include Virginia wild rye (*Elymus virginicus*), lizard's tail (*Saururus cernuus*), stout wood-reed (*Cinna arundinacea*), jewelweed (*Impatiens capensis*), Canadian clearweed (*Pilea pumila*), creeping jenny (*Lysimachia nummularia*), panicled aster (*Aster simplex*), reed canary grass (*Phalaris arundinacea*), and rice cutgrass (*Leersia oryzoides*). Soils in this area were identified as hydric due to a depleted matrix. Wetland hydrology was typically defined by inundation, saturation, high water table, drift lines, and drainage patterns (Scott AFB 2010a).

The majority of the wetlands at Scott AFB are classified as palustrine wetlands, including palustrine forested wetlands and palustrine emergent wetlands. Forested wetlands are typically found bordering streams, creeks, and drainages, and their primary vegetation consists of trees. At Scott AFB, these forested wetlands are found within the Silver Creek Riparian Corridor. Emergent wetlands are characterized as having predominately herbaceous (non-woody) vegetation that is rooted and erect (emergent) and present for most of the growing season. Examples of emergent wetlands at Scott AFB are those found near the golf course or adjacent to Scott Lake (Scott AFB 2010a).

In recent years fallen timber has created debris blockages which results in localized flooding in the Silver Creek riparian corridor. CE Environmental, along with the Scott AFCEC Installation Support Section (ISS) and USFWS Ecological Services in Moline, IL, are coordinating a planned removal of the blockages potentially in 2023 and future years as necessary. Special consideration is being given to the timing of the work in relation to the presence of the Indiana bat and measures will be taken so as not to disturb maternal roosting site trees. This project is listed in Chapters 8 and 10.

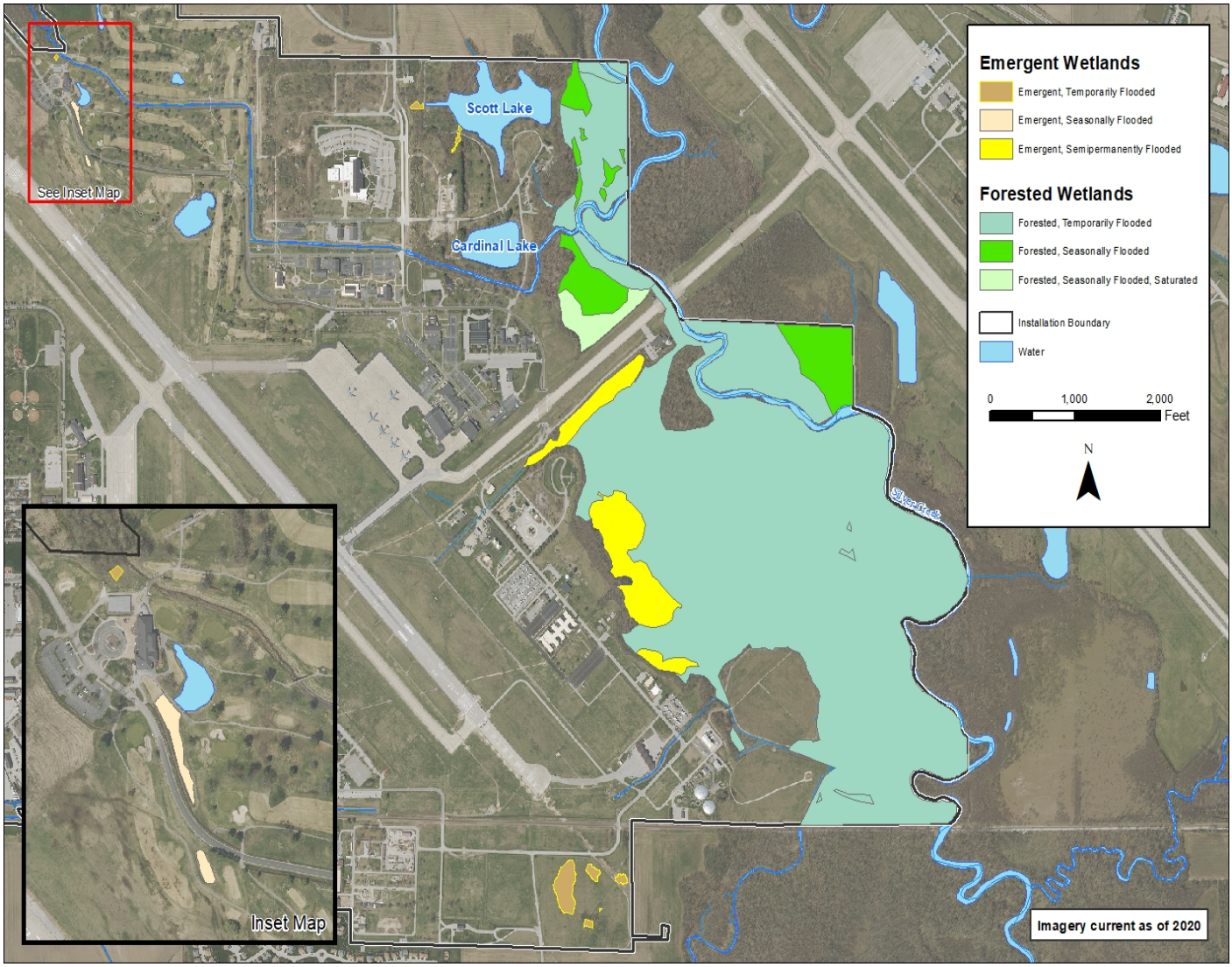

Figure 2-16. Wetlands at Scott AFB

Floodplains

Floodplains are lowlands and relatively flat areas adjoining waters that are subject to a one percent or greater chance of flooding in any given year (i.e., 100-year floodplain). In 2009, a Floodplain Analysis was undertaken to estimate the 100-year floodplain water surface elevation for the surface water drainages located on Scott AFB (Scott AFB 2009a). The 2009 study encompassed all three main drainages and watersheds (Silver, Cardinal, and Ash Creeks) at Scott AFB. The 2009 study provided the necessary 100-year flood water surface elevations and floodplain map (Figure 2-17, 100-Year Floodplain) for the on-base reaches of Silver, Cardinal, and Ash Creeks to support natural resource and operational management needs. Approximately 583 acres of 100-year floodplain are present within the boundaries of Scott AFB.

In 2014, a Stream Corridors Assessment was conducted by TEAMS Enterprise Unit, under contract to AFCEE. The study looked at the three stream drainages at Scott AFB. During the assessment the 2009 study was reviewed, new LIDAR data was obtained and analyzed, and stream channels within the base boundaries were field-reviewed. Design alternative options to potentially reduce flooding impacts were discussed, as well as recommendations to relocate infrastructure and hazardous materials storage within high risk areas (TEAMS 2014).

New LIDAR data was obtained in 2020; this data will be utilized by an AFCEC contractor in late 2021 to update floodplain delineation, which will in turn be used by USFWS biologists in an ongoing capacity during Indiana bat management activities.

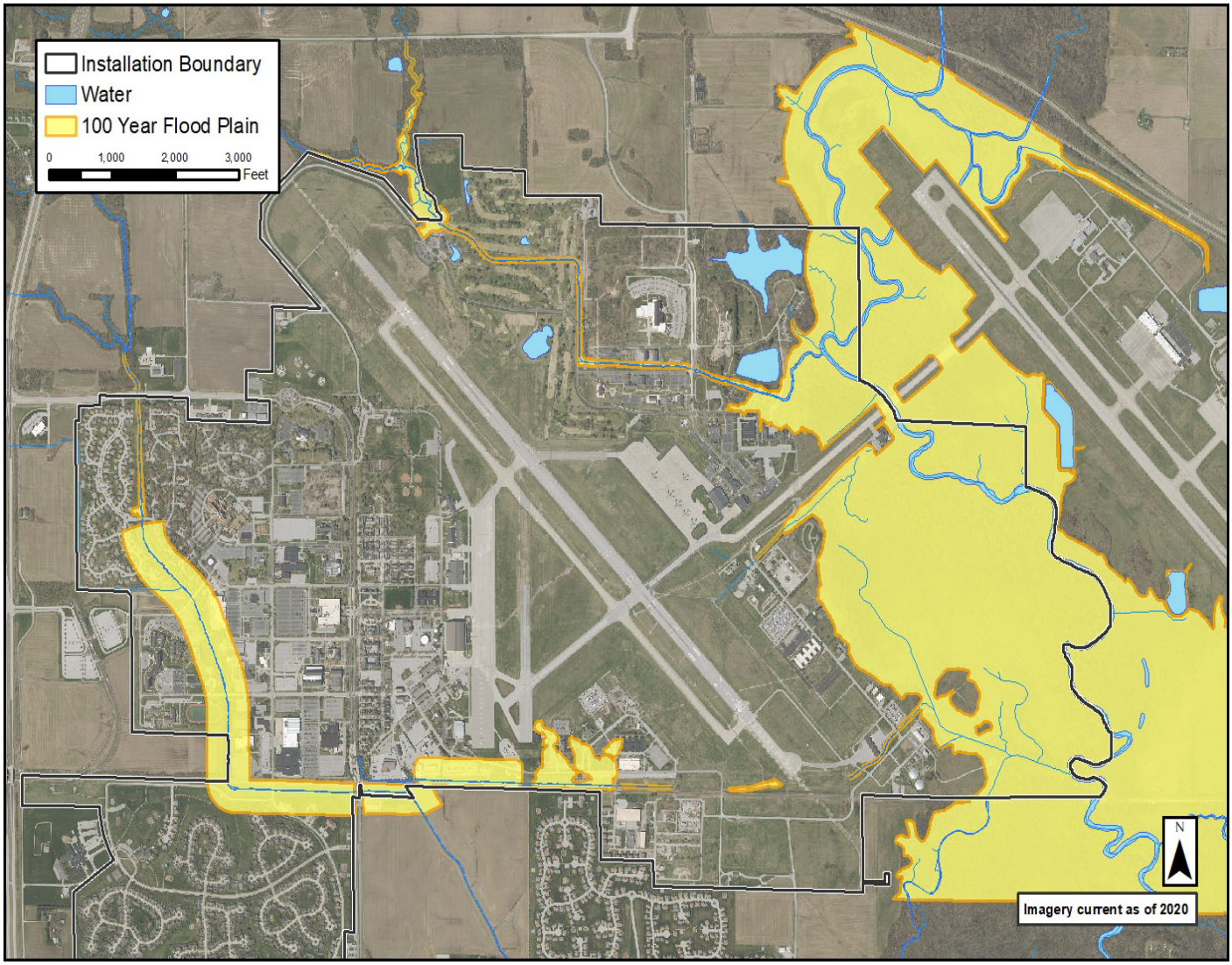

Figure 2-17. 100-Year Floodplain

Climate Change

The following text from the CSU CEMML project report describes potential changes to the wetlands and flood plain at Scott AFB due to climate change (CSU CEMML, 2021).

"Wetland systems within the installation consist of riparian areas, pond edges, and depressional pools. These areas provide valuable wildlife habitat, water quality protection, and flood protection. These systems are vulnerable to changes in the quantity and quality of their water supply, and it is expected that climate change will have a pronounced effect on wetlands through alterations in hydrological regimes (Erwin, 2009). While increases in temperature will increase evaporation rates in the area, this will be mitigated by a corresponding increase in precipitation under most scenarios. As such, the extent of wetland gain or loss at Scott AFB will depend on this balance of precipitation versus evapotranspiration. If precipitation is reduced, as projected by three of the four emissions scenarios, wetland function and extent will likely decline.

The expansion of invasive plant species' ranges could also negatively impact the health of wetlands on the installation (Junk et al., 2013). Exotic plant species tend to have broader environmental tolerance limits, including being more resilient to higher temperatures and altered hydrological regimes. Exotic species may also outcompete native wetland plants due to greater capacity to utilize resources such as nutrients and sunlight. Possible impacts to wetlands could include alteration of plant community structure and diversity, plant productivity, nutrient cycling, and soil biota (Zedler & Kercher, 2004).

Increasing winter minimum and maximum temperatures have the potential to shift hydrological regimes (i.e. shifting from a snow- to rain-driven system) to the detriment of wetland function (Wuebbles & Hayhoe, 2004). Snow drifts that collect in temperate wetlands often provide crucial water level supply during spring snowmelt. Evapotranspiration in the summer months often exceeds rainfall and this late-spring water supply aids in maintaining wetland form and function (Conly & Van Der Kamp, 2001); (Voldseth et al., 2007); (Zhang et al., 2011)."

2.3.6 Other Natural Resource Information
Installation Supplement

There is no content for this section.

2.4 Mission and Natural Resources

2.4.1 Natural Resource Constraints to Mission and Mission Planning
Installation Supplement

The INRMP enables the installation to meet the requirements of the military mission within the limitations and legal restrictions of the baseline natural resources at Scott AFB. Natural resources on Scott AFB that have a potential to pose a constraint to the Air Force mission, future development, and mission expansion include the federally-listed endangered Indiana bat and NLEB, migratory birds, floodplains, wetlands, and BASH occurrences. The primary impact related to these resources is the limitations to utilizing the Silver Creek riparian corridor for future development

Wetlands

It is Air Force policy not to construct new facilities in wetland areas where practicable. If construction within wetlands is necessary, appropriate permits from state and federal regulatory agencies will be obtained. In addition, in accordance with Executive Order (EO), 11990 *Protection of Wetlands*, a Finding of No Practical Alternative (FONPA) will be accomplished for these actions.

Threatened and Endangered Species and Associated Habitats

Two federally-endangered bat species and several state-listed bird species (Appendix H) have been documented on Scott AFB or at MidAmerica Airport. Although the Indiana bat and NLEB have been identified within the Silver Creek riparian corridor at Scott AFB, no area on Scott AFB has been designated as critical habitat by the USFWS. No mission-related activities are planned within the known roost areas of these bats.

As indicated in Section 2.3.4, a sensitive plants survey has been funded by AFCEC and is scheduled to be conducted over several months in 2021-2022. Should this study indicate the presence of any T&E plant species, appropriate management recommendations will be implemented. The impacts of mission-related activities cannot be fully assessed until the status of these species potentially at Scott AFB is better understood.

100-Year Floodplain

It is Air Force policy to avoid constructing new facilities within the 100-year floodplain in order to protect the functions of floodplains, minimize the potential damage to facilities, and to ensure the safety of working personnel. Knowing the locations of flood zones (Figure 2-17) helps mission planning either avoid building in the delineated floodplain or realizing, in the planning stages of construction, that a building pad needs to be elevated out of the floodplain. If construction is required within the floodplain, a zero rise study would be completed along with an associated FONPA.

Bird/Aircraft Strike Hazards

BASH incidents are likely to continue at a level similar to recent years. The base has adopted an aggressive prevention program to reduce potential wildlife habitat that may be attractive to birds and other animals along the flightline. Additional recommendations made by McDonald (2010) will also be implemented to reduce potential future incidents. The USDA Wildlife Services is currently working under an agreement to implement these recommendations and assist with monitoring BASH issues at Scott AFB.

Potential Mission Impacts of Climate Change

The following text from the CSU CEMML project report describes potential future mission impacts at Scott AFB due to climate change (CSU CEMML, 2021).

"To assess the potential impacts of climate change on mission activities at the installation, we first conducted a review of the mission activities described in the installation INRMP. We then assessed mission-related vulnerabilities based on both literature review and spatial and temporal overlap between projected climate change exposures, associated secondary climate change effects, and mission requirements.

Based on the projected scenarios, the installation is not likely to experience substantial direct impacts to the military mission due to climate change. This is largely because Scott AFB's mission of providing support for various airlift and deployment capabilities does not depend heavily on the biotic environment at the installation.

Minor mission impacts in relation to personnel morale may occur due to climate-related changes to outdoor recreation such as increased safety risks from extreme heat and reduced populations for fishing and birdwatching (Section 10.2).Other impacts discussed throughout this report may divert resources away from the military mission, including: stress on riparian and mesic woodland communities from drought, increased prevalence and management of invasive species, and increased management and health risk to personnel from mosquito and tick-borne pathogens.

Additional AF-wide potential impacts from climate change to consider include:

- Unsafe environmental conditions for the launch of current and planned weapons and equipment due to increases in the occurrence of extreme high temperature days and higher wind velocities. This could lead to increased maintenance requirements, the need for new equipment, and/or decreased launch capacity (DoD, 2014);
- Shorter equipment lifespan and lower visibility caused by the increased dust generation related to periods of drought and high wind velocity (DoD, 2014);
- Damage to vital mission infrastructure due to increased wind velocities (Sydeman et al., 2014);
- Reduced water supplies caused by increased drought frequency and severity (Glick et al., 2011);
- Potential loss of future training areas that may be needed in light of a changing geopolitical landscape and/or base realignment.
- Disruption to the acquisition and transportation of materials required for the maintenance, construction, and storage of the equipment (DoD, 2014).

Adapting to climate change will require that the installation assess current operations and procedures to identify gaps that may increase their vulnerability to changes in climate and its secondary effects. Once these gaps are identified, climate change considerations will need to be integrated across all organizational levels in order to manage associated risks. Climate change mitigation and adaptation will also require collaboration with internal and external stakeholders in order to fully ensure the installation's mission is not compromised in the future (DoD, 2014)."

2.4.2 Land Use

Installation Supplement

The total installation area covers 3,638 acres. Improved grounds include approximately 1,602 acres of land occupied by buildings and other permanent structures, including the administrative and support facilities, the airfield and hangars, community housing, the athletic fields and golf course, as well as lawns and landscape plantings in these areas. INRMP activities in improved areas include urban forest management, grounds maintenance, and pest management.

Semi-improved grounds are areas where periodic maintenance is performed primarily for operational reasons, such as erosion and dust control, bird control, and visual clear zones. This land use classification includes areas adjacent to runways, taxiways, and aprons; runway clear zones; lateral safety zones; picnic areas; and antenna facilities. These areas total approximately 768 acres. INRMP activities in semi-improved areas include water resource management, grounds maintenance, and BASH management.

Unimproved grounds include forest lands, lakes, ponds, and wetlands, and any areas where natural vegetation is allowed to grow unimpeded by maintenance activities. This includes the wooded wetlands and bottomland forests of Silver Creek, and the Cardinal Creek Area (Figure 2-4). Approximately 528 acres are unimproved grounds. Natural resources that are managed under the INRMP are primarily associated with unimproved grounds at Scott AFB. The management programs include fish and wildlife management, management of the endangered Indiana bat, water resource management, wetland protection, and forest management.

The remaining acreage (740 acres) is held in a navigational easement, which limits certain types of development. This land is owned by St. Clair County, and the land use is generally agricultural. Because the land is not owned by the Air Force, no INRMP management is conducted in these areas.

2.4.3 Current Major Mission Impacts on Natural Resources

Installation Supplement

The purpose of this section is to identify potential conflicts and incompatibility issues between the natural resources management efforts and the military mission. Mission activities at Scott AFB include aircraft flights that depart from and land at the airfield, along with ground support activities that assist with the flying mission of Scott AFB. Most of the aircraft activities occur at high altitudes in designated airspace. Routine flight activities produce virtually no ground impacts on natural resources at Scott AFB. Impacts to natural resources are more likely to result from mission support activities, including aircraft engine testing, runway-related activities, and facility and utility construction activities. In addition, support and non-mission related activities, such as management and disposal of hazardous substances, industrial operations, landscape maintenance activities, and recreational activities, can potentially affect natural resources. Potential conflicts with the acceptable stewardship of military lands at Scott AFB are avoided through active planning, education, and management activities. Areas of potential natural resource constraints are shown on Figure 2-18, Potential Natural Resource Mission Constraints.

Current mission impacts include the potential disturbance to, or taking of, birds and other wildlife by aircraft operations, including a potential impact to the federally endangered Indiana bat. Other potential impacts include the introduction of invasive weeds through support and non-mission related activities; potential damage to the local environment through the use of hazardous materials, pesticides, and herbicides; potential ground disturbance at undiscovered archaeological sites; and potential noise resulting from aircraft operations. Each of these current potential impacts is discussed below.

Bird/Wildlife Populations

A significant number of migratory birds occupy Scott AFB and the surrounding land areas. Aircraft operations have the potential to disturb or inadvertently strike birds during aircraft arrival and departure. Disturbance to birds may also occur with other human activities and base operations, including runway maintenance, grounds maintenance, and cutting or trimming of trees. Scott AFB has a formal BASH Plan (Scott AFB 2019) to reduce the number of potential strikes. Routine airfield inspections, habitat manipulation, dispersal measures, and depredation are used, as necessary, to control birds and other wildlife. The management activities are further discussed in Section 7.12. Incidental bird deaths may also occur in collisions with motor vehicles.

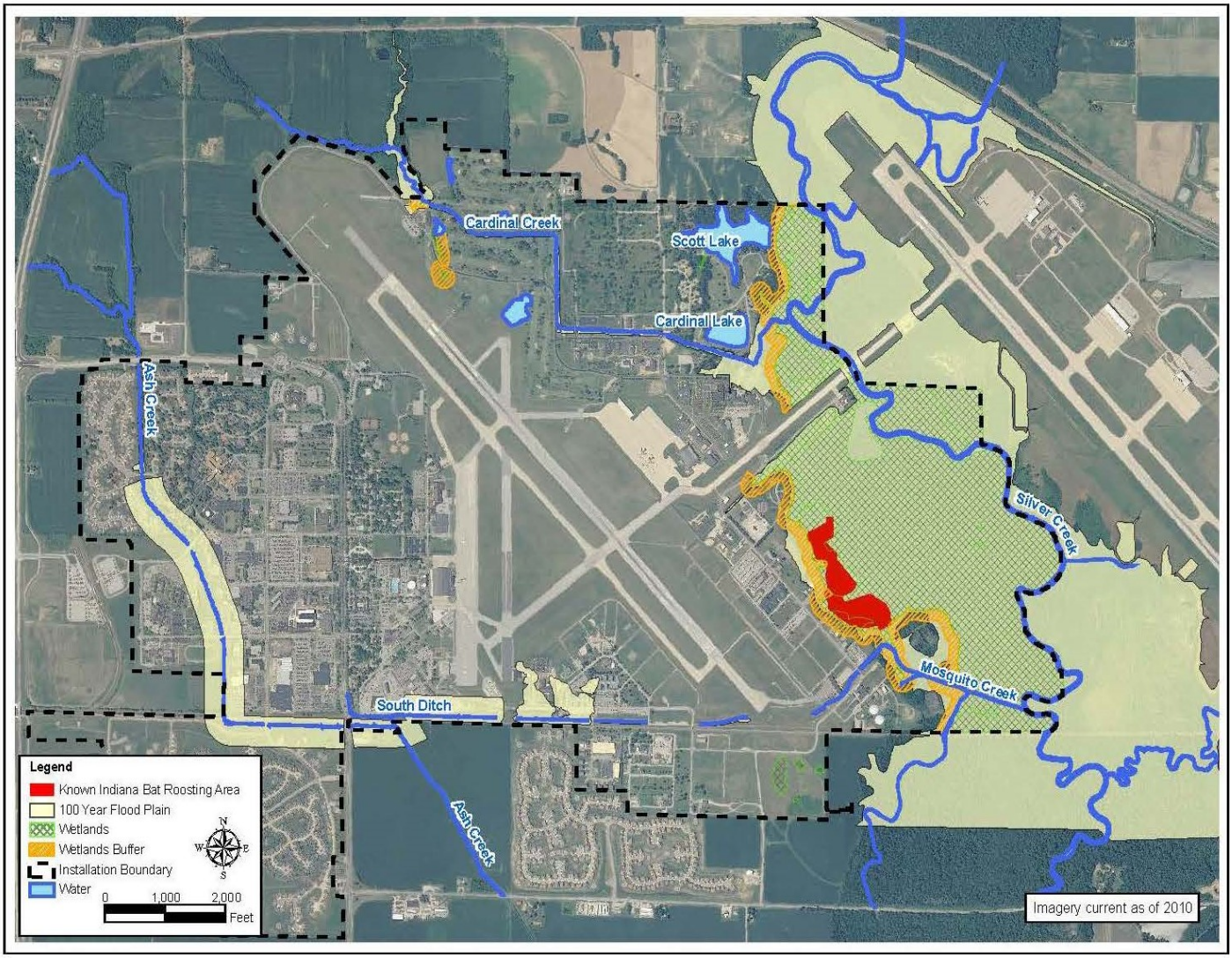

Figure 2-18. Potential Natural Resource Mission Constraints

Vegetation Communities

Native vegetation communities on Scott AFB had been significantly disturbed by agricultural practices prior to the establishment of Scott AFB and since 1917 by construction of roads, runways, structures, residences, and other support facilities needed for previous and current mission operations.

Most areas of the base (except for the floodplain located in the Silver Creek riparian corridor on the eastern boundary of the base) have been developed for the military mission. Use of the forest is not necessary for Scott AFB's military mission and these areas are used on a limited basis for recreational activities. The riparian corridor also serves as a useful buffer between Scott AFB and non-aviation-related neighbors. In some areas of this natural forest, native vegetation has been displaced by the introduction of invasive and noxious weeds, in particular bush and Japanese honeysuckle and multiflora rose. The introduction of these species has resulted in a shift to lower quality and value habitat and a reduction in biodiversity where introduced. This is especially true in the transitional zone that is found on the western edge of the Silver Creek riparian corridor. Additionally, changes to the hydrologic regime within the Silver Creek watershed, and particularly the channelization of Silver Creek around the runway at MidAmerica Airport, has caused an increase in flooding and massive amounts of siltation which has buried herbaceous plants and is leading to the death of numerous trees.

As a sub-component of the bat survey they conducted in 2016, USFWS performed an evaluation of forest stands on Scott AFB and provided stand prescriptions which serve as guidance documents with recommended treatment and monitoring schedules (USFWS 2017b). This information guides forest management at the installation under the annual bat habitat management and invasive species management projects.

Scott AFB, like most military and civilian airfields, has an ongoing issue with the removal of flightline obstructions resulting from the growth of woody vegetation within the approaches to the runway. Generally these areas are maintained as grassland or agricultural fields to reduce the need to remove or trim trees, but occasionally trees may have to be trimmed to remove flightline obstructions. The installation has plans for removal of trees in both the north and south runway approaches during summer/fall of 2021; USFWS is being consulted to ensure these actions have no negative impact on bat habitat.

Endangered Species

The ESA requires federal agencies that control suitable lands to conserve and recover listed species. As defined in the ESA, conservation is the use of all methods and procedures necessary to bring any listed species to the point where protections provided by the Act are no longer necessary. Section 7 of the ESA requires Scott AFB to formally consult and confer with the USFWS if any action by the installation may affect a listed species or critical habitat.

The federally-endangered Indiana bat and additionally the NLEB are known to roost in the forested floodplains of Silver Creek at Scott AFB. The persistence of these species populations on the installation depends primarily on good stewardship of the forest community, and on maintaining disturbance patterns within normal ranges. An ESMP (Appendix G) for the Indiana bat has been developed. This plan addresses recommendations for management of this endangered species at Scott AFB (Scott AFB 2010a). An additional survey was accomplished by USFWS in 2017 (USFWS 2018). Management practices have been incorporated into the INRMP during recent annual updates.

Historic Properties

An Integrated Cultural Resources Management Plan (ICRMP) (Scott 2017b and Appendix E) was developed to address potential conflicts between the historic properties found at Scott AFB and the military mission. Any ground disturbance activities that may occur in a potential archaeological site would require coordination with the Cultural Resources Manager. The Cultural Resources Manager will work with the State Historic Preservation Officer (SHPO) to determine if any mitigation will be required. Additionally, activities involving landscaping or urban tree management at the Historic District must consider the historic landscape elements in planning activities (Scott 2017b).

Hazardous Materials

Hazardous materials and petroleum products are used throughout the installation for various functions, including aircraft refueling, maintenance, and washing; vehicle maintenance and washing; petroleum oil lubricant distribution and management; facilities maintenance and repair; maintenance of ground support equipment; and aircraft support operations. Hazardous materials used in these functions include fuels and lubricating oils, solvents, paints and thinners, antifreeze, deicing compounds, and acids. Issues associated with hazardous material and waste typically center around the storage, transport, use, and disposal of these substances. When such materials are improperly used in any way, they can threaten the health and well-being of wildlife species, habitats, and soil and water systems, as well as humans.

At Scott AFB, hazardous wastes are managed through the base level Hazardous Waste Management Plan (Scott AFB 2020a and Appendix G) in accordance with AFI 32-7042, *Solid and Hazardous Waste Compliance*. The Hazardous Waste Management Plan provides guidance to Scott AFB personnel on the handling, storage, and disposal of hazardous materials; this plan will implement the "cradle-to-grave" management control of hazardous waste, as mandated by the U.S. Environmental Protection Agency (USEPA). Hazardous materials, with the exception of fuels, are managed through a centralized base Hazardous Material Pharmacy using an Environmental Management Information System, which tracks the inventory and acquisition of hazardous materials along with hazardous waste disposal and health and safety information. The base Integrated Contingency Plan for Oil and Hazardous Substances Spill Prevention Plan (ICP) (Scott AFB 2017a and Appendix G) provides guidance on hazardous material and petroleum storage, spill prevention measures, and contingency procedures including spill containment and cleanup. This plan establishes responsibilities for handling fuels and other hazardous fluids, containing and recovering spills, spill training, and spill reporting procedures.

Pesticides and Herbicides

Pest management activities on Scott AFB generally focus on control of insects (mosquitoes), vertebrates (rodents and snakes), and vegetation. The base maintains an IPMP (Scott AFB 2011c and Appendix F). This Plan is implemented to provide safe and effective control of specific pest problems in accordance with applicable laws and regulations. The primary goal of pest management is to use preventive control measures and supplement with corrective chemical measures after other pest management procedures have failed. Personnel at the Entomology Shop record the types and amounts of pesticides and herbicides used at the base.

Noise

Scott AFB and MidAmerica Airport are co-located aviation facilities. Noise calculations consider the frequency of flight operations, runway utilization, and the flight tracks and flight profiles flown by each type of aircraft. Some additional noise results from day-to-day activities associated with operations, maintenance, and the industrial functions associated with the operation of the two airfields. These noise sources include the operation of ground-support equipment and other transportation noise from vehicular traffic. However, this noise is generally localized in industrial areas on or near the airfield, or on established routes supporting traffic to-and-from the airfield. Noise resulting from aircraft operations is the dominant noise source in the airfield region.

For the most part, the potential impacts to natural resources from flight operations are from aircraft engine noise. Noise impacts to wildlife on base are primarily limited to an animal's startle, freeze, flight, or retreat reaction from the aircraft engines (Manci et. al. 1988). While the behavioral response of wildlife has been fully described, the accompanying physiological response to aircraft noise has not been well studied, due to the difficulty of assessing these effects in the field (Manci et al 1988). Noise levels that exceed 90 decibels (dB) are considered to have an adverse effect, while studies have shown that noise levels below 90 dB lessen adverse impacts on wildlife behavior (Manci et al 1988). The findings of the *Environmental Assessment for Installation Development at Scott Air Force Base, Illinois* indicated that wildlife in the Silver Creek riparian corridor are exposed to noise levels less than 65 dB (Scott AFB 2020b) and therefore no adverse impacts to wildlife are anticipated.

Stormwater Management

Currently, there are a number of stormwater management challenges, some caused by on-base practices and some that are regional in scope. There is currently both considerable erosion and sediment deposition within streams and ditches on base. This, in addition to regional hydrologic changes within the Silver Creek watershed, have led to flooding problems within several developed portions of the bases. A number of projects are planned to address these issues. Further discussion is in Sections 7.5 and 7.6.

2.4.4 Potential Future Mission Impacts on Natural Resources

Installation Supplement

The Scott AFB IDP (Scott AFB 2021) was created to guide development at the installation for a range of periods including current (1-5 years), short-range (6-10 years), and long-range (11-20 years). The IDP uses capacity planning to allow planners to determine an installation's maximum development capacity based on conformance to the installation's planning vision, goals and objectives. Capacity planning allows the base to focus future development in portions of the base that have been previously developed and thereby reduce the need to develop natural or undisturbed habitats on the installation. As a result only one development project is anticipated to have a potential to impact natural resources on the installation in the next ten years. This project is the Cardinal Creek Gate project which would involve land acquisition of approximately 20 acres on the east side of the installation. The project, planned to occur in 2027, would involve acquiring land that was formerly used for St. Clair County elementary and middle schools and for agricultural purposes.

All other proposed construction will occur within the developed areas of the base and no impacts to natural resources are expected. Erosion resulting from ground-disturbing activities, such as construction and grading may have short-term effects to natural resources. The 375 CES will implement best management practices (BMPs) during construction projects. These practices include minimizing the amount of area disturbed and the length of time barren ground is left exposed during construction activities to limit erosion; utilizing general sediment and erosion controls (stabilization); installing engineering structures to divert or store flow, or limit runoff; and using sediment and erosion control measures.

There are a large number of ash trees within the developed portions of the base (Figure 2-19, Ash Tree Locations). Many are in locations where dead trees are a safety hazard and the death of concentrations of ash within housing will lead to reductions in shade and aesthetics. Since 2019, more than 100 ash trees have been removed and more will be removed in coming years.

In the time period since the 2015 INRMP was written emerald ash borer (EAB) was found in the general area around Scott AFB. In light of this, Scott AFB took action to investigate its potential presence on the installation. A comprehensive survey of ash trees was accomplished in April of 2017 (Scott AFB 2017c). Results of the survey and corresponding management recommendations were provided to CE Operations and its contractor, Challenge Unlimited, which would be involved with ash tree removal. Subsequent inspections in 2017 by IDNR and USDA Animal and Plant Health Inspection Service confirmed the presence of EAB on the installation.

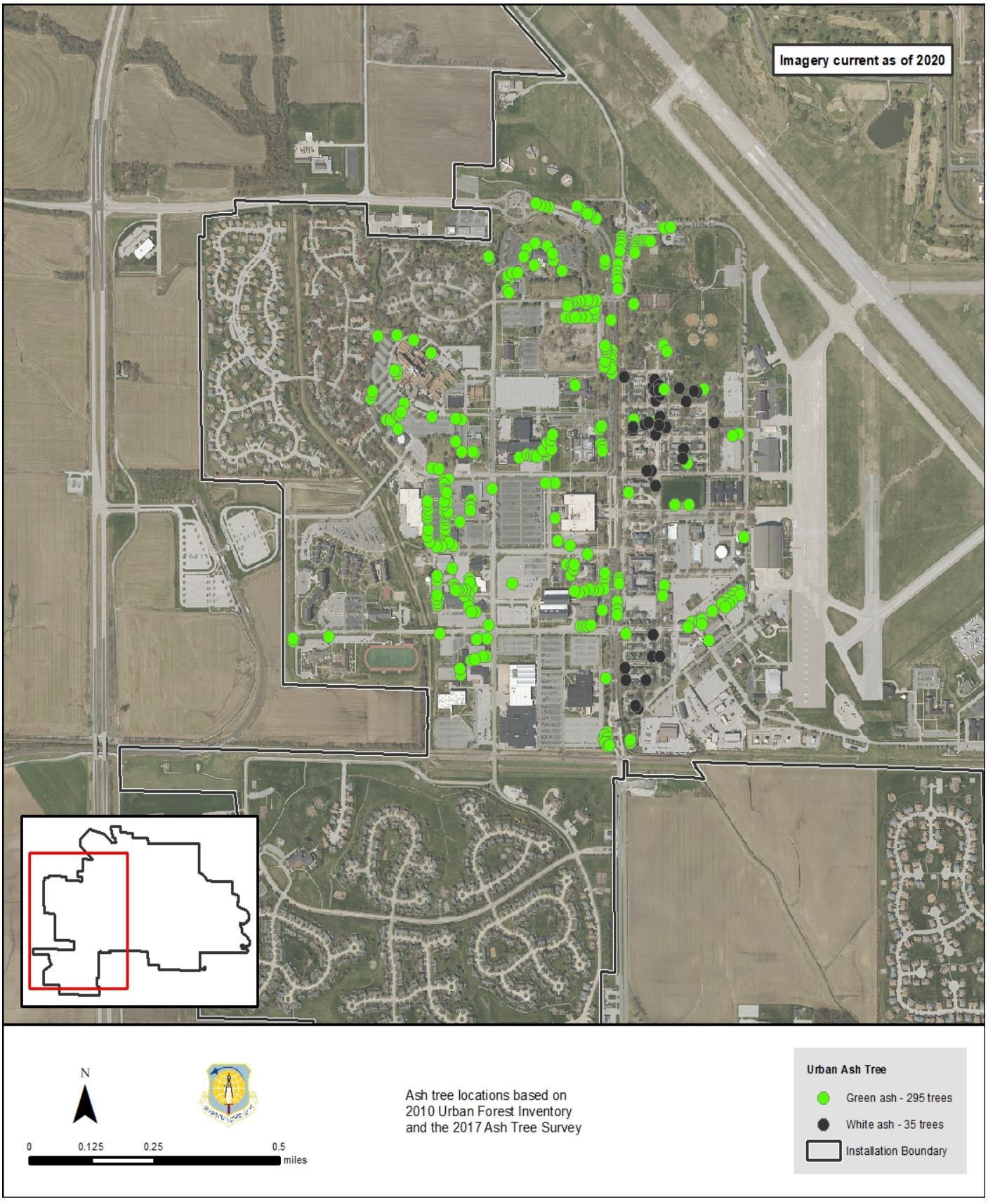

Figure 2-19. Ash Tree Locations

3 ENVIRONMENTAL MANAGEMENT SYSTEM

The USAF environmental program adheres to the Environmental Management System (EMS) framework and its Plan, Do, Check, Act cycle for ensuring mission success. Executive Order (EO) 13834, *Efficient Federal Operations*; DoDI 4715.17, *Environmental Management Systems*; AFI 32-7001, *Environmental Management*; and International Organization for Standardization (ISO) 14001 standard, *Environmental Management Systems – Requirements with guidance for use*, provide guidance on how environmental programs should be established, implemented, and maintained to operate under the EMS framework.

The natural resources program employs EMS-based processes to achieve compliance with all legal obligations and current policy drivers, effectively manage associated risks, and instill a culture of continual improvement. The INRMP serves as an administrative operational control that defines compliance-related activities and processes.

4 GENERAL ROLES AND RESPONSIBILITIES

General roles and responsibilities that are necessary to implement and support the natural resources program are listed in the table below. Specific natural resources management-related roles and responsibilities are described in appropriate sections of this plan.

Installation Supplement

Table 4-1

Roles and Responsibilities

Office/Organization/Job Title (Listing is not in order of hierarchical responsibility)	**Installation Role/Responsibility Description**
Installation Commander	Planning and management of base resources, including natural resources, is the responsibility of the Wing Commander. The INRMP represents a key component of the planning process. The Wing Commander ensures that an INRMP is developed and maintained. The specific responsibilities of the Wing Commander are: • Approving the INRMP; • Certifying INRMP 5-year update; • Ensuring that all unit commanders are knowledgeable in their areas of responsibility as outlined in the INRMP; • Providing appropriate funding and staffing to ensure implementation of the INRMP; and • Controlling access to, and use of, installation natural resources.
AFCEC Natural Resources Media Manager/Subject Matter Specialist (SMS)/Subject Matter Expert (SME)	Coordinates with installation NRM/points of contact (NR POC) to: identify changes and provide technical assistance to each respective base's program; changes to execution strategy (to include accomplishing in-house) and/or execution agent; provides and manages contracts/agreements; confirm funding amounts, distribution date, and mission/situational changes that may initiate the emergent requirement process; administers training.

Installation Natural Resources Manager (NRM/POC)	• Implementing the INRMP and its programs to ensure the inventory, classification, and management of all applicable natural resources; • Maintaining an organization with the resources available to accomplish the INRMP; • Coordinating with local, state, and federal governmental and civilian conservation organizations relative to natural resources management; • Ensuring the ongoing and timely coordination of current and planned land uses between mission, natural resources, environmental, legal, and master planning; • Ensuring applicable installation personnel are aware of, and comply with, procedures and requirements necessary to accomplish objectives of the INRMP, together with laws, regulations, and other measures that promote environmental quality; • Reviewing all environmental documents (e.g., environmental assessments, environmental impact statements, and remedial action plans), construction designs, and proposals to ensure adequate protection of natural resources, and ensuring that technical guidance, as presented in the INRMP, is adequately considered; • Reviewing mitigation measures that have been implemented or recommended for the protection of natural resources; • Providing technical assistance in the implementation of this INRMP; • Acting as the office of primary responsibility (OPR) for the development and review of the INRMP; • Managing outdoor recreation activities in undeveloped areas; and • Review and update as necessary, the INRMP annually.
Installation Security Forces	The 375th Security Forces Squadron (SFS) will enforce AFI 32-7001, *Fish and Wildlife Management*, as well as the State of Illinois Fish and Game Laws, within the confines of Scott AFB and they will maintain a liaison with state and federal conservation enforcement agencies. The Base Conservation Officer will be appointed, by letter, from the 375th Mission Support Group (MSG) Commander. Archery deer and trapping fees will be collected by the Base Conservation Officer.
Installation Unit Environmental Coordinators (UECs)	See AFI 32-7001
Pest Management	Pest Management's responsibility for natural resources includes the control of nuisance wildlife. The primary pests of natural resources on Scott AFB are stray and unleashed pets (Scott AFB, 2011b). Pest management also assumes responsibility for trapping and removing the occasional raccoon or other nuisance animals that take up residence in structures on the installation. Pest Management utilizes, in coordination with the NRM, Scott AFB's depredation permits.

Conservation Law Enforcement Officer (CLEO)	Scott AFB does not have a CLEO. Rather, the SFS serves in that role. See Installation Security Forces section, above.
National Environmental Policy Act (NEPA)/Environmental Impact Analysis Process (EIAP) Manager	Civil Engineer EIAP Manager
U.S. Forest Service	The U.S. Forest Service (USFS) is available to assist Scott AFB with professional expertise in managing forest pests. Additionally, the USFS can provide support in the management of timber harvesting and provide guidance on natural resources habitat improvements.
USFWS	In accordance with the Sikes Act, this INRMP must be prepared in cooperation with the USFWS and IDNR to ensure proper consideration of fish, wildlife, and habitat needs. The USFWS is a co-signatory on the INRMP. The purpose of the Sikes Act is "to promote effectual planning, development, maintenance, and coordination of wildlife, fish, and game conservation and rehabilitation in military reservations" (Public Law 106-580). The USFWS helps manage natural resources at Scott AFB by providing expertise on natural resource issues, including T&E species, migratory birds, invasive species, and fisheries. In accordance with section 7 of the ESA, Scott AFB consults with the USFWS to ensure that any action authorized, funded, or carried out is not likely to jeopardize the continued survival of a listed species or result in the adverse modification or destruction of its critical habitat. Coordination with the USFWS is also accomplished if species proposed for listing is likely to be jeopardized or if proposed activities could directly or indirectly harm birds protected by the Migratory Bird Treaty Act. Additionally, the USFWS executes many natural resources projects on Scott AFB and provides a liaison to provide technical support and program management assistance throughout the year.
Environmental Safety and Occupational Health Committee (ESOHC)	The ESOHC ensures a coordinated approach between natural resources programs and is the primary means of preventing conflicts between natural resources programs and other installation programs. The general circulation of projected activities (both mission-related and natural resources-related) among ESOHC members ensures that all involved agencies are kept informed of installation programs. In addition, the implementation of any major natural resources project is routinely brought to the attention of any installation organization in the vicinity of the activity.

U.S. Department of Agriculture	The U.S. Department of Agriculture (USDA) Wildlife Services Division is available to help resolve issues related to both wildlife and invasive plant species. Support is provided to Scott AFB in response to specific issues related to control of wildlife under the BASH program, management and control of other pest animals. Additionally, the USDA Natural Resources Conservation Service (NRCS) Plant Materials Center is available to provide technical support and information on plant and animal control and plant identification, and can be a source of cost-share funds.
Base Civil Engineer	The Base Civil Engineer and staff will ensure that the INRMP is accomplished. The preparation, maintenance, and day-to-day implementation of the INRMP are the responsibility of the Base Civil Engineer and the NRM. The Base Civil Engineer ensures compliance with the INRMP.
Air Force Civil Engineer Center (AFCEC)	The 375 AMW is the host wing at Scott AFB and has the primary responsibility of implementing the INRMP. Air Force, AFCEC provides support to the 375 AMW and assists in overseeing the implementation of the INRMP.
Civil Engineering Squadron (375 CES)	Some of the activities of the 375th Civil Engineering Squadron (375 CES), such as road repair and maintenance, weed and pest control, fire prevention and suppression, and grounds maintenance, overlap with natural resources management programs. The NRM supports these missions by providing regulatory and technical guidance, reviewing and requesting permits, and consulting with other agencies as required. The 375 CES at Scott AFB, with oversight by the NRM, coordinates natural resources use, management, and implementation of this plan. The NRM will maintain close coordination and cooperation with other pertinent organizations and agencies, particularly the USFWS and the IDNR. In addition to the responsibilities to coordinate with agencies outside of Scott AFB, the NRM will coordinate with installation stakeholders at Scott AFB to include Pest Management, Flight Safety, and Grounds Maintenance.
State Agencies	The IDNR is also a co-signatory on the INRMP in accordance with the Sikes Act. Cooperative efforts with the IDNR primarily involve management of hunting activities at the base, management of game populations, and fish and wildlife survey and research needs. The IEPA is responsible for providing water quality certifications under Section 401 of the Clean Water Act (CWA) and administration of other CWA regulations. These regulations involve management of wetlands.
Contractors	Contractors have conducted various natural resource surveys and development of management plans that support INRMP implementation in the past. These include wetland inventories, floodplain assessments, urban and natural area tree surveys, and an Indiana Bat management plan. In accordance with the Sikes Act, priority is now given to land-managing agencies and the USFWS executes most natural resources projects.

Others	Implementation of the INRMP may require assistance from other squadrons and divisions, such as Contracting (375 CONS) and Logistics (375 LRS), Public Affairs (375 PA), Flight Safety (375 SEF), Security Forces (375 SFS), and Resources (375 SGSR). Commanders of assigned and tenant units must be familiar with the INRMP contents and comply with its provisions. Scott AFB is working with the Heartland Conservancy and local communities within an Air Force-Community Partnership-Stormwater Working Group to develop and implement watershed management recommendations that supplement INRMP activities. The Heartland Conservancy used to be known as Southwestern Illinois Resource Conservation & Development; it is an active environmental organization that serves to provide outreach, technical, and administrative support to local and regional partnerships.

5 TRAINING

USAF installation NRMs/POCs and other natural resources support personnel require specific education, training, and work experience to adequately perform their jobs. Section 107 of the Sikes Act requires that professionally trained personnel perform the tasks necessary to update and carry out certain actions required within this INRMP. Specific training and certification may be necessary to maintain a level of competence in relevant areas as installation needs change, or to fulfill a permitting requirement.

Installation Supplement

- NRMs at Category I installations must take the course DoD Natural Resources Compliance, endorsed by the DoD Interservice Environmental Education Review Board and offered for all DoD Components by the Naval Civil Engineer Corps Officers School (CECOS). See http://www.netc.navy.mil/centers/csfe/cecos/ for CECOS course schedules and registration information. Other applicable environmental management courses are offered by the Air Force Institute of Technology (http://www.afit.edu), the National Conservation Training Center managed by the USFWS (http://www.training.fws.gov), and the Bureau of Land Management Training Center (http://training.fws.gov)
- Natural resource management personnel shall be encouraged to attain professional registration, certification, or licensing for their related fields, and may be allowed to attend appropriate national, regional, and state conferences and training courses
- All individuals who will be enforcing fish, wildlife, and natural resources laws on USAF lands must receive specialized, professional training on the enforcement of fish, wildlife, and natural resources in compliance with the Sikes Act. This training may be obtained by successfully completing the Land Management Police Training course at the Federal Law Enforcement Training Center (http://www.fletc.gov/)
- Individuals participating in the capture and handling of sick, injured, or nuisance wildlife should receive appropriate training, to include training that is mandatory to attain any required permits
- Personnel supporting the BASH program should receive flight line drivers training, training in identification of bird species occurring on airfields, and specialized training in the use of firearms and pyrotechnics as appropriate for their expected level of involvement
- The DoD-supported publication Conserving Biodiversity on Military Lands -- A Handbook for Natural Resources Managers (http://dodbiodiversity.org) provides guidance, case studies, and other information regarding the management of natural resources on DoD installations

Natural resources management training is provided to ensure that installation personnel, contractors, and visitors are aware of their role in the program and the importance of their participation to its success. Training records are maintained IAW the Recordkeeping and Reporting section of this plan.

6 RECORDKEEPING AND REPORTING

6.1 Recordkeeping

The installation maintains required records IAW Air Force Manual 33-363, *Management of Records*, and disposes of records IAW the Air Force Records Management System (AFRIMS) records disposition schedule (RDS). Numerous types of records must be maintained to support implementation of the natural resources program. Specific records are identified in applicable sections of this plan, in the Natural Resources Playbook, and in referenced documents.

Installation Supplement

All Scott natural resources management official records are kept electronically and physical files are located at the Environmental Flight office. Unofficial Scott AFB natural resources management electronic working files are located on the CES CEIE installation shared drive. These unofficial electronic records are updated regularly. Reports, licenses, permits, and other frequently accessed program documents are in the natural resources documents folder on the installation eDASH website.

6.2 Reporting

The installation NRM is responsible for responding to natural resources-related data calls and reporting requirements. The NRM and supporting AFCEC Natural Resources Media Manager and SMS should refer to the Environmental Reporting Playbook for guidance on execution of data gathering, quality control/quality assurance, and report development.

Installation Supplement

In accordance with the Depredation at Airports (migratory birds) permit requirements, an annual report must be filed by 31 January describing wildlife take during the previous year. The IDNR Deer Removal Permit requires annual reporting to include return of unused leg tags and a completed carcass disposition report. Both of these reporting actions are performed by USDA Wildlife Services on behalf of Scott AFB.

7 NATURAL RESOURCES PROGRAM MANAGEMENT

This section describes the current status of the installation's natural resources management program and program areas of interest. Current management practices, including common day-to-day management practices and ongoing special initiatives, are described for each applicable program area used to manage existing resources. Program elements in this outline that do not exist on the installation are identified as not applicable and include a justification, as necessary.

Installation Supplement

The concept of ecosystem management is integral to natural resource planning. Provided below is a brief summary of natural resource management elements at Scott AFB:

• Geographic Information System (GIS) – Update and maintain spatial data for natural resource management, support project planning and decision making with current records and data;
• Fish and Wildlife – Manage fish and wildlife species to maintain compliance with laws and regulations and build partnerships with fish and wildlife management agencies and groups;
• Threatened and Endangered Species – Manage and protect sensitive species while maintaining operational functionality of the base's missions and remaining in compliance with the Endangered Species Act and other applicable regulations;
• Water Resources – Continue to monitor water quality and remain in compliance with laws and regulations;
• Wetlands - Protect wetlands and other surface waters by data gathering, monitoring and maintaining compliance with the CWA;
• Grounds Maintenance – Reduce costs by planning and integrating actions with the INRMP projects, and control noxious and invasive plants;
• Forest Management – Sustain and maintain the "urban forest," protect riparian forest, and manage functional shelterbelts for wind and snowbreaks and to reduce greenhouse gases, save energy, provide wildlife habitat where applicable and sequester carbon emissions;
• Pest Management – Eliminate noxious and invasive plant species on base and reduce pest species that could be harming natural environments;
• Outdoor Recreation - Support outdoor recreation opportunities involving natural resources while maintaining ecosystem integrity;
• Cultural Resources – Protect and prevent the loss of important cultural resources on base;

• Public Outreach – Promote natural resources awareness, educational opportunities and appreciation of native wildlife and plants at Scott AFB.

7.1 Fish and Wildlife Management
Installation Supplement

Applicability Statement

This section applies to all USAF installations that maintain an INRMP. The installation is required to implement this element.

Program Overview/Current Management Practices

Fish and wildlife management at Scott AFB includes managing both game and non-game species, and maintaining and enhancing biodiversity while supporting the Air Force mission. Management of these resources is both a stewardship responsibility of the base and an opportunity to provide recreational opportunities to base personnel. The primary fish and wildlife management issues addressed are migratory birds and other wildlife habitat management. Authority for fish and wildlife management is outlined in AFMAN 32-7003. Relevant laws include the ESA and the Migratory Bird Treaty Act (MBTA).

Migratory Birds

Management of migratory songbirds and waterfowl at Scott AFB is directed by two different requirements; the MBTA and EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*. Scott AFB is required to take measures to protect migratory birds and restore or enhance migratory bird habitat whenever feasible. However, migratory bird management must also address the safety of aircraft that utilize the runway at Scott AFB. Any enhancement of bird habitat must be consistent with the mission and BASH considerations. A BASH issue does exist at Scott AFB due to resident and migratory bird species and other wildlife. A BASH Plan has been developed for the base and is further discussed in Section 7.12.

In 1991, the DoD joined the PIF (http://dodpif.org) initiative and is now working in partnership with over 300 federal and state agencies and private wildlife conservation groups to encourage the conservation of neotropical migratory and resident birds and their habitat. As a part of this partnership, the DoD actively manages its natural resources to support mission needs and flight safety goals while also pursuing a sound conservation ethic that strives to benefit bird species throughout the Americas. The DoD PIF program offers a coordinated framework for incorporating bird habitat management efforts into INRMPs. The strategy focuses on inventory, management, education, and long-term monitoring to determine changes in residential and migrant bird populations on military bases. The DoD's vision is to support the military training and testing mission while being a vital and supportive partner in regional, national, and international bird conservation efforts (DoD 2002).

Past management activities at Scott AFB for migratory birds have focused on identifying the migratory birds utilizing the installation (See Section 7.11). A list of migratory bird species known to occur at Scott AFB is presented in Appendix H. A bird survey is planned for FY25 (Project 8.3.3.8) from which to generate specific management recommendations.

Other Wildlife Species

Incidental observations of other species, such as mammals and reptiles, have been documented in association with other field surveys (e.g., Endangered Species Management, Fish and Wildlife Plan). While no specific surveys or habitat improvements have occurred for these species, habitat improvement projects are planned.

Wildlife habitat is managed in accordance with DoDI 4715.03 and AFMAN 32-7003. Habitat management at Scott AFB was limited to managing timber resources, though in 1996 this changed to prohibiting all activities (e.g., firewood collection, timber harvest, dead tree removals, etc.) within the Silver Creek riparian corridor. Studies occurred between 2010 and 2014 (Scott AFB 2010b, Scott AFB 2010d, and USFWS 2014) which include recommendations that will be incorporated into this INRMP to improve federally-endangered Indiana bat habitat and to manage the natural forest community (further discussed in Sections 7.4 and 7.8). Projects to implement these recommendations are present in Section 8 and will aid Indiana and Northern long-eared bats and thereby also aid other wildlife species.

Potential problems with wildlife, such as muskrats around Scott and Cardinal Lakes, raccoons in the improved areas of the base, and feral animals, are controlled by Pest Management (discussed in Section 7.11).

Climate Change

The following text from the CSU CEMML project report describes potential changes to future fish and wildlife management at Scott AFB due to climate change (CSU CEMML, 2021).

"Fish and wildlife management on Scott AFB is not likely to need to change greatly in response to climate change. Current fish and wildlife management issues such as invasive species management and BASH concerns are likely to persist under the projected conditions. The changing climatic conditions will likely present new opportunities for invasive species to flourish and push out native species, so invasive species monitoring will continue to be important and management plans should be flexible enough to adapt to changing concerns (Hellmann et al., 2008). Wildlife surveys will be a critical tool for documenting any changes in native species populations.

Prevention and control of wildlife disease spread, especially WNS, will be important in protecting native species and habitats. Increasing temperatures can favor disease-vectoring organisms such as mosquitoes and ticks (Süss et al., 2008). Managers can help to reduce mosquito populations by minimizing stagnant water in and around the cantonment area. Tick populations in urban settings can be minimized by keeping lawns mowed and by preventing overabundances of hosts such as deer and rodents.

Warmer temperatures could have a negative impact on amphibians and aquatic macroinvertebrate species by increasing the chances of algal blooms occurring and decreasing dissolved oxygen in lentic systems (Paerl et al., 2011). Managers may consider efforts to protect ponds used by waterfowl from the effects of climate change, including the removal of invasive aquatic plants and algae and the planting of shade trees (Poff et al., 2002). Wildland fire management, which may be more necessary under the projected climate conditions, will help to prevent negative impacts on water quality due to erosion."

7.2 Outdoor Recreation and Public Access to Natural Resources

Installation Supplement

Applicability Statement

This section applies to all USAF installations that maintain an INRMP. The installation is required to implement this element.

Program Overview/Current Management Practices

Scott AFB has several areas suitable for outdoor recreation, as indicated in Figure 7-1, Outdoor Recreation. As defined in AFMAN 32-7003, suitable outdoor areas are classified into three classes of use based on outdoor recreation potential and ecosystem sustainability. Scott AFB has developed recreation areas, such as campgrounds and picnic areas as well as dispersed recreation areas for activities such as hunting, fishing, bird watching, and walking. Use of outdoor recreation resources by the general public is not compatible with the military mission on Scott AFB since there is no method to enable access to some locations (such as Scott Lake or the Silver Creek riparian corridor) and simultaneously prevent access to other portions of the base. All personnel with access to Scott AFB are welcome to use outdoor recreational facilities.

Figure 7-1. Outdoor Recreation

Resource Management Program

Natural Resource management for recreation purposes at Scott AFB occurs around Scott and Cardinal Lake. The bottomland forest areas along Silver Creek are the largest unimproved areas at the installation. However, these areas offer limited opportunities for outdoor recreational activities aside from the fishing and hunting opportunities described in this section. Additionally, the use of off-road vehicles is prohibited at Scott AFB except for those needed for safety and security purposes.

Recreational Fishing

Recreational fishing at Scott AFB is governed by Scott AFB Instruction 32-7001, *Fish and Wildlife Management*, and all IDNR regulations. Recreational fishing is allowed at both Cardinal Lake and Scott Lake, though the majority of fishing occurs at Cardinal Lake due to ease of access. The program is open to all personnel whom have access to the Scott AFB. An individual or family permit is required to fish on base. Permits are available from Outdoor Recreation (Building 3176). Fishing regulations, permit costs, and pertinent restrictions are reviewed as needed by the NRM. Scott AFB has a catch and release policy for game fish.

Fishery management is also conducted in accordance with EO 12962, *Recreational Fisheries*. EO 12962 directs federal departments, including the DoD, to improve the quantity, function, and sustainable productivity of recreational fisheries for increased opportunities, when practical to do so. Scott AFB maintains long-term monitoring of the lakes in cooperation with the regional USFWS office (Carterville Fish and Wildlife Conservation Office, Carbondale, Illinois). USFWS biologists inventory the lakes biennially and monitor and report on the overall health of the lakes annually. The first documented fisheries management at Scott AFB began in 1980 rotenone was used to remove rough fish from Scott Lake and restock the lake with largemouth bass, bluegill, redear sunfish, and channel catfish. The regional USFWS office conducted annual electroshock and gill netting surveys at Scott Lake from 1985 until 2011 (with the exception of 1987 and 1989). Fisheries management of Cardinal Lake began in 1995 with the stocking of bluegill, redear sunfish, fathead minnows, and largemouth bass. Annual surveys of Cardinal Lake began in 1996 and occurred annually until 2011. Both lakes were again surveyed in 2014. Since then the electrofishing surveys have been conducted on a biennial basis. The results of these monitoring events are used to more effectively manage fish populations and habitat within the lakes. The USFWS also periodically retains some fish for aging studies. Age and growth estimates are derived from these data and help managers to ensure a properly balanced fishery is maintained.

Management of the lakes also includes evaluation of water quality as it relates to fish habitat and aesthetic quality. The lakes require annual maintenance to control weeds and algae. Weed control is necessary to allow anglers access to, and utilization of, the recreational fishery as well as to enable maintenance of an adequate dissolved oxygen level for fish survival. Scott Lake has a recurring aquatic weed problem due to relatively shallow water and abundant nutrients from runoff of nearby fields. Regular weed suppression from April through September maintains the aesthetic quality of the lake. Two aerator systems, which increase dissolved oxygen concentrations in the surrounding waters, were installed at Scott Lake in 2004 along with installing a system at Cardinal Lake. Seven new aerators were installed in the lakes in 2020; annual maintenance is required for the aeration systems on both lakes.

In addition to use of the aeration systems to artificially enhance dissolved oxygen concentrations, annual treatments with herbicides are also required. Herbicides are effective for clearing aquatic vegetation along the shoreline for angler access. Partial treatments with herbicides are necessary during summer months to prevent large amounts of dead vegetation which leads to fish kills caused by low dissolved oxygen concentrations. Copper sulfate is used for algae, Endothol is used for submerged weeds, and the herbicide 2,4-D is used to control emergent aquatic vegetation. Additionally, Triploid grass carp, which consume large quantities of aquatic vegetation, have been stocked in Scott Lake to provide a measure of long-term control. The USFWS has recommended that small amounts of vegetation (10 to 25 percent of the total surface area) should be allowed to persist (Rogers and Caswell 2010). In 2017 approximately 60 largemouth bass were added to Scott Lake and approximately 600 catfish, 1,000 bluegill, and 1,000 redear sunfish were stocked in Cardinal Lake.

Recreational Hunting and Trapping

Hunting and trapping at Scott AFB are governed by Scott AFB Instruction 32-7001 and all IDNR hunting and trapping regulations. Hunting activities at Scott AFB include participation in the annual State of Illinois archery deer season. Season dates and times correspond to those set by the IDNR. The program is open to the first 100 applicants whom have base access, with priority given to active duty military. A Scott AFB hunting permit is required and is available by application with the 375 SFS. Hunting permit costs and hunting and trapping limits are reviewed annually by the NRM. As outlined in Scott AFB Instruction 32-7001, the hunting program is overseen by the NRM. Trapping opportunities are also available to base personnel, but this program has not been as widely utilized as the hunting program. Currently, Scott AFB Instruction 32-7001 authorizes ten trappers per season, but no trapping currently occurs at the installation.

In addition to the hunting opportunities at Scott AFB, MidAmerica Airport may open up the wooded habitat within the airport's boundaries for archery hunting by Scott AFB personnel. This opportunity and number of hunters are determined on a year-to-year basis and the hunt is managed by the 375 SFS. Hunters must follow regulations specified by the airport, including no hunting on agricultural lands and no hunting near the urbanized areas (parking lots, buildings, etc.) of the airport. Permission to hunt at MidAmerica is at the discretion of the airport authority and may be withdrawn at any time. As of 2022, MidAmerica has removed access to hunting on their property.

Management Issues and Concerns

Outdoor recreational opportunities are limited within the Silver Creek riparian corridor due to a lack of trails and the regular flooding of Silver Creek. A wetland walkway installed without prior coordination as a Boy Scout Eagle project in 2008 now requires demolition since there is both no way to maintain it (it is not on base real property records) and it is subject to frequent damage from tree falls. Demolition will be coordinated with the NRM and assessed to determine if a Section 404 permit is required. In the meantime, all signage indicating its presence has been removed and the walkway has been cordoned off.

Use of outdoor recreation resources by the general public is not compatible with the military mission on Scott AFB since there is no method to enable access to some locations (such as Scott Lake or the Silver Creek riparian corridor) and simultaneously prevent access to other portions of the base. This limits access to active duty military personnel and personnel who otherwise have access to the base. Hunting is further limited by order of the Commander to active duty military and their dependents, active reservists and their dependents assigned to Scott AFB, military retirees, and DoD civilians assigned to Scott AFB (Scott AFB 2010i). Non-profit groups may request limited access. Initial access will be granted on a case-by-case basis for Sikes Act or other natural resources related activities, such as to a local chapter of the Audubon society to conduct bird surveys on the base property. Depending upon the success of these programs, additional access may be granted to other organizations.

Recreational Fishing

Scott Lake was constructed in 1960 for recreational purposes. At its creation, the lake had a maximum depth of 15 feet and was approximately 15 acres in size. Due to sedimentation, the lake currently has a maximum depth of 10 feet and is approximately 13 acres in size. In 2006, the USFWS recommended dredging of Scott Lake to improve the recreational fishery. Due to many years of sedimentation the lake is becoming too shallow to maintain a healthy fishery. Overabundance of aquatic vegetation in Scott Lake has led to large fish kills in the past due to vegetation die offs during warm summer months. The decaying vegetation depletes dissolved oxygen levels in the lake leading to fish kills. The shallow depths of the lake magnify the problem of low dissolved oxygen by further reducing the volume of water available for fish habitat. However, it is anticipated that the installation of additional aerators described above will improve oxygen levels in the lakes. The primary management issue for fisheries is the dredging of Scott Lake. Management of vegetation, water quality, and recreational fisheries will continue to be problematic until the siltation and associated excess nutrient loading are addressed. The lake needs to be dredged back to the original depth and the shoreline graded to a proper slope. If this were done, Scott Lake should provide many more years of high quality recreational fishing with minimal vegetation management needed.

Overabundance of aquatic vegetation at Scott Lake and Cardinal Lake can inhibit fishing access. The base currently uses a chemical treatment plan recommended by USFWS to control vegetation. Management of the vegetation at Scott AFB also increases the recreational benefit of the lakes by facilitating access to fishing areas.

Recreational Hunting

Scott AFB has an ongoing and effective hunting program that provides recreational opportunities for base residents and helps to manage wildlife that could become a hazard to aircraft utilizing the runways at MidAmerica Airport and Scott AFB. MidAmerica re-opened the forested habitat along Silver Creek for hunting by Scott AFB personnel. This provides increased recreational opportunities and ensures better control of the deer population by eliminating a nearby refuge. In order to maintain this relationship with MidAmerica, Scott AFB plans to continue the current hunting and safety programs provided by the 375 SF in consultation with the NRM. Security Forces monitors hunters for compliance with MidAmerica regulations. Scott AFB will evaluate options and determine a method to ensure compliance with IDNR regulations.

Migratory Birds

Past surveys at Scott AFB have documented the occurrence of a number of migratory birds (Appendix H). However, the majority of these sightings have been incidental observations and it is unknown if these species are utilizing Scott AFB for breeding habitat. Scott AFB will conduct additional breeding bird surveys to determine what migratory bird species are currently utilizing habitat at Scott AFB for both breeding and temporary foraging.

As described in Section 2.3, Scott AFB is located in an area that was historically dominated by a mosaic of forested and grassland (prairie) habitats. While some of the native forested habitat remains at Scott AFB, no native prairie habitats are present at the installation. The Illinois Comprehensive Wildlife Conservation Plan & Strategy (IDNR 2005) identifies restoration of this habitat as a priority in the region and PIF has identified the lack of suitable grassland habitat as an issue of regional concern (Butcher et al. 2006) regarding native grassland birds. Following coordination regarding BASH issues, Scott AFB is considering restoring selected locations to native habitat (see Section 2.3.2.2).

Other Wildlife Species

Based on available information (Section 2.3.3), no comprehensive wildlife inventory has been conducted at Scott AFB. Without these surveys, the NRM is unable to effectively determine, and thus properly manage, the natural resources of the base. In addition, recommendations in past endangered species surveys (Martin et al. 2002, Scott AFB 2005b, and Scott AFB 2010e) have indicated that a lack of positive findings of endangered species does not preclude the possibility of the occurrence of these species. Future studies will be conducted to better define the natural resources at Scott AFB while continuing to monitor for endangered species and other species of conservation concern.

No comprehensive vegetative surveys have been conducted at Scott AFB (see Section 2.3.2). Limited single season surveys were conducted at Scott AFB in 2001 and 2005. These surveys were limited to one season or a single day and were not accomplished during the blooming period as required to identify a number of sensitive plant species. While these surveys were generally focused on identifying and locating endangered species, they also provided an opportunity to evaluate the natural habitat at the installation. A survey for sensitive plant species will be conducted in 2022; Scott AFB will conduct a vegetation survey that includes habitat evaluation and production of management recommendations.

The primary wildlife habitat issue of concern at Scott AFB is the degradation of the bottomland forest of the Silver Creek riparian corridor. Scott AFB is working along with the Heartland Conservancy within an AF-Community Partnership-Stormwater Working Group to address regional issues. The bottomland forest of the Silver Creek riparian corridor is being actively degraded by alterations of the hydrology of Silver Creek caused by the erosion and the subsequent deposition of silt from floodwaters. Alterations include basin-wide construction and the channelization of many segments of Silver Creek to include those caused or exacerbated by the construction of the MidAmerica runway. Regional efforts are needed in order to address this habitat damage. Additional efforts planned by the working group are discussed in Sections 7.5 and 7.6.

Climate Change

The following text from the CSU CEMML project report describes potential changes to outdoor recreation and public access to natural resources at Scott AFB due to climate change (CSU CEMML, 2021).

"Climate change is likely to have some minor impacts on outdoor recreation and public access to natural resources on Scott AFB. Activities in the dispersed areas of the installation (e.g., fishing, hunting, bird watching, and hiking) are likely to be more negatively impacted by climate change than those in the developed areas. Recreational activities in developed areas (e.g., camping and picnicking) occur in areas managed as "improved" or "semi-improved" and are therefore unlikely to experience any significant land use or vegetation cover change due to climate change. More frequent days with extremely hot temperatures are unlikely to cause serious safety concerns to those participating in outdoor activities; however, higher temperatures may make these activities less pleasant, primarily during the summer months. Recreation may also be less safe due to a greater abundance of disease-carrying ticks (Süss et al., 2008). As mentioned in the Fish and Wildlife Management section (Section 10.1), one way to control tick populations is to reduce populations of hosts such as deer and rodents that may be overabundant due to the shifts in climate. Fish and Wildlife managers may also consider increasing the number of hunting permits and trappers allowed at the installation if host species become burdensome and wildlife disease spread increases.

Climate change may have unfavorable effects on fishing at Scott AFB, as warmer water temperatures are likely to decrease levels of dissolved oxygen and increase chances of algal blooms (Paerl et al., 2011). This could adversely affect aquatic ecosystems and the fish and wildlife within them. Scott and Cardinal Lakes are both highly managed to improve recreational fishing, but these management practices may need to be adapted to mitigate the changes caused by climate change and maintain a viable fishing stock.

Climate change may also impact outdoor recreation by indirectly affecting migratory bird species, and thus potentially reducing opportunities for bird watching. Warmer temperatures may cause insects to emerge earlier, causing a temporal mismatch between migratory birds and their food source on the installation (Both at al., 2010)."

7.3 Conservation Law Enforcement
Installation Supplement

Applicability Statement

This section applies to all USAF installations that maintain an INRMP. The installation is required to implement this element.

Program Overview/Current Management Practices

Management Program

Several enforcement activities associated with natural resource areas at Scott AFB are described in Scott AFB Instruction 32-7001. The 375 SFS will enforce (within the confines of Scott AFB) the Instruction, as well as IDNR fish and game laws. The 375 SFS maintains a liaison with the state and federal conservation enforcement agencies. The base has a volunteer role within 375 SFS to serve as the Hunting POC for conservation enforcement; this role interfaces with IDNR enforcement personnel as needed. Archery, deer, and trapping fees are collected by the Hunting POC.

The control of off-road vehicles on Scott AFB is the responsibility of the 375 SFS. The governing regulation is Air Force Regulation 125-14 and Scott AFB Sup 1, Section P. Section R. Para 109-112.

Management Issues and Concerns

Currently, the only known management issue is ensuring compliance with IDNR hunting and fishing regulations and that no poaching occurs within the Silver Creek riparian corridor. The NRM will work with the 375 SFS and IDNR and/or USFWS personnel to assess conservation liabilities and develop a Memorandum of Understanding with IDNR if the need arises for it in the future.

7.4 Management of Threatened and Endangered Species, Species of Concern, and Habitats
Installation Supplement

Applicability Statement

This section applies to USAF installations that have threatened and endangered species on USAF property. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

Resource Management Program

To comply with the ESA, AFMAN 32-7003, and AFPD 32-70, Scott AFB will preserve and protect the federally-endangered species and the habitat utilized within the base. Currently, the only federally-listed species that are known to occur at Scott AFB are the Indiana bat and the NLEB. While the ESA does not provide protection for Illinois-listed T&E species, AFMAN 32-7003 instructs that INRMPs will provide protection for these species when practicable.

Indiana bat

The prior focus of INRMP management for the federally-endangered Indiana bat was to limit all management activities in the bottomland forest until the population of bats present at the base was defined. The results of mist-netting and radio-telemetry studies conducted at Scott AFB during 2001 and 2009 indicate that the federally-endangered Indiana bat is utilizing roost trees, roadways, and bottomland forests in the Silver Creek Riparian Corridor for foraging and/or travel. As a result of these studies, Scott AFB has prepared an ESMP for the Indiana bat (Scott AFB 2010e). Protection of foraging and roosting habitat is the major focus of the current Indiana bat management efforts at Scott AFB.

Northern long-eared bat

Surveys for Indiana bat also identified the presence of NLEB, which was listed as threatened on 2 April 2015. The NLEB uses the same habitat as the Indiana bat, except that it has a higher propensity to occasionally use buildings for shelter. Current management practices are those originally intended for protection of the Indiana bat.

Other Federally Listed Species

No other federally-listed species are known to occur at Scott AFB; surveys for mammals have been conducted and will be performed for vegetation in 2021 and pollinators in 2024. Habitat for the federally-threatened decurrent false aster has been identified at Scott AFB, but no specimens of the species have been observed (Martin et al. 2002). The planned surveys will concentrate on identification of species of conservation concern.

State-Listed Species

No state-listed species are known to occur on Scott AFB and thus there are no management activities are currently conducted specifically for state-listed species.

Management Issues and Concerns

Indiana bat and NLEB

Previous studies at Scott AFB have shown that the Indiana bat and NLEB are utilizing habitat on the installation and that a stable population of Indiana bat apparently exists within the Silver Creek riparian corridor. Primary management practices for NLEB are currently the same as those for Indiana bat and are detailed in the ESMP (Scott AFB 2010e). They focus on conserving and maintaining existing roosting and foraging habitat. Timber stand improvement in the Silver Creek riparian corridor would improve bat habitat. The objective of the improvements are to conserve habitat by maintaining tree canopy closure within forested stands; maintaining a diverse, uneven aged forest; retaining snags in areas marked as potential roost areas (Figure 2-15); maintaining desirable tree species (e.g., shagbark hickory) as well as other high value tree species and sizes identified for the Indiana bat; and limiting selective harvesting of specific timber stands within the protected habitat areas at the base. The area surrounding known roosting areas will also be preserved to serve as a protective buffer. No trees greater than three inches in diameter will be felled for any management activities when bats may be present (1 April to 30 September).

Prior to conducting habitat improvements, Scott AFB will establish bat habitat management zones. These zones will serve to focus long-term habitat management activities. Projects are included to conduct one management activities within these management zones. The former forest roads within the Silver Creek riparian corridor will be evaluated to determine which, if any, can be maintained to allow access to bat areas for monitoring and habitat maintenance, as well as to preserve the flyways currently used by the bats. If necessary, additional access routes and/or flyways will be created.

Continued monitoring of the Indiana bat population, as well as other bat species, is necessary to ensure the bat community is stable and to ensure that management practices have desired effects. Radio-telemetry and mist-netting studies are planned. Routine monitoring will also be conducted to include brief visual surveys of known roosting habitat to ensure that no disturbance has occurred. To help ensure the long-term viability of the bat habitat at Scott AFB, foraging habitat studies, further roosting habitat surveys, and habitat management activities (travel corridor maintenance, tree thinning, and planting preferred roosting trees) will be conducted.

The presence of federally-endangered species utilizing habitat at Scott AFB provides a unique opportunity to educate members of the public about the importance of these rare animals and the necessity of preserving their habitat. The NRM will continue to utilize the base newspaper and the Public Affairs Office to inform residents of the presence of species of conservation concern at the base. Continued use of these media in conjunction with other public outreach and educational materials to update the base community on monitoring and management efforts for the Indiana bat, as well as NLEB, is planned.

White Nose Syndrome

In 2009 a previously undocumented disease was observed in hibernating bat populations in the northeast. This disease has been identified as the White Nose Syndrome (WNS). WNS is thought to be caused by a species of fungi (Pseudogymnascus destructans) that invades the skin of bats through hair follicles. Bats infected with WNS are characterized by a white fungus that grows around the muzzle and on the wings. Six species of hibernating bats, including the Indiana bat, have been affected by WNS in the northeastern U.S. WNS is rapidly spreading south and west across the United States. According to a memorandum published by the Office of the Under Secretary of Defense (Appendix J) it is incumbent on DoD to manage natural resources to ensure no net loss to readiness and that installations with known populations of these species should institute strategies to help combat the spread of WNS. Scott AFB will comply with these objectives by continuing to monitor the population of Indiana bats at the installation and ensuring that all monitoring activities comply with the latest USFWS Guidelines for Reducing the Spread and Transmission of White-Nose Syndrome (USFWS 2011). The most up-to-date protocols for decontamination to prevent the spread of WNS by anyone handling bats are found at: www.whitenosesyndrome.org/sites/default/files/resource/national_wns_revise_final_6.25.12.pdf.

Other Federally-Listed Species

A comprehensive vegetation survey is needed to determine the presence, or absence, of the federally-threatened decurrent false aster (*Boltonia decurrens*) on base. Recommendations from both the 2001 and 2005 vegetation surveys defined a need for a multi-seasonal vegetative survey of the Silver Creek riparian corridor to better determine the status of federally-listed species at Scott AFB. A survey is planned for 2021-2022.

Scott AFB will further consult with USFWS to create a list of additional federally-listed threatened or endangered species that may occur at Scott AFB. Closing the existing gaps in data regarding federally-listed plant species is critical for Scott AFB to adequately manage its natural resources and meet federal, state, and Air Force regulations, policies, and management guidelines. To reduce the data gaps, consultation with the USFWS and IDNR, as well as utilization of previous biological surveys, will be used to prepare a list of federally-listed plant species that may occur at Scott AFB. Using this list, Scott AFB will conduct a comprehensive vegetation survey to update the inventory of plant species that occur at the base and determine potential habitat for federally-listed species.

State-Listed Species

Scott AFB intends to further consult with the IDNR to refine the list of state-listed T&E species that may occur at Scott AFB. Closing the existing gaps in data with regard to state-listed plant species is critical for Scott AFB to adequately manage its natural resources and meet state, and Air Force regulations, policies, and management guidelines. To reduce the data gaps, consultation with the IDNR and utilization of previous biological surveys will be used to prepare a list of state-listed plant species that have the potential to occur at Scott AFB. Scott AFB will combine this list with that of federally-listed species to conduct a comprehensive vegetation surveys to provide a single comprehensive plant list for the base that includes a determination of potential habitat for state-listed species.

There are existing data gaps with regard to migratory birds and state-listed bird species. In consultation with the IDNR and other relevant agencies, a list of target bird species that have the potential to utilize Scott AFB as breeding habitat will be prepared. This will include any state-listed species, migratory birds, and watch listed species. Using this list, Scott AFB will scope an appropriate bird survey to be conducted in FY25 (Project 8.3.3.8) to determine potential habitat for state-listed bird species and provide the basis for creation of management recommendations that are consistent with reduction of BASH risks.

7.5 Water Resource Protection
Installation Supplement

Applicability Statement

This section applies to USAF installations that have water resources. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

Aquatic habitats at Scott AFB consist of Silver Creek, Ash Creek, Cardinal Creek, Mosquito Creek, wetlands, artificial drainage ditches, and several artificial lakes and ponds. Four ponds were constructed within the golf course, and two impounded lakes are present in the outdoor recreational area in the northeast corner of the base (Figure 2-2). One golf course pond was drained and is currently a wetland. The two lakes, Scott Lake and Cardinal Lake, are managed for recreational fisheries. These surface water features provide aquatic habitat for amphibians, reptiles, fish, waterfowl, and wading birds. Several state-listed bird species have been observed utilizing the shallow water habitat at Scott Lake. Maintenance of a healthy fishery within the lakes will continue to provide a foraging habitat for these listed species. Any dredging of the lake would improve the overall lake depth and increase the carrying capacity of the lakes fishery, while maintaining the shallow water habitat for species such as snowy egret and little blue heron.

In accordance with AFMAN 32-7003, land management activities must consider the protection and enhancement of desirable natural and man-made features in the landscape. The land management programs that directly relate to protection of water resources at the base include irrigation and water management, control of non-point source pollution, and soil erosion control.

Water management and the control of point and non-point source pollution into surface waters are regulated under the Clean Water Act (CWA). Section 313(a) of the CWA specifies that federal facilities must comply with federal, state, and local requirements, including categorical effluent limitations contained in 40 Code of Federal Regulations (CFR) Parts 405 through 471, and must obtain discharge permits under the National Pollutant Discharge Elimination System (NPDES). Wastewater includes sanitary sewage, stormwater, non-point source surface water discharge, and industrial wastes. The CWA allows the USEPA to authorize individual states to administer the CWA and its resultant regulations. The State of Illinois has been authorized to administer the CWA through the IEPA. The Illinois Pollution Control Board Rules regulations governing stormwater quality are located at Title 35 of the Illinois Administrative Code, Subtitle C, Chapter 1.

The IEPA requires Scott AFB to obtain coverage under two stormwater permits, which include: (1) an Illinois General NPDES Permit for Discharges from State and Federal Small Municipal Separate Storm Sewer Systems (MS4) (Permit No. ILR00 2659) and (2) a General Discharge Permit for Stormwater Associated with Industrial Activities (Permit No. ILR40 0611). The first permit is often referred to as the Phase II MS4 Stormwater Discharge Permit, while the second permit is known as the General Industrial Stormwater Discharge Permit.

The Phase II MS4 Stormwater Discharge Permit requires Scott AFB to develop and implement BMPs with measurable goals. The six minimum control measures identified in the permit include public education and outreach, public participation/involvement, illicit discharge detection and elimination, construction site runoff control, post-construction runoff control, and pollution prevention/good housekeeping (Scott AFB 2010f).

Resource Management Program

Water quality in surface water resources is primarily managed through the Water Program. The Water Program Manager functions as part of the Water Program Team to maintain, revise, and implement the water program, which includes a Stormwater Pollution Prevention Plan (SWPPP) (Appendix G). To demonstrate compliance with stormwater regulations and permits, Scott AFB biannually performs water quality sampling at four inflow and six outflow sites (Figure 7-2, Stormwater Monitoring Locations) (Scott AFB 2010f). Results from these sampling events are reported to the IEPA in the annual stormwater report and are used to monitor the quality of the water resources at Scott AFB.

The SWPPP includes the BMPs and procedures to minimize the release of potentially harmful pollutants into the stormwater system which thus minimizes the potential for causing harm to natural resources. These potential pollutants include chemicals used in the day-to-day operations of a military airfield and include chemicals from runway de-icing, aircraft de-icing, and aircraft maintenance/refueling operations. Scott AFB's SWPPP practices include performing preventive maintenance, good housekeeping, and visual inspections of stormwater infrastructure. Implementation of BMPs from the Phase II Permit is an integral part of the stormwater management program. BMP goals, measurements, and responsibilities are reported to the IEPA in the NPDES Phase II annual report for Scott AFB.

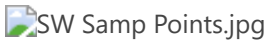

Figure 7-2. Stormwater Monitoring Locations

Management Issues and Concerns

The NPDES general permit does not specify the parameters or the limits that are monitored at Scott AFB. For comparison purposes only, the results of the 2019 NPDES sampling are compared to the State of Illinois water quality standards. The State of Illinois maintains water quality standards for pH, total dissolved solids, total ammonia, and oil and grease. No samples exceeded the State of Illinois water quality standards during the 2019 sampling events (Weber, 2021). Several projects are programmed within the water program to further reduce the potential for pollutants to enter the stormwater system (Figure 7-3, Planned Stormwater Project Locations). As discussed in Rogers (2014), there are three things keeping Scott Lake from being an outstanding recreational fishery. The first issue is the sediment load in the lake. Once lakes reach 20-plus years in age, they have typically accumulated a significant amount of sediment. The sediment load makes the lake shallower which can cause problems for overwinter survival of fish and enhances the filamentous algae growth. Historical records indicate that Scott Lake had a maximum depth of 15 feet and an average depth of 2.4 feet. During a USFWS survey of the lake in 2014, the deepest water was located near the dam and was 8 feet. The rest of the lake was extremely shallow. In this geographic region, 8 feet deep is the shallowest a pond can be in order to maintain over winter fish survival under the ice. In the summer months deeper water is beneficial as it will be cooler and hold more oxygen. The large sediment load is the root of the algae problem, and the algae problem will never go away until the sediment load is reduced.

The second issue is the amount of filamentous algae. A small amount of algae is not detrimental to the lake. Currently, Scott AFB tries to manage it at 10-25% of the surface area. Those numbers are probably a little high (Rogers 2014), but to maintain it less than that would be very challenging and expensive until the root cause is addressed. The algae causes several problems. It is not very aesthetically pleasing and when large amounts start to accumulate and then die, it creates a foul odor. Filamentous algae also impedes fishing. This type of algae is probably the most frustrating and difficult aquatic vegetation to fish in and around and typically deters anglers from fishing at all. Additionally, the algae prevents predators (largemouth bass in this case) from being able to utilize the smaller fish as food. The algae provides such good cover for smaller fish that they become unavailable to the bass which leads to poor body condition, further discouraging anglers.

The third issue is that the algae can lower the oxygen levels in the lake to the point of causing a fish kill. In the summer months, warm water holds less oxygen than the cool water holds at other times of the year. This is also when the algae is usually at its thickest. Overnight, the algae will use a lot of oxygen in the water. Oxygen levels get to their lowest point pre-dawn; and if it is low enough, can kill most or all the fish in the lake. Additionally, once algae die, decay also uses up oxygen.

An additional concern has been a lack of routine shoreline maintenance. There is one fishing pier located on each lake but access to much of the remaining shoreline is difficult. Grass and shrubs were tall and over hanging limbs had fishing line and lures stuck in them. During their 2014 survey, USFWS talked with a few anglers that were fishing at the time and they indicated that they would like to see at least a few areas around the lake maintained more consistently to allow easier access to the water (Rogers 2014).

There are a number of efforts planned and underway to address these concerns. A project has been programmed to drain and dredge Scott Lake and to repair and maintain the east end dam and spillway, as recommended by the USACE in 2014. Plans will be coordinated with the NRM. The AF-community Partnership-Stormwater Working Group plans a study of surface runoff near the Cardinal Creek Gate (near O-SL1 on Figure 7-2), which is the source of the water within Scott Lake. This water drains from off-base agricultural fields and thus contains nutrients that further worsen the algae problem, along with sediment. There is also a related nutrient loading issue involving the Security Forces K-9 kennels that will be addressed. Once the study is completed, plans will be developed in coordination with the NRM to minimize nutrient and sediment loading. In the meantime, the NRM will continue to coordinate routine monitoring and management of algae levels with USFWS.

A project to install four new aerators in Scott Lake and three in Cardinal Lake was completed in December 2020. This will ensure continued introduction of additional oxygen. Scott AFB will also assess appropriate locations to improve shoreline vegetation management and the NRM will coordinate accomplishment of such with Grounds Maintenance.

In 2021, muskrat chew marks were found in aerator fountain chords. A replacement of stainless-steel chords was made to prevent further damages.

Recommendations for water quality protection of jurisdictional wetlands on-base are presented in Section 7.6. These would be implemented using the existing NPDES discharge monitoring locations such as O-SL1 or DA-13 (Figure 7-2) to monitor water quality entering and leaving wetlands on base.

Figure 7-3. Planned Stormwater Project Locations

Climate Change

Potential impacts of climate change to water resources are discussed in Section 2.2.4, Hydrology.

7.6 Wetland Protection
Installation Supplement

Applicability Statement

This section applies to USAF installations that have existing wetlands on USAF property. This section **IS** applicable to this installation.

Resource Management Program

AFMAN 32-7003 requires compliance with EO 11990, *Protection of Wetlands*, and Sections 401 and 404 of the CWA. These regulations protect wetlands (as a subset of waters of the U.S.) as natural resources of the U.S. EO 11990 states that new construction shall be avoided in wetlands unless there is no practicable alternative to such construction, and that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such action. These provisions apply to all wetlands, not just jurisdictional wetlands. Sections 404 and 401 of the CWA establish a program to regulate discharges of dredged or fill material in jurisdictionally determined waters of the U.S. to ensure that the biological and chemical quality of the water is protected. A wetland delineation is required to determine if a wetland is jurisdictional. A jurisdictional delineation is valid for the purposes of obtaining a 404 permit for a period of five years.

Wetland inventories at Scott AFB were conducted in accordance with DoDI 4715.03. This instruction states that "biologically or geographically significant or sensitive natural resources (e.g., wetlands, forests, floodplains, watersheds, estuaries, riparian areas, coastal barrier islands, marine sanctuaries, critical habitats, animal migration corridors) or species (e.g., threatened or endangered species, certain marine mammals, and migratory birds) shall be inventoried and managed to protect these resources, and to promote biodiversity." DoDI 4715.03 further states that DoD lands shall be managed for the goal of no net loss of wetlands, and that operations and activities shall avoid the net loss of size, function, or value of wetlands.

Information in this INRMP regarding wetlands is derived from multiple sources. Site-specific wetland delineations are conducted if there is a potential need to obtain a Section 404 permit and a delineation addressing the specific project area has not occurred within the past five years. These data are maintained within GeoBase. A wetland inventory is also maintained within GeoBase and shared with base planning and operations to prevent adverse impacts to wetlands while conducting base improvements or actions that ensure mission continuity.

Management Issues and Concerns

DoDI 4715.03 includes the goal of maintaining or restoring native ecosystem types across their natural range where practical and consistent with the military mission, and maintaining or restoring the hydrological processes in streams, floodplains, and wetlands when feasible. AFMAN 32-7003 states that "on installations with jurisdictional wetlands, the INRMP must include long-term monitoring of trends in habitat values as well as plans for wetland restoration and enhancement." Several management issues and concerns have been identified in regard to these regulations.

In order to maintain and protect the hydrological processes in wetlands, Scott AFB has protective buffers around base wetland areas. Protective buffers are geographical areas adjacent to wetlands that are not mowed and naturally vegetated that protect the wetland from the effects of nearby development. Although not regulated or required, protective buffers were identified with the 2009 Wetland Delineation Report (SAFB, 2009) for each jurisdictional wetland area, to the extent practicable, (as shown in Figure 2-16). These will be assessed in accordance with overall habitat management and mission requirements and specific projects added during future INRMP updates.

The Silver Creek riparian corridor is the single largest natural resource habitat at Scott AFB. Monitoring is an essential first step in the process of conserving and restoring this natural wetland habitat. Wetland delineations have occurred periodically at Scott AFB since 1993. However, these delineations have always focused on defining the boundaries of jurisdictional wetlands, and only limited historical data on wetland quality or function exists (see TAMS 1995). Observations in the field (i.e. dead trees, siltation) and anecdotal evidence from long-time base personnel indicate that the hydrology of Silver Creek has changed significantly over the years. The types of changes in hydrology have altered the function and values of the floodplain and these wetlands. Future wetland studies will include a rapid wetland assessment evaluation of these functions and values and recommendations for long-term monitoring. Long-term monitoring of biological attributes and water quality will be used to assess the health of local habitat, document changes in stream or wetland health over time, and detect stress on the system. Disturbed or degraded areas that are within, or adjacent to, high-value wetlands provide opportunities for restoration.

As part of the AF-Community Partnership-Stormwater Working Group referenced in section 7.5, efforts are planned by the Heartlands Conservancy to address issues within the Silver Creek riparian corridor. The working group is a regional planning effort to enable coordination of storm water management. Local installation projects (Figure 7-3) which will be coordinated between the Water Program Manager and NRM include debris and logjam removal within Silver Creek, installation of infiltration and detention basins at several locations on Scott AFB, and improvements to stormwater infrastructure to reduce streambank erosion at outfalls among other issues.

7.7 Grounds Maintenance
Installation Supplement

Applicability Statement

This section applies to USAF installations that perform ground maintenance activities that could impact natural resources. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

Grounds Maintenance

The land at Scott AFB is maintained by several entities based on ground maintenance categories (Figure 2-5). The improved areas of the base (i.e., administrative areas) are managed by a grounds maintenance service contract administered by the 375 Civil Engineering Squadron, Operations Flight, Maintenance Engineering Section (375 CES/CEOE). They also manage maintenance of the semi-improved grounds, such as the airfields, warehouse areas, sewage treatment plant, roadways, and the mowed areas around Scott Lake and Cardinal Lake. The 375th Forces Support Squadron (375 FSS) maintains the athletic facilities and FamCamp, and supervises maintenance of the golf course. Housing areas within Scott AFB have been privatized and grounds maintenance is provided in accessible areas by Hunt Brothers. The NRM manages the unimproved areas of the base, e.g. the Silver Creek riparian corridor. A link to the current Grounds Maintenance Performance Work Statement is included in Appendix G.

Resource Management Program

Grounds maintenance services are contracted to a commercial landscaping company that provides services such as mowing, trimming, edging, irrigation, weed removal, and fertilization. The goals of the grounds maintenance program are to maintain compatibility with operational needs, comply with aesthetic considerations, comply with Air Force regulations and guidelines, and avoid adverse effects to natural resources from routine grounds maintenance.

Scott AFB supports the goals of EO 13148, *Beneficial Landscaping*, on all new or extended landscaped areas and considers native plants when replacement or rejuvenation of existing landscaping is required. A list of approved plants for landscaping has been developed for Scott AFB and is included in Appendix I. Scott AFB uses BMPs that minimize adverse effects on natural habitats. Practices include reducing fertilizer and pesticide use, implementing integrated pest management practices, recycling green waste (composting), using water-efficient irrigation systems and recycled water, minimizing surface runoff, and designing landscape areas to utilize plants in a manner that reduces maintenance activities and energy use.

The priority for grounds maintenance at the improved areas (i.e., administrative areas, athletic fields, housing areas) is to maintain the sod cover. These areas receive regular applications of fertilizer, herbicide, and turf insecticide. All other semi-improved grounds are maintained using herbicide for control of broadleaf weeds, but no fertilizers or insecticides are used. In accordance with the DoD's Comprehensive Pollution Prevention Strategy, installations are required to reduce pesticide use to less than 50 percent of their 1993 baseline threshold, which Scott AFB has met and will continue to meet. Additional information regarding pesticide usage is provided in the Scott AFB IPMP (Scott AFB 2011c). Application of pesticides and fertilizers within 50 feet of a designated drainage ditch or wetland is prohibited. Personnel handling pesticides, herbicides, and fertilizers are certified under State of Illinois and DoD standards, and are provided with personal protective equipment and enrolled in the medical monitoring program (Scott AFB 2011c).

Overseeding is required annually on the airfield and also occurs at areas requiring renovation. The seed blend used is a 3-way blend of turf-type fescue for general use. The golf course uses a perennial rye and bluegrass blend for roughs, "Meyer" zoysia grass for fairways, and creeping bentgrass for the greens. Improved areas of the base are mowed biweekly or weekly, depending on the season. The standards for mowing are based on maintaining the height of cut within 1.5 to 3 inches for all improved areas. In the semi-improved areas the height parameter is 7 to 14 inches. The airfield is mowed on an "as-needed" schedule with a height of cut of 7 to 14 inches, depending on the season. In the improved areas of the base, shrubs and trees are pruned if they create a safety hazard or are in high visibility areas.

Information regarding pest management and invasive weed species management is discussed in Section 7.11.

Management Issues and Concerns

Currently, the base uses a drought and disease resistant mix suited to this area. Regional turf grass trials have shown that turf-type tall fescue is a superior turf grass.

Grounds maintenance activities at semi-improved areas can be reduced or minimized by establishing native vegetation at specific areas of the base. Converting tracts of semi-improved land from non-native cool season grasses to native grasslands reduces soil erosion, invasion by noxious species, and improves wildlife habitat. Scott AFB will consider converting suitable tracts of semi-improved land from non-native cool season grasses to native grassland (or other habitat type as appropriate) to increase wildlife habitat and decrease grounds maintenance requirements.

A major source of noxious and invasive weeds is an approximately 51-acre tract in the former Cardinal Creek Housing Area near the Cardinal Creek Gate (Figure 2-5). This area has been unmanaged since the residential housing that formerly occupied the area was demolished in 1999.

Urban Forest Management

Resource Management Program

Urban forestry is the management of woody landscape plant populations in developed or improved environments. AFMAN 32-7003 requires development of long-term goals and objectives to achieve a desired future state for installation landscape trees, along with production of a recommended list of trees and shrubs that favors native and other species that will survive with a minimum of maintenance beyond a two-year establishment period. All plantings must consider BASH safety guidelines. Current management activities include pruning or removing hazardous trees and ensuring that contractors comply with approved planting and pruning specifications.

Identifying and quantifying an installation's tree population is crucial to determining a comprehensive, long-term approach to maintaining the well-being of the urban tree population. With routine maintenance, trees will generally live longer and require less intensive long-term care.

Management Issues and Concerns

Management activities focus on the routine maintenance of the urban forests at Scott AFB to maintain a healthy tree community. The program includes routine pruning and removal of dead, declining, or hazardous trees. The program includes recommendations to gradually replace dead, declining, and hazardous trees with ones that will grow to a similar height. The urban tree program will work towards a goal of replacing every removed tree with two new trees and planting trees on empty sites. Scott AFB will also implement procedures to ensure contractors meet the specified guidelines for tree plantings (species selection, irrigation, mulch, and stake removal), as designated in the *Urban Forest Management Plan* (Scott AFB 2010c and Appendix G). As part of the urban forest survey conducted at Scott AFB in 2010, tree condition was evaluated based on the overall health of the tree. A number of large (greater than 60-feet tall) pin oak trees were reported as suffering from chlorosis (Scott AFB 2010c). These trees will be fertilized as part of the grounds maintenance activities. Routine maintenance of the urban tree inventory at Scott AFB will be more effectively managed by maintaining a tree inventory database. This database will be updated to include newly planted trees, replacement trees, and to identify newly dead trees.

The 2010 survey results also show that the systematic tree planting program requires modification. Previously accepted urban forestry practice was that no single species should make up more than 10 percent of an urban area's tree population. The DoD codified this guideline in the Unified Facilities Code (UFC) 3-201-02, which states that a DoD installation should not plant more than 10 percent of any species. At Scott AFB, no single species exceeded the 10 percent guideline within the entire study area, although the base is close to exceeding the 10 percent limit for red maples. Therefore, no additional mass planting of red maples will occur on the base in the near future. Limited plantings of red maples every few years would be acceptable to aid in maintaining a diverse age class (Scott AFB 2010c). The tree size distribution at Scott AFB is skewed to smaller/younger trees (41 percent small, 51 percent medium, and 7 percent large). While the age distribution of trees is difficult to alter with plantings, trees that grow to larger-size trees will be considered when planting new trees (e.g., swamp white oak, bur oak, tulip popular, etc.). Planting goals will select species that comply with UFC 3-201-02 and the AMC Architectural Guide, and that will grow to a larger size. Newly established urban forest tree planting guidelines on species and genus composition and diversity are to plant no more than 5 percent of any one species and 10 percent of any one genus (Brunk 2021). Future tree planting actions will be planned to follow these guidelines.

Due to the threat of the ash borer, no additional ash or white fringetree will be planted at Scott AFB. To facilitate addressing emerald ash borer, an ash tree inventory project was conducted in 2017, along with production of management recommendations (Scott AFB 2017c). Figure 2-19 shows several clusters of ash trees in housing and high visibility areas. It is the responsibility of the NRM to coordinate activities with grounds maintenance and contracting.

There is a current need for an updated Urban Forest Management Plan and tree inventory. The latest inventory is from 2010.

Climate Change

The following text from the CSU CEMML project report describes potential impacts to grounds maintenance at Scott AFB due to climate change (CSU CEMML, 2021).

"Overall, ecological systems on the installation and their associated vegetation are vulnerable to the rising temperatures and shifts in precipitation expected due to climate change. These changes are likely to influence the products and services supported by natural resources at the installation. To help support the resilience of these systems, natural resource managers could focus on monitoring vegetation for indications of climate stress. Managers could also conduct restoration activities, including restoring native species diversity, maintaining the soil moisture regime (e.g., irrigation/drainage of natural communities), and evaluating needs for species (e.g., pollinators) and habitat characteristics (e.g., soil crusts, hydrology) that will restore essential functions to the system. Managers should also consider using localized wildfire models to restore fire regimes where they have been severely altered due to removal of herbivores, wildfire suppression, or invasive plant introductions. Finally, we recommend that managers monitor for invasive plant expansion, including shrub invasion (Comer et al. 2018)."

7.8 Forest Management
Installation Supplement

Applicability Statement

This section applies to USAF installations that maintain forested land on USAF property. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

The principal objective of forest management on Air Force installations is to maintain and enhance the ecological integrity of forested landscapes while supporting the military mission. Forestry operations provide an effective way to manipulate the forest environment to achieve the goals of ecosystem management, such as forest enhancement and restoration, wildlife habitat improvement, and wildfire protection, as well as achieving military training requirements, airfield safety compliance, and, as appropriate, wood production.

Resource Management Program

Tree planting, herbicide applications, and mechanical treatments are the main practices that have been used to manage natural forest resources at Scott AFB. Tree removal, if necessary, is only to be completed between October and March due to forest utilization by the Indiana bat and NLEB. Planned activities within bat habitat are carefully scrutinized to ensure that roosting trees are not impacted. If a project must occur, the NRM will accomplish consultation with USFWS under the ESA.

Periodic timber harvests were conducted between 1968 and 1993 at Scott AFB in the Silver Creek riparian corridor (Scott AFB 2005a). The last harvest, conducted in 1993, resulted in the harvest of 44,000 board feet of immature saw timber for the new taxiway, providing $2,500 to the Air Force Forestry Account from the sale. Timber stand improvements were completed from 1998 through 2001. Due to the change in management strategies for the various forest stands on Scott AFB, no timber management has occurred since 2001.

There were approximately three miles (4.8 km) of various improved roads within the forest. These roads have not been improved since at least 2012. At that time, they were in need of additional work, including the maintenance or replacement of existing culverts. These roads provide flyways for foraging Indiana bats and have the ability to provide access for recreation such as hiking and hunting. Historically, the 375 CES maintained these roads, but an assessment is required regarding if road maintenance is even still feasible given changes to the hydrologic regime within the Silver Creek floodplain since the construction of MidAmerica Airport in 1997.

Management Issues and Concerns

Habitat management is the main focus of the INRMP for natural forests at Scott AFB. Bottomland hardwood forests are naturally excellent habitat for many species of wildlife, including the Indiana bat. Many large trees provide cavities and shelter throughout the natural forest stands. Standing dead trees provide nesting material, food sources for insectivores, and the potential for new cavities. Rotting logs on the forest floor also benefit amphibians and reptiles, providing necessary cover area. However, during flood, excess woody debris is swept into Silver Creek and it then produces log jams that have the potential to diminish habitat values and increase flooding of developed portions of the base. As previously mentioned in Section 2.3.5, CE Environmental along with the AFCEC Scott ISS and USFWS Ecological Services in Moline, IL, are coordinating a planned removal of the blockages potentially in 2023 and future years as necessary.

Natural forest management activities aim to establish or maintain uneven-aged, multi-dimensional forests, while retaining existing bat roost trees and potential bat roost trees for the Indiana bat. Restoring the timber harvest program within the Silver Creek riparian corridor will enhance forest health. Small openings for natural forest regeneration promote a healthy, complex, multi-dimensional forest that enhances habitat diversity. All of the natural forest stands on Scott AFB would benefit from single tree, small group, or small-scale timber harvests for timber stand improvements, and Scott AFB will accomplish forest thinning and/or a timber sale as is determined most feasible. Removal or thinning a stand to a less dense basal area would open the canopy and allow for natural regeneration to occur. While all of the stands are over stocked, very few areas within stands have adequate young sapling stock growing in the understory (Scott AFB 2010b). As mentioned in Section 2.4.3, as a sub-component of the bat survey they conducted in 2016, USFWS performed an evaluation of forest stands on Scott AFB and provided stand prescriptions which serve as guidance documents with recommended treatment and monitoring schedules (USFWS 2017b). This information guides forest management at the installation under the annual bat habitat management and invasive species management projects.

Timber sales within the natural forests could help meet the overall forest health and wildlife management recommendations and goals, and provide funding to implement natural resource-related management projects (e.g., forest road improvements, bat habitat improvements). The estimated total volume of merchantable timber present within the five natural forest stands of Scott AFB was approximately 2,800 million board feet in 2010. The average volume of timber per acre on Scott AFB was then 6,180 board feet. The majority of standing timber volume on Scott AFB within the natural forest is from larger, mature trees. The basal areas recorded for each stand are all over 100 square feet of standing timber per acre. This is an exceptionally high stocking rate, especially for larger trees. Simply stated, there are too many large trees, very tightly spaced, per acre, which precludes maintenance of a healthy productive forest for an extended period of time (Scott AFB 2010b). Thinning will emphasize removal of non-native species and, with the arrival of emerald ash borer, ash species. At the time of of the updating of this INRMP, the installation had no immediate plans for timber sales.

Regeneration in applicable areas will be conducted by planting hardwood seedlings on the areas cleared by timber harvesting activities. Small openings will be planted or allowed to regenerate naturally. The IDNR may provide seedlings at no cost; seedlings can also be ordered from local nurseries. Regeneration of forest areas will focus on the increase in tree species which are more valuable in terms of wildlife habitat than the existing dominant silver maples.

Due to the proximity of the forest stands to Silver Creek, management of the natural forest areas will incorporate projects to reduce the potential for soil erosion. Improvements to existing roadways within the Silver Creek riparian corridor will be conducted by repairing or replacing culverts along the road to alleviate the washout damage caused during large rain or flood events. Because many of these may be located in jurisdictional wetland areas, each project will be evaluated for potential regulatory issues. Use of roadways within the natural forest will also be limited to help reduce potential soil erosion. The designation of buffers (vegetated zones on both sides of Silver Creek and other streams, along with appropriate wetlands) help absorb surface water runoff by trapping sediments. Using silt fences and leaving large trees within these buffers will help to reduce soil erosion.

In some of the smaller intermittent creeks that drain into Silver Creek, beavers may create prolonged inundation by damming. The increased flood duration and the beaver damage have altered the density of living trees within some areas of the natural forest. It will become increasingly important to the stands' overall health to reduce flood duration, especially during the growing season. Also, if left unchecked, the area of inundation will likely increase and the stands will likely evolve into a flooded scrub/shrub community. USDA Wildlife Services personnel on base work to reduce the impacts of beavers through puncturing holes in dams or completely removing them as well as controlling the population through take.

7.9 Wildland Fire Management

Installation Supplement

Applicability Statement

This section applies to USAF installations with unimproved lands that present a wildfire hazard and/or installations that utilize prescribed burns as a land management tool. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

Resource Management Program

There is no wildland fire management plan for Scott AFB because the threat of wildfire to the mission and natural resources is extremely low. Under normal circumstances, vegetation is sufficiently maintained throughout the base so that it does not pose a wildland fire hazard. With the exception of an extended or severe drought, wildland fire potential and severity in the Silver Creek riparian corridor is relatively low. Dense hardwoods in riparian areas tend to provide more shade and hold more moisture, thus reducing wildfire potential and activity. There is currently no prescribed burning that occurs at Scott AFB, but use may occur in the future as a management strategy for areas converted to native grasslands. There have been no reported wildfires in recent history. The Scott AFB Fire Department is responsible for wildfire protection at the base. Should prescribed burning become a management technique at Scott AFB, the Air Force Wildland Fire Center will develop a Wildland Fire Management Plan.

Management Issues and Concerns

There are currently no management issues or concerns for the management of wildland fires.

Climate Change

The following text from the CSU CEMML project report describes potential changes to wildland fire issues at Scott AFB due to climate change (CSU CEMML, 2021).

"Using data from July in the RCP 8.5 2035 scenario because it represented the month with the greatest potential to influence fire behavior, fire behavior models still predict no change in flame length or spread rates from the projected climate data relative to the historic climate data. These estimates are based on the projected monthly mean data and are intended only to give a sense of the potential trends in fire behavior. Weather conditions that are more conducive to fire activity than the average can be expected frequently under the future climate scenarios, and those conditions will produce considerably more severe fire behavior than the average projections suggest. While there is no increase in fire behavior projected given the average climate projections, it is possible that increases or decreases in fire behavior relative to the current potential may exist when the weather conditions deteriorate. As such, fires occurring under conditions farther from the mean may produce more severe fire behavior than is observed currently.

Fall is the most conducive season for fire currently, and there is some potential for that fire activity to extend into winter due to increased temperatures and slightly decreased relative humidity. This would extend the fire season, though the marginal changes suggested by the climate projections indicate the winter would still be predominantly fire-free.

The current and future fire potential at Scott AFB is very low. The installation is located where conditions are simply unsupportive of active fire behavior. When combined with the nature of the mission of Scott AFB, which is relatively benign in relation to fire ignition potential, the risk of wildfire can be expected to remain low through 2050."

7.10 Agricultural Outleasing
Installation Supplement

Applicability Statement

This section applies to USAF installations that lease eligible USAF land for agricultural purposes. Scott AFB does not lease land but a brief history of this topic is provided below.

Program Overview/Current Management Practices

In accordance with 10 U.S. Code (U.S.C.) 2667(d)(4) *Leases; Non-Excess Property* and AFMAN 32-7003, installation commanders are required to review the suitability of their non-excess land for agricultural leasing, when such leasing is in the public interest and does not conflict with existing or planned military land use requirements. Agricultural outleasing for cropland and grazing can be used to maintain ecologically sound stewardship of public lands. Outleasing helps to reduce the maintenance costs of land and can generate revenue to support other aspects of the natural resource management program. AFMAN 32-7003 requires that all agricultural outleases include a conservation plan that details the BMPs to protect the natural resources and government interests under the lease. The only agricultural lease at Scott AFB expired in 2009 and will not be renewed. No other areas are suitable as potential outleases.

Resource Management Program

Twenty-one acres of land at the former Radio Relay Range, located about two miles (3 km) west/southwest of the base (Figure 2-3), were previously outleased for agricultural use as a grazing field. The lack of livestock water restricted potential lease options to nearby landowners because livestock had to return home each day for water so leasing was discontinued years ago. This tract of land is no longer in use as a Radio Relay Range but contains impacted soil which requires restoration prior to Scott AFB initiating the process of excessing the property.

Management Issues and Concerns

None.

7.11 Integrated Pest Management Program
Installation Supplement

Applicability Statement

This section applies to USAF installations that perform pest management activities in support of natural resources management (e.g., invasive species, forest pests, etc.). This section **IS** applicable to this installation.

Program Overview/Current Management Practices

DoDI 4150.7, *Pest Management Program*, implements policy, assigns responsibilities, and prescribes procedures for the DoD Integrated Pest Management (IPM) Program according to DoD Directive 4715.1E, *Environment, Safety, and Occupational Health*, AFI 32-1053, *Integrated Pest Management Program*, and DoDI 4715.03. The purpose of IPM is to prevent or control pests and disease vectors that may adversely impact readiness or military operations by affecting the health of personnel, or by damaging structures, material, or property.

DoDI 4150.7 also requires installations to comply with EO 13112, *Invasive Species*. All installations are required to prevent the introduction of invasive weed species, detect and respond rapidly to invasive species, control populations using IPM techniques, monitor invasive species populations accurately and reliably, promote public education on invasive species, and restore native species and habitat conditions in ecosystems that have been invaded.

Resource Management Program

Pest management objectives at Scott AFB have been developed to provide safe and effective control of specific pest problems in accordance with applicable laws and regulations (Scott AFB 2011b). Pest management includes the control of undesirable or nuisance plants and animals (including insects), control of disease vectors or animals of medical importance, prevention of damage to natural resources, and protection of real estate from depreciation. Strategies for pest management relevant to the INRMP include: invasive species, animal damage control, BASH, ecosystem management, forestry, and grounds maintenance. These areas are also addressed within the IPMP.

All aspects of the IPM program are evaluated to reduce herbicide and pesticide risks and prevent pollution. Scott AFB also cooperates with the USFS in regard to forest insect and disease suppression projects on DoD-controlled land. The development of the IPMP requires installations to consult with the USFWS on any activities (e.g., application of pesticides) that may affect species that are proposed for listing, or listed as threatened or endangered (ESA Section 7(a)(2)).

Pest management at Scott AFB is integrated and involves four primary control strategies: mechanical control (removal), biological control (use of organisms that control a specific pest), chemical control (use of herbicides and pesticides), and cultural control (reseeding or planting with native species). Pest management strategies include prevention first, followed by control once pests are present.

The mosquito (*Aedes* sp.) is a common pest on Scott AFB and is a carrier of the West Nile virus, as well as a nuisance to routine work and recreational activities. Ongoing monitoring and control measures are implemented to evaluate conditions on-base to determine the need to implement pest management controls. Three major insect pests and two animal species are managed on the non-golf course portion of the base. The insects include elm leaf beetle, (*Galerucella xanthomelaena*), bagworm (*Thyridopteryx ephemeraeformis*), and white grub (*Ochrosidia villosa*). Visual inspections are employed to assess the need to implement control strategies, and chemical controls are applied when needed. Termite inspections are performed between October and March in all wood or partial wood buildings. Treatment is conducted in accordance with AFI 32-1053.

According to the recent Climate Change Report for Scott AFB (CSU CEMML, 2021), increasing temperatures can favor disease-vectoring organisms such as mosquitoes and ticks. Managers can help to reduce mosquito populations by minimizing stagnant water in and around the cantonment area. Tick populations in urban settings can be minimized by keeping lawns mowed and by preventing overabundances of hosts such as deer and rodents.

DoDI 4150.07 also requires installations to implement vertebrate pest management programs, including BASH reduction programs, to prevent vertebrate pest interference with operations, destruction of real property, and adverse impacts on health and morale. BASH is further discussed in Section 7.12. Other animals, such as raccoons, squirrels, feral cats and bats, are managed in and around housing and office areas because of their potential to spread rabies or other diseases, and because of their potential to cause utility and structure damage. Visual inspections are conducted on a routine basis, and management strategies are implemented using pesticide applications when necessary (Scott AFB 2011b).

Bats typically found in or around housing and administrative areas are the Little brown bat and the Big brown bat. Indiana bats do not typically utilize artificial nesting sites (USFWS 2007), though NLEB may occasionally roost in structures (USFWS 2015). Future monitoring activities for Indiana bat will include the maternity roost monitoring. Scott AFB will revise management strategies to address the potential for listed bats to roost in buildings as necessary.

Weeds, including invasive and noxious weeds, are controlled in improved and semi-improved areas of the base. Ongoing monitoring is conducted in the improved areas of the base and in the airfield to identify weeds that require management. The primary methods to control weeds are mechanical and cultural controls. Mowing is accomplished on all areas of improved and semi- improved lands. Cultivating and mulching is done on new areas or recently disturbed areas. A preventive maintenance control program includes weed control on road shoulders and cracks in pavement for road protection, and selective weed control in landscaped areas. Some control of unwanted plants is done mechanically using mowers or weedeaters. Noxious weeds (as defined within Illinois Noxious Weed Law) are controlled using herbicide applications. Fungi are also managed in improved lawn areas of the base. Controls implemented to reduce the development and spread of fungi include improved drainage, adjustments to irrigation and fertilization, mowing, and fungicide application. Application of herbicides and fungicides are conducted in accordance with USEPA labels and in accordance with management strategies defined in the IPMP (Scott AFB 2011b).

Invasive and/or noxious weeds found on-base include Johnson grass, common ragweed, giant ragweed, musk or nodding thistle, Canada thistle, black locust (*Robinia pseudoacacia*), Phragmites (*Phragmites australis*) and Japanese honeysuckle. The Invasive Species Management Plan (Scott AFB 2011a and Appendix G) identifies the extent of infestation of invasive species as of 2011, identifies management practices to prevent the introduction of invasive species, describes methods to monitor plant populations and to respond rapidly in implementing weed controls, and provides techniques to restore affected native species and their habitat. These methods have been implemented and may be adjusted as current information is obtained through ongoing surveys coordinated with removal actions. Use of native plants in landscaping, grounds maintenance, and land restoration projects is required as part of the overall management plan for grounds maintenance. Coordination with the NRM is required if plant control is proposed in undeveloped habitat. Areas affected by invasive plants will be prioritized by the severity of the infestation and removal efforts undertaken. Areas with especially aggressive invasives such as Johnson grass, Phragmites, and bush honeysuckles such as Japanese honeysuckle will receive priority for removal.

Annual aquatic weed control is conducted each spring and summer at Scott Lake and Cardinal Lake to improve the overall water quality for fisheries and recreational use. Visual surveys of the lakes are conducted during the months of April through September to determine if additional algal and duckweed control is needed. Algal treatment is applied as required and the edges of the lakes are mowed to reduce vegetation. Pesticide applications are also implemented in accordance with the PMP (Scott AFB 2011b) and in accordance with EPA regulations regarding the use of pesticides in the vicinity of water.

All pesticides used at Scott AFB are applied in accordance with the product labels and their Material Safety Data Sheets. All pesticides are stored in compliance with DoDI 4150.7 and with federal, state and local laws, and are inspected annually by the Pest Management Shop (Scott AFB 2011b). In accordance with DoDI 4150.07, all installations will meet the use reduction goal in annual pesticide use and ensure certification of all pesticide applicators. Scott AFB has certified all applicators, and the Scott AFB Entomology Shop and Golf Course permits are current. In 2000, Scott AFB met the pesticide reduction goal by reducing pesticide use by 67 percent and will continue to meet these goals (Scott AFB 2009c).

Management Issues and Concerns

In accordance with DoDI 4150.07, all installations will maintain IPM plans that are reviewed and approved by a DoD-certified pest management consultant and annually updated by the installation pest management coordinator.

Two main concerns identified in the Invasive Species Management Plan are to eliminate existing populations of invasive species and prevent the spread of new species. A key approach to managing noxious and invasive weeds is to prevent their infestation. In order to do this, BMPs that prevent the introduction of noxious and invasive species will be incorporated into daily work practices and contract specifications for Scott AFB. An integrated weed control program for noxious and priority invasive species will be implemented using mechanical control and herbicide use. The most effective method of controlling weeds is maintaining a dense and vigorously growing cover of desirable plant species. Weed control and eradication in large areas, or in newly disturbed sites, requires reestablishment of native vegetation so that infestation does not occur or reoccur in previously treated areas. New landscaping or existing grounds maintenance activities will select species that include native species.

7.12 Bird/Wildlife Aircraft Strike Hazard (BASH)
Installation Supplement

Applicability Statement

This section applies to USAF installations that maintain a BASH program to prevent and reduce wildlife-related hazards to aircraft operations. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

As required by AFI 91-202, *The U.S. Air Force Mishap Prevention Program*, the Air Force is responsible for maintaining the safety of aircraft that utilize the runway at Scott AFB. A BASH exists due to resident and migratory bird species and other wildlife at Scott AFB. To maintain compliance with this requirement, Scott AFB has a BASH Plan (Scott AFB 2019 and Appendix C).

Resource Management Program

Reducing the BASH at Scott AFB requires a cooperative effort between several Air Force, Air Force Reserve and, Illinois Air National Guard organizations; tenant units, and the surrounding community. Scott AFB and MidAmerica Airport share responsibility for habitat management, bird control efforts, and communications as part of their joint-use agreements (Scott AFB 2019). The OPR for coordinating the Scott AFB BASH plan is the 375 Safety Officer (375 SE). Scott AFB also has a BHWG to collect, compile, and review data on bird strikes and to prepare informational programs for aircrews. The BHWG also identifies and recommends actions to reduce hazards, including changes to operational procedures, and assists the installation commander by acting as a point of contact for off-installation BASH issues (Scott AFB 2019). The Scott AFB NRM is required to be a member of the BHWG.

The Scott AFB BASH Plan describes the management program used to identify hazards and apply controls to eliminate or lower the risk of bird strikes, as discussed in Air Force Pamphlet 91-212, *BASH Management Techniques*. The BASH program outlines procedures to identify high hazard situations and aircraft and airfield operations to avoid high-hazard situations, provides guidelines for dispersing birds when they congregate on the airfield, provides procedures for disseminating bird hazard information and bird avoidance methods to all assigned and transient aircrews, and establishes procedures and guidelines to decrease airfield attractiveness to birds in accordance with AFMAN 32-7003. Scott AFB also has a Wildlife Hazard Assessment (USDA 2013) containing a plan which includes survey information and identifies specific risks.

The BASH Plan outlines the process for the declaration, dissemination, and active reduction of moderate or severe bird watch conditions and the management of wildlife that may cause hazardous conditions on the airfield and in local operating areas. Bird strikes, based on actual encounters, are a low occurrence. The peak migratory seasons (15 August to 30 November and 1 March to 30 April) are the most likely periods of significantly increased local bird activity (Scott AFB 2019). Many strikes to aircraft throughout the DoD generally occur in the airfield environment. These strikes can be minimized through habitat management, bird watch condition warnings, control of wildlife populations, and bird dispersal techniques. Base operations are responsible for conducting daily visual inspections before each mission. In coordination with the NRM, the 375 CES eliminates factors that attract birds and other animals (such as deer) that may pose a problem. Airfield areas are selectively managed to maintain a monoculture of grasses to promote a uniform cover. Dead vegetation and standing water are removed, and low spots are filled in. Grasses are mowed to maintain an average uniform height of 7 to 14 inches. Access to hangars and buildings is removed by screening windows, closing doors, and blocking entry points. Management strategies are provided in the BASH Plan, Chapter 6 (Scott AFB 2019). BASH must be considered prior to accomplishing habitat management activities. The Scott NRM maintains coordination with the BHWG.

Management Issues and Concerns

Cooperative efforts between Scott AFB and the MidAmerica Airport ensure that airfield habitat, including vegetation and drainages, is managed to minimize bird and wildlife attractants. The entire infield area of the airfield has a dense turf that is well established and maintained at recommended heights to discourage use by birds and wildlife. In order to minimize bird habitat near the airfield, grass is maintained at the recommended height over the entire airfield operating area. Bare areas will be seeded with grass to eliminate attractants to birds such as killdeer (USDA 2013).

Migratory waterfowl, especially geese and locally large flocks of blackbirds and starlings, are the primary hazards during fall and winter months. A former golf course pond adjacent to the airfield was drained to prevent larger waterfowl, however, it is currently filled with cattails that are attractive to blackbirds. As bird migration begins, elimination of standing water at the airfield and surrounding areas is a priority to reduce the attraction to waterfowl. In particular, lowland areas present in the Clear Zone (south of the airfield and west of the Warehouse and Storage Area) become inundated during rainy periods and create standing water. The ponding of water attracts wading birds and other migratory birds that pose a strike hazard to flying and taxiing aircraft on the flightline. Management to eliminate the attractiveness of these areas to wildlife will be conducted. These low-lying areas were identified as non-jurisdictional wetlands during the 2009 wetland delineation (Scott AFB 2010a). Vegetation and shallow standing water will also be removed whenever they develop in any of the airfield ditches, creeks, or low spots through the use of gang or boom mowers, or by hand if necessary, to reduce the attractiveness to birds and to prevent heavy vegetative growth from complicating maintenance. Alteration of any potential wetland habitat will be coordinated with the NRM and conducted in compliance with federal and state regulations.

Blackbirds are a primary issues every year during migratory season and fall harvest time and the reason the base enters BASH Phase II in the spring and fall each year. Management of these birds is of the upmost importance due to the potential damage they pose to aircraft as well as the threat to human health and safety in regards to aviation at the base. A large roost of these blackbirds (population estimated to be in the millions) is located on a private landowner's property approximately 8 miles south of the airfield downstream on Silver Creek (Oswald 2015). Birds have been followed crossing through SAFB airspace to enter this roost. The birds utilize the invasive reed, Phragmites, which has taken over a reclaimed mining area of approximately 200 acres on a private landowner's property. The roost has been mowed and is sprayed twice a year to manage the vegetation which has resulted in a reduction of its use by the various species of blackbirds. The landowner is working with Scott AFB and has plans to perform some more permanent modifications but has yet to begin. Until the land is permanently modified, aerial spraying will continue to be performed twice yearly to prevent the location from returning to its previous attractive state. The project has been extremely successful with a reduction of blackbirds observed on and around the airfield in the 74-78% range in each of the last three years (2018-2020) when compared to previous year's observations (Wedemeyer 2021). Similar actions are being accomplished for smaller stands located on Scott AFB (see Section 7.11) to contribute to the removal of invasive species, increase native wetland species, and simultaneously reduce BASH.

Isolated trees, airfield structures, runway markers, poles, and equipment are frequently used as a perch by several species of birds, including Red-tailed hawk, American Kestrel, Turkey Vulture, and song birds (McDonald 2010). Where practical, these structures will be removed or reconfigured so that they are not used as perching sites. If not feasible to eliminate or reconfigure such attractants, these structures will be targeted for active dispersal techniques. Nixalite perch deterrents have been installed on all airfield signage.

Cliff and barn swallows are discouraged from building nests under eaves of buildings, bridges, and culverts by hosing the surfaces with a pressure washer prior to egg laying. Standard frightening techniques such as pyrotechnics may also be needed and are used in accordance with federal and state permits. A significant issue currently exists along Taxiway Golf which connects Scott AFB to MidAmerica and passes over Silver Creek. Swallows nest on the bridge understructure where they are difficult to reach (USDA 2013). Swallow nests may not be disturbed after eggs have been laid without proper depredation permits.

The airfield on Scott AFB is only partially surrounded by a fence (Figure 7-4, Airfield Fence Locations). In some locations, the boundary fence effectively serves as an airfield security fence, e.g. the north end. Gaps under fences and in gates are also found along some sections of the fence. Significant access points also exist in the culverts at either end of the field where Silver Creek enters and exits the properties (McDonald 2010). There is currently no fencing along Silver Creek, which serves as the northeastern border of the base, to deter wildlife from accessing the airfield. As a result, white-tailed deer (*Odocoileus virginianus*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), and other mammals are occasionally observed on the airfield. The current perimeter fence is only six feet high and inadequate for preventing wildlife from accessing the airfield. To address this inadequacy, there is a project planned that would construct approximately 2.4 miles of eleven-foot high wildlife fence on the eastern side of the installation. An environmental assessment for the project is planned to be prepared by contractor in the summer of 2021; construction of Phase 1 of the fence project could begin in fall of 2021.

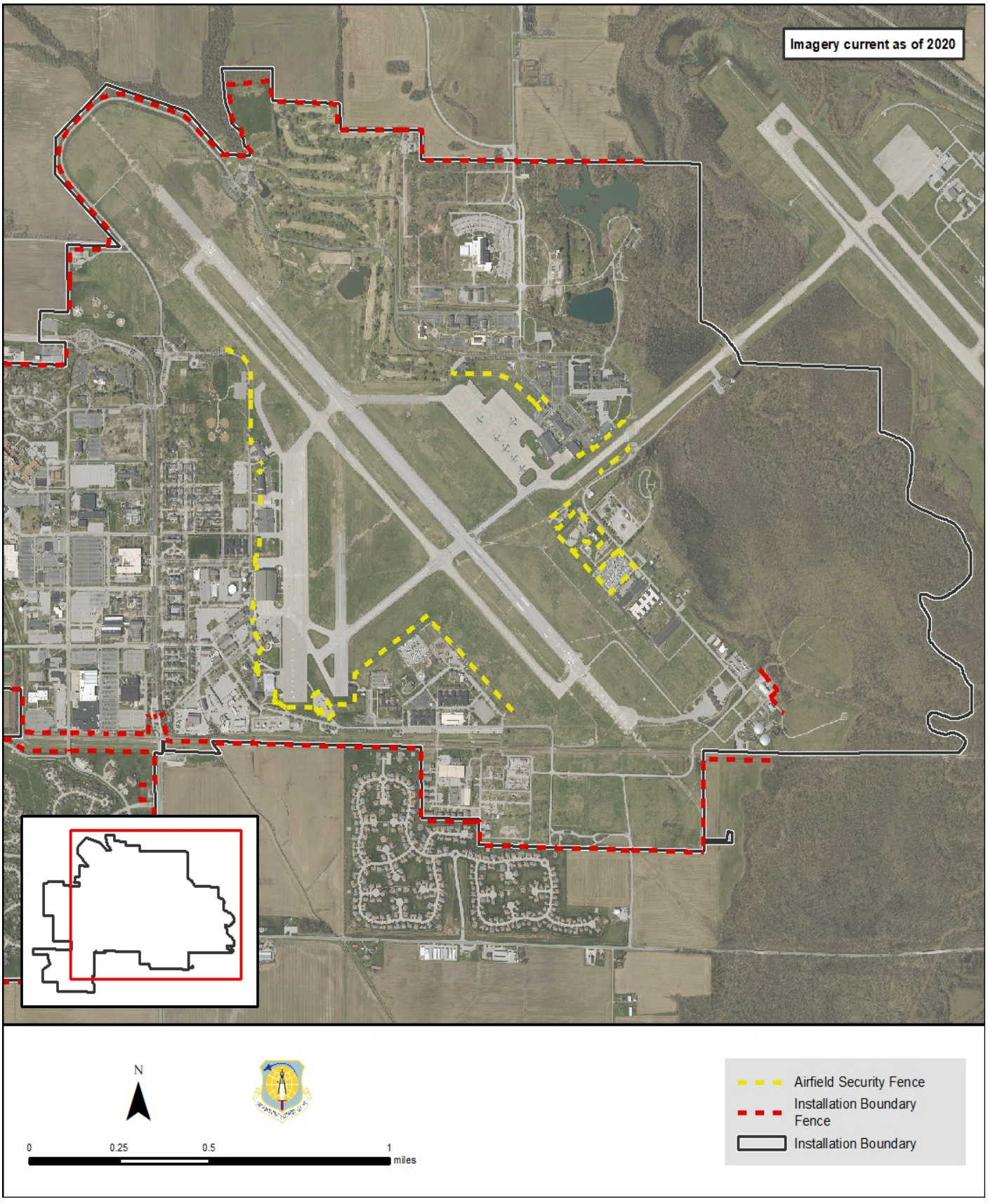

Figure 7-4. Airfield Fence Locations

Climate Change

Potential impacts of climate change to BASH management are discussed in Section 7.1, Fish and Wildlife Management.

7.13 Coastal Zone and Marine Resources Management
Installation Supplement

Applicability Statement

This section applies to USAF installations that are located along coasts and/or within coastal management zones. This section **IS NOT** applicable to this installation.

Program Overview/Current Management Practices

There is no coastal zone at Scott AFB; therefore, there are no requirements for a coastal zone program or management plan.

7.14 Cultural Resources Protection
Installation Supplement

Applicability Statement

This section applies to USAF installations that have cultural resources that may be impacted by natural resource management activities. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

The cultural resources at Scott AFB are managed by 375 CES/CEIE, which in turn advises the base on compliance with local, state, and federal laws governing cultural resources management. The Cultural Resources Manager is responsible for reviewing proposed projects that have the potential to impact cultural resources. In order to provide for effective management of cultural resources, an ICRMP (Scott 2017b and Appendix E) was developed as an integral part of the base IDP, as directed by AFI 32-7001, *Cultural Resources Management*. The ICRMP presents the history and prehistory of the base, reviews past historical and archaeological survey efforts, outlines and assigns responsibilities for the management of cultural resources, and discusses related concerns and standard operating procedures that will help preserve the cultural resources of Scott AFB (Scott 2017b).

Resource Management Program

Scott AFB has completed identification and nomination requirements of historic structures under Section 110 of the National Historic Preservation Act (NHPA) of 1966, as amended. Scott AFB has 99 historic buildings mostly in the Scott Field Historic District (Figure 2-4), which is listed in the National Register of Historic Places (NRHP). The district includes a variety of building types related to the base's early history.

There are 16 archaeological sites wholly or partly on Scott AFB. None of these sites are eligible for listing on the NRHP. However, consultation with the SHPO concerning effects to unidentified archaeological sites is necessary on a project-by-project basis in several areas, including within the Silver Creek riparian corridor; within an area located on the dissected uplands of Silver Creek in the southeast corner of the base; within another area located in the upland plains on the north side of the main entrance on Scott Drive and Seibert Road; and areas of the base periphery where sites are reported outside, but abutting the boundary (Scott 2017b).

Management Issues and Concerns

Natural resource management issues associated with cultural resources are those that have the potential to disturb these cultural resources. Since the listing of the historic district includes landscaping as a contributing factor to the eligibility of the district, an aspect of the management of the district overlaps with natural resource management considerations. Urban tree management and other aspects of grounds maintenance must consider historic landscape elements and may require consultation with the SHPO under Section 106 of the NHPA. There are also several areas on the base that have not been evaluated for archaeological sites, including large portions of the Silver Creek riparian corridor. In the event of planned ground disturbance in these areas, activities will be coordinated with the Cultural Resources Manager and the SHPO.

7.15 Public Outreach
Installation Supplement

Applicability Statement

This section applies to all USAF installations that maintain an INRMP. The installation is required to implement this element.

Program Overview/Current Management Practices

The mission of the 375 AMW Public Affairs Office is to provide trusted counsel to leaders; build, maintain, and strengthen Airmen morale and readiness; enhance public trust and support; achieve global influence and deterrence; and provide photo, video, and graphics multimedia support to the entire base populous. Internal information programs are the primary means Air Force leaders use to communicate with Airmen and their families, as well as retirees, civilians, and contract employees. Internal programs include the Commander's Access Channel, the base Guide, maps, biographies, and fact sheets. Additionally, the Community Planner within 375 CES/CENPL works with local planning boards and zoning boards to ensure surrounding land uses remain compatible with the Scott AFB mission.

The Scott AFB Public Affairs community relations program is designed to identify community concerns about activities at Scott AFB and to give the community the opportunity to provide input into these activities. The 375 AMW Public Affairs community relations programs include base tours, civic leader tours, and the Speakers Bureau program. The NRM will routinely work with Public Affairs to accomplish public outreach.

Resource Management Program

The NRM at Scott AFB works with both the Community Planner and Public Affairs Office to maintain an ongoing natural resources public relations program. The existing base communications tools have been the primary method used for public outreach. For example, the Command Post has presented articles pertaining to fishing or hunting. Information about hunting and fishing seasons and dates are usually listed in the daily bulletin, and hunter education classes are conducted by the 375 SFS. The Command Post has also run educational features on the Indiana Bat and management activities for this endangered species. As recounted within Section 7.12, Scott AFB also works with local landowners on natural resources issues that are of joint concern.

Management Issues and Concerns

Natural resources at Scott AFB are utilized as outdoor recreational space as well as habitat for plant and animal species. The protection of these resources is critical in maintaining the natural habitat at Scott AFB. The NRM will work with the Public Affairs Office to update the newcomers' orientation materials as well as develop educational materials on an as needed basis.

Additionally, volunteer opportunities for the base community to participate in habitat clean-up events, monitoring activities, or reporting incidental wildlife or invasive species would also help educate the community on the uniqueness of these resources at Scott AFB, as well as provide support to INRMP implementation. The NRM will annually consider if there are any appropriate projects to accomplish with volunteers, to include any that are suitable for application for a National Public Lands Day grant.

7.16 Climate Change Vulnerabilities
Installation Supplement

Applicability Statement

This section applies to USAF installations that will identify climate change risks, vulnerabilities, and adaptation strategies using authoritative region-specific climate science, climate projections, and existing tools. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

In late summer 2020, CSU CEMML conducted a climate assessment study for Scott AFB. Following is the project description:

A team of climate scientists, ecologists, environmental planners, military land managers and engineers reviewed the INRMP for the installation, generated site-specific downscaled temperature and precipitation climate projections for two future emission scenarios, and used tools and models to assess impacts of future climate on the installation's natural resources. The team compiled potential adaptation strategies for installation consideration during goal, objective, and work plan development.

Management Issues and Concerns

Previous sections of this Plan contain findings and management recommendations from the CSU CEMML project report for dealing with potential climate change impacts to specific natural resource components. The following text from the CSU CEMML report summarizes future potential vulnerabilities to natural resources at Scott AFB due to climate change (CSU CEMML, 2021).

"Vulnerability to climate change generally refers to the extent to which a species, habitat, ecosystem, place, or project is susceptible to harm from climate change impacts (Stein et al., 2014). By this definition, species and systems that are more vulnerable will experience greater harm, while less vulnerable species and systems will be less affected or even benefit from climate change.

Based on the CSU CEMML climate change projections, natural resources at Scott AFB may be vulnerable to the following changes:

- An increase in average temperature by up to 4.7 ºF by 2050, with the most consistent monthly increases occurring from June – October.
- Shifts in precipitation that vary depending on the modeled scenario, but generally show slight increases relative to the baseline.
- Peak flows associated with 10-year storm events potentially reduced to nearly half of the baseline peak flows. Although total inundation area affiliated with these storms is projected to remain similar in the modeled area, given the modeled floodplain is somewhat constricted and much lower lying than the surrounding embankments and other installation infrastructure, the depth of inundation and consequential ground-water recharge may be reduced.
- A range of possible changes in vegetation due to the shift in temperature and precipitation and indirect impacts including changes in wildfire, flood dynamics, disease and insect outbreaks, and invasive species.
- Indirect impacts on fish and wildlife, including shifts in temporal availability of food for migratory birds.
- Greater potential for infectious disease outbreaks such as WNS, which damages bat populations, and West Nile virus, which could negatively impact wildlife and be transmitted to humans.
- Reduction in the quality of aquatic habitats due to lower dissolved oxygen and more frequent algal blooms.
- Threats to T&E species, especially the Indiana Bat, NLEB, and EMR.
- Indirect threats to the mission, including diversion of resources (due to the drivers mentioned above) and an increased regulatory environment (due to possible shifts in T&E species populations).
- Need for enhanced Natural Resources Program Management to increase the resilience of fish and wildlife habitats, maintain outdoor recreation opportunities, adaptively manage for changing T&E species, and protect wetlands as climate shifts."

7.17 Geographic Information Systems (GIS)
Installation Supplement

Applicability Statement

This section applies to all AF installations that maintain an INRMP, since all geospatial information must be maintained within the AF GeoBase system. Scott AFB **IS** required to implement this element.

Program Overview/Current Management Practices

Resource Management Program

The Air Force adaptation of GIS is known as GeoBase. Scott AFB maintains an installation GeoBase database that is managed by the 375 CES and which contains a variety of data layers associated with the installation geographic information, to include past natural resource studies and information on the infrastructure (roads, paved areas, trails, building locations). Information relevant to the INRMP includes wetlands, T&E species, forestry, land use, grounds maintenance, floodplains, and soils.

The environmental portions of GeoBase are centrally managed by AFCEC/CZCA. A functional data set for natural resources (and other environmental media) has been developed and is managed and maintained in accordance with DoDI 8130.01, *Installation Geospatial Information and Services (IGI&S)*, through a cooperative agreement managed by AFCEC/CZCA. Details on data steward determination and maintenance of the geospatial data are outlined in the Data Layer Specifications for each feature class and hosted on the Environmental GIS eDASH page.

Management Issues and Concerns

Data gathering requirements include tree removal and planting information associated with urban forestry and grounds maintenance, results of natural resource studies at MidAmerica, and BASH-related records. Environmental GIS data deliverables for Scott AFB should be provided to the Scott ISS Analyst under the AFCEC/CZCA Environmental GIS program. The analyst will ensure the data are migrated into the installation Environmental Geodatabase and the current SDSFIE schema. Following a thorough QC step the data will be fully integrated into the AFGIMS system.

8 MANAGEMENT GOALS AND OBJECTIVES

The installation establishes long term, expansive goals and supporting objectives to manage and protect natural resources while supporting the military mission. Goals express a vision for a desired condition for the installation's natural resources and are the primary focal points for INRMP implementation. Objectives indicate a management initiative or strategy for specific long or medium range outcomes and are supported by projects. Projects are specific actions that can be accomplished within a single year. Also, in cases where off-installation land uses may jeopardize USAF missions, this section may list specific goals and objectives aimed at eliminating, reducing, or mitigating the effects of encroachment on military missions. These natural resources management goals for the future have been formulated by the preparers of the INRMP from an assessment of the natural resources, current condition of those resources, mission requirements, and management issues previously identified. Below are the integrated goals for the entire natural resources program.

The installation goals and objectives are displayed in the 'Installation Supplement' section below in a format that facilitates an integrated approach to natural resource management. By using this approach, measurable objectives can be used to assess the attainment of goals. Individual work tasks support INRMP objectives. The projects are key elements of the annual work plans and are programmed into the conservation budget, as applicable.

Installation Supplement

GOAL 8.1:Maintain or restore upland native ecosystems present at Scott AFB where practical and consistent with the military mission.

- OBJECTIVE 8.1.1: Reduce the amount of non-native species present at the installation.
    - PROJECT 8.1.1.1: Conduct invasive species surveys every year to determine the effectiveness of ongoing treatments and provide any appropriate recommendations for inclusion within INRMP.
    - PROJECT 8.1.1.2: Annually remove invasive species from approximately 5 acres based on NRM judgement and coordination with USFWS on prioritized species.
    - PROJECT 8.1.1.3: Create a prohibited species list. Incorporate into grounds maintenance contract.
    - PROJECT 8.1.1.4: Include a provision in construction specifications for the base to ensure the reseeding of disturbed areas (e.g. new construction, demolitions, restoration efforts) with appropriate grasses to prevent exotic annual species spread.
- OBJECTIVE 8.1.2: Restore upland habitats where practical and consistent with the military mission.
    - PROJECT 8.1.2.1: Develop best management practices to include as part of all forest management activities.

GOAL 8.2:Maximize structure, function, and native composition of wetland ecosystems where practical and consistent with the military mission.

- OBJECTIVE 8.2.1: Maintain, protect, and restore the hydrological processes in streams, floodplains, and wetlands where feasible, including avoiding net loss of size, function, or value of wetlands.
    - PROJECT 8.2.1.1: Establish and implement a method to accomplish long-term monitoring of trends in wetland habitat values.
    - PROJECT 8.2.1.2: Accomplish a rapid assessment of wetland habitat values and develop recommendations for habitat improvements that are compatible with the mission. Project includes collection of geospatial data to update wetland maps.

    - PROJECT 8.2.1.3: Assess wetlands and streams to determine locations buffers can be added to reduce erosion, entry by non-point source pollutants, and protect habitat values and not increase BASH risks. Includes buffer design.
    - PROJECT 8.2.1.4: Implement and maintain buffers at locations determined within project 8.2.1.3.
    - PROJECT 8.2.1.5: Assess MidAmerica Airport wetland mitigation and Wildlife Hazard Assessment survey results to determine need, and appropriate protocols, for future surveys.
    - PROJECT 8.2.1.6: Update floodplain delineation using recent LIDAR data. Will utilize data produced from AFCEC 2021 contracted project.
- OBJECTIVE 8.2.2: Reduce flooding to mission critical areas.
    - PROJECT 8.2.2.1: Remove the remaining log jam within Silver Creek to include incorporated heavy silt and debris (appliances, plastic and other refuse).
    - PROJECT 8.2.2.2: Annually check for debris accumulation at the south base boundary overpass and coordinate any necessary removal action with Norfolk Southern Railroad.

GOAL 8.3: Maintain and enhance quality habitat for the management of federal and state-listed species and other sensitive wildlife and plant species where practical and consistent with the military mission.

- OBJECTIVE 8.3.1: Conserve existing Indiana and Northern long-eared bat roosting and foraging habitat at Scott AFB.
    - PROJECT 8.3.1.1: Evaluate and discuss habitat in regards to creating access routes for management/maintenance and flyways or flight/foraging corridors for bat species.
    - PROJECT 8.3.1.2: Create flyways as determined within project 8.3.1.1. If feasible, activities should occur during periods when Indiana bats are not present (1 October – 31 March).
    - PROJECT 8.3.1.3: Maintain flyways within the Silver Creek floodplain. If feasible, maintenance activities would occur during periods when Indiana bats are not present (1 October – 31 March).
- OBJECTIVE 8.3.2: Increase long-term viability of Indiana and Northern long-eared bat habitat at Scott AFB.
    - PROJECT 8.3.2.1: Conduct survey every five years to monitor existing habitat conditions within the Bat Management Zones. Survey should use existing habitat assessment methods to enable comparisons with previous surveys and thus monitor the effectiveness of habit improvements. Project includes development adaptive management recommendations for inclusion within INRMP.
    - PROJECT 8.3.2.2: Annually improve five acres of bat habitat, e.g. removal of forest invasives, planting of bat-friendly trees, etc.
    - PROJECT 8.3.2.3: Perform monitoring of Indiana bat habitat and roosts within the floodplain forest every other year. This monitoring will include a brief visual survey of known roosting habitat to ensure that no disturbance is occurring in the vicinity of roost trees and an evaluation of the flyways to ensure they are being maintained.
    - PROJECT 8.3.2.4: Based on foraging habitat study (2016) results, implement adaptive management to enhance Indiana bat foraging habitat and/or minimize any identified harmful impacts.
- OBJECTIVE 8.3.3: Identify and manage species of concern at Scott AFB.
    - PROJECT 8.3.3.1: Identify and implement appropriate methods to maintain the shallow water habitat at Scott Lake for bird species of concern.
    - PROJECT 8.3.3.2: Regularly consult with BASH personnel to integrate mission and natural resources priorities.
    - PROJECT 8.3.3.3: Implement upland habitat management recommendations identified during surveys and other management activities.
    - PROJECT 8.3.3.4: Accomplish sensitive species plant survey and update vegetation inventory by habitat type. Project includes production of management recommendations.
    - PROJECT 8.3.3.5: Accomplish management methods IAW recommendations produced as a result of project VDYD511418 survey for sensitive plant species in semi-improved and unimproved areas of Scott AFB.
    - PROJECT 8.3.3.6: Accomplish pollinator survey. Project includes production of management recommendations.
    - PROJECT 8.3.3.7: Accomplish management methods IAW recommendations produced as a result of pollinator survey project.
    - PROJECT 8.3.3.8: Accomplish migratory bird survey at recommended intervals that focuses on habitat utilization and development of management recommendations that are consistent with reduction of BASH.

GOAL 8.4:Increase awareness of base personnel and the general public about natural resources

- OBJECTIVE 8.4.1: Inform base population and surrounding communities of sensitive species on Scott AFB and the efforts to preserve these species.
    - PROJECT 8.4.1.1: Conduct public outreach and education by developing educational materials, (fact sheets, pamphlets, handbooks, educational displays, videos, media releases, etc.) to educate base personnel and the

community regarding the problems, issues, and process of conserving sensitive species and their habitats at Scott AFB.

- OBJECTIVE 8.4.2: Enhance recreational opportunities that are also compatible with the military mission and natural resource protection.
    - PROJECT 8.4.2.1: Maintain aquatic vegetation on the lakes to less than 20 percent aerial coverage by routinely monitoring lakes to assess vegetative growth and the need for implementing pre-emptive control measures.
    - PROJECT 8.4.2.2: Maintain current policy of pre-emptive vegetation control which includes spring treatment of duckweed and algae.
    - PROJECT 8.4.2.3: Maintain lake aeration.
    - PROJECT 8.4.2.4: Annually assess deer population to determine harvest rates and any necessary changes to hunting procedures in coordination with USDA-WS.
- OBJECTIVE 8.4.3: Manage Scott and Cardinal Lakes as a warm water fishery and aesthetical purposes.
    - PROJECT 8.4.3.1: Conduct spring electrofishing inventory every two years of both Scott and Cardinal Lakes (April or May) for use in developing stocking requirements.
    - PROJECT 8.4.3.2: Use electrofishing inventory to determine the need for signs around the lake perimeters to encourage harvest of crappie and grass carp. Place signs as needed.
    - PROJECT 8.4.3.3: Accomplish annual assessment of water quality of Scott and Cardinal Lakes to determine the need for any adaptive changes to lake management methods.
    - PROJECT 8.4.3.4: Accomplish fish stocking (every other year or as-needed) IAW electrofishing recommendations.
    - PROJECT 8.4.3.5: Assess vegetative control along shorelines with respect to improving access by anglers in coordination with Grounds Maintenance.
    - PROJECT 8.4.3.6: Conduct Creel Survey to gage fishing interest, catch and release intentions, etc...

GOAL 8.5: Remain in compliance with Federal, state, and local laws and regulations regarding natural resources.

- OBJECTIVE 8.5.1: Maintain appropriate state and federal permits to enable necessary wildlife control within the aircraft movement area.
    - PROJECT 8.5.1.1: Coordinate with USDA-WS to obtain Migratory Bird Treaty Act permit from USFWS and maintain related reporting.
    - PROJECT 8.5.1.2: Coordinate with USDA-WS to maintain Nuisance Wildlife Control Permit.
    - PROJECT 8.5.1.3: Coordinate with USDA-WS to obtain Depredation at Airports Permit from IDNR.
    - PROJECT 8.5.1.4: Coordinate with USDA-WS to maintain Deer Removal Permit.
- OBJECTIVE 8.5.2: Maintain currency of INRMP as to operation and effect.
    - PROJECT 8.5.2.1: Accomplish annual review and update of INRMP in coordination with Sikes Act partners.
    - PROJECT 8.5.2.2: Store and maintain data about natural resources, listed species, historical conditions, trends and current status to facilitate the determination of the need to modify current management methods.

9 INRMP IMPLEMENTATION, UPDATE, AND REVISION PROCESS

9.1 Natural Resources Management Staffing and Implementation

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Staffing

In accordance with Section 107 of the Sikes Act, sufficient numbers of professionally trained natural resources management and natural resources law enforcement personnel are to be available and assigned responsibility to prepare and implement this INRMP. AFCEC natural resources personnel are available to support Scott AFB in the preparation of INRMP reviews and ongoing natural resources program management. When another base organization is responsible for implemention of a project, they are identified in the work plans. Projects shown in Section 10 may be accomplished by in-house staff, volunteers, through cooperative agreements with state and federal agencies or other private organizations, or by contractors. However, per the Sikes Act, priority for procurement of services for implementation and enforcement services shall be given to Federal and state agencies having responsibility for conservation and management of fish and wildlife.

Implementation

In accordance with AFMAN 32-7003, each military installation in the United States under the jurisdiction of the Secretary of Defense must prepare and implement an INRMP unless a determination is made that the absence of significant natural resources makes preparation of such a plan inappropriate. The need for an INRMP is based on Category I criteria. Scott AFB per se is classified as a Category I installation and requires an INRMP because the base has natural resources requiring protection and management, including a federally-endangered species, aquatic resources, and habitat that is suitable for conserving and managing wildlife. Category II installations do not require an INRMP because of a limited natural resources land base and the absence of significant natural resources. As discussed in section 2.1.1, several Scott GSUs qualify as Category II installations. In accordance with AFMAN 32-7003, this INRMP was prepared in cooperation with the USFWS and the IDNR. Annual work plans are developed using the goals, objectives, and projects identified as management issues and concerns (Section 8). The projects presented in Chapter 10 that require funds will become the line items in the proposed budget for the INRMP. The NRM will coordinate with the OPR to program projects not eligible for Environmental Quality funding or managed by another program. The Air Force programming procedures will be followed by Scott AFB to request funding for these projects.

9.2 Monitoring INRMP Implementation

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The Scott AFB NRM and other environmental personnel will monitor the implementation of this INRMP during the Annual Review process by noting which projects within the work plan for the year just past have been completed, which ones are ongoing, and which ones have not been implemented to date. The status of requests for funding will also be provided. Scott AFB will review its status against the DoD metrics in coordination with USFWS and IDNR.

9.3 Annual INRMP Review and Update Requirements

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In accordance with the tripartite memorandum of understanding between the Department of Defense, USFWS, the Association of Fish and Wildlife Agencies (2013, Appendix K, Memorandum of Understanding), and AFMAN 32-7003, the INRMP is kept current through annual reviews and updates.

An annual review will verify that the INRMP has been implemented. The specific items that demonstrate that the INRMP has been implemented include:

- A summary of specific INRMP accomplishments since the last review.
- An upated Annual Work Plan for implementing the INRMP that includes the current year and at least two future fiscal years (ideally at least four succeeding years). The work plan must include all projects and activities identified as essential for the successful implementation of the INRMP goals and objectives, and an implementation schedule that is realistic and practicable.
- A statement indicating the projects in the Annual Work Plan for which the collaborating agencies have expressed an interest in participating in project execution.
- A statement that sufficient numbers of qualified natural resources personnel and resources are available to oversee implementation of projects and activities identified in the work plan.
- A summary of required updates that will be incorporated into the INRMP to keep the INRMP current in operation and effect (and/or a draft update formatted such that changes are easy to identify); or alternatively a statement that significant changes to the installation mission or natural resource goals require an INRMP revision (Section 9.2).
- Documentation that required coordination with the USFWS and IDNR has occurred. Signatures from these agencies are not required (nor is the Wing Commander's or appropriate designee's).

The annual work plan from the past year will be evaluated to determine if all projects were completed. If not, and if determined to still be needed, unimplemented projects will be added to the current or out-year work plans.

INRMP Update and Revision Process

Scott AFB is responsible for informing each of the cooperating agencies (USFWS and IDNR) about the progress, successes, and/or issues with the implementation of this INRMP. An annual in-person meeting or a teleconference is the preferred approach but if agency representatives are unable to participate in those ways, information can be sent for review and comment. Scott AFB will prepare a brief annual summary of the progress, successes, and/or issues resulting from monitoring the implementation of this INRMP for each of the cooperating agencies. Each agency will be requested to return correspondence with concurrence. This annual agency coordination and review documentation will be kept as part of this INRMP. Any issues that arise will be addressed in a timely manner with all affected agencies getting involved. All agreed comments will be incorporated into the update.

The Air Force has developed and is now implementing an environmental plan management tool called T-EMP. This tool replaces the traditional process of hard copy plans with annual pen and ink revisions. Environmental plans in a standardized template format have been uploaded to T-EMP. The INRMP will be updated electronically on an annual basis. During the annual review, the status of projects will be reviewed and plans/projects adjusted appropriately in accordance with adaptive management and progress made in the previous year. Each year another year of projects will be added so that the plan will always have five years-worth of projects.

In cases where changes in the military mission, significant new environmental compliance requirements, or other new information significantly change the goals within the INRMP, a major revision is required. A detailed process for the preparation, coordination, and approval of an INRMP revision is provided in Sections 3.6 and 3.7 of AFMAN 32-7003. As part of the review process, the public is also provided the opportunity to review and comment on the draft INRMP. All comments provided by regulatory review and the public are incorporated, as appropriate, into a Final Draft INRMP, which is then distributed to the cooperating agencies for final coordination and signature. The INRMP will then be staffed for signature by the Wing Commander or appropriate designee. Unclassified portions of the final INRMP will be made available electronically.

10 ANNUAL WORK PLANS

The INRMP Annual Work Plans are included in this section. These projects are listed by fiscal year, including the current year and four succeeding years. For each project and activity, a specific timeframe for implementation is provided (as applicable), as well as the appropriate funding source and priority for implementation. The work plans provide all the necessary information for building a budget within the USAF framework. Priorities are defined as follows:

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

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Annual Work Plans

Work Plans should extend out to current year plus 4 additional years

Resource Category	Goal	Objective	Occurrence	FY	OPR	Funding Source	Priority Level	PB28 Code*	Standard Title*	Project Number	Description

EQ	8.1	8.1.1	1x/5 yrs	2022	USFWS	EQ	Medium	INRP	Mgt, Invasive Species	VDYDA5 3227120	8.1.1.1: Conduct invasive species surveys to determine the effectiveness of ongoing treatments and provide any appropriate recommendations for inclusion within INRMP.
EQ	8.1	8.1.1.2	Annual	2021 2022 2023 2024 2025	USFWS	EQ	Medium	INRP	Mgt, Invasive Species	VDYDA5 3217120 VDYDA5 3227120 VDYDA5 3237120 VDYDA5 3247120 VDYDA5 3257120	8.1.1.2: Annually remove invasive species from at least 5 acres.
EQ	8.1	8.1.1.3	Once	2021	USFWS	EQ	Medium	INRP	Mgt, Invasive Species	VDYDA5 3217120	8.1.1.3: Create a prohibited species list. Incorporate into grounds maintenance contract and coordinate with Hunt Brothers.
EQ	8.1	8.1.1.4	Once	2023	NRM	In house	Low				8.1.1.4: Include a provision in construction specifications for the base to ensure the reseeding of disturbed areas (e.g. new construction, demolitions, restoration efforts) with appropriate grasses to prevent exotic annual species spread.

EQ	8.1	8.1.2.1	Once	2022	USFWS	EQ	Low	T&E	Mgt, Habitat	VDYDA5 3227118	8.1.2.1: Develop best management practices to include as part of all forest management activities.
EQ	8.2	8.2.1.1	1x/3 yrs	2022	USFWS	EQ	Medium	T&E	Mgt, Habitat	VDYDA5 3227118	8.2.1.1: Establish and implement a method to accomplish long-term monitoring of trends in wetland habitat values.
EQ	8.2	8.2.1.2	Once	2022	USFWS	EQ	Medium	T&E	Mgt, Habitat	VDYDA5 3227118	8.2.1.2: Accomplish a rapid assessment of wetland habitat values and develop recommendations for habitat improvements that are compatible with the mission. Project includes collection of geospatial data to update wetland maps.
EQ	8.2	8.2.1.3	Once	2021	USFWS	EQ	Medium	T&E	Mgt, Habitat	VDYDA5 3217118	8.2.1.3: Assess wetlands and streams to determine locations buffers can be added to reduce erosion, entry by non-point source pollutants, and protect habitat values and not increase BASH risks. Includes buffer design.

EQ	8.2	8.2.1.4	Once	2021	USFWS	EQ	Medium	INRP	Mgt, Habitat	VDYDA5 3217118	8.2.1.4: Implement and maintain buffers at locations determined within project 8.2.1.3.
EQ	8.2	8.2.1.5	Once	2022	USFWS	EQ	Medium	T&E	Mgt, Habitat	VDYDA5 3227118	8.2.1.5: Assess MidAmerica Airport wetland mitigation and Wildlife Hazard Assessment survey results to determine need, and appropriate protocols, for future surveys.
EQ	8.2	8.2.1.6	Once	2022	AFCEC Contractor (CSU GIS Specialist)	AFCEC	Medium	N/A	N/A	N/A	8.2.1.6: Update floodplain delineation using recent LIDAR data. Will utilize data produced from AFCEC 2021 contracted project.
SRM	8.2	8.2.2.1	Once	2023	CEO	SRM	Low	N/A	N/A	N/A	8.2.2.1: Remove the remaining log jam within Silver Creek to include incorporated heavy silt and debris (appliances, plastic and other refuse).

SRM	8.2	8.2.2.2	Annual	2021 2022 2023 2024 2025	CEO	In house	Low	N/A	N/A	N/A	8.2.2.2: Annually check for debris accumulation at the south base boundary overpass and coordinate any necessary removal action with Norfolk Southern Railroad.
EQ	8.3	8.3.1.1	Once	2022	USFWS	EQ	Medium	T&E	Mgt, Habitat	VDYDA5 3227118	8.3.1.1: Evaluate and discuss habitat in regards to creating access routes for management/maintenance and flyways or flight/foraging corridors for bat species.
EQ	8.3	8.3.1.2	Once	2023	USFWS	EQ	Medium	T&E	Mgt, Habitat	VDYDA5 3237118	8.3.1.2: Create flyways as determined within project 8.3.1.1. If feasible, activities should occur during periods when Indiana bats are not present (1 October – 31 March)
EQ	8.3	8.3.1.3	Annual	2021 2022 2023 2024 2025	USFWS	EQ	Medium	T&E	Mgt, Habitat	VDYDA5 3217118 VDYDA5 3227118 VDYDA5 3237118 VDYDA5 3247118 VDYDA5 3257118	8.3.1.3: Maintain flyways within the Silver Creek floodplain. If feasible, maintenance activities would occur during periods when Indiana bats are not present (1 October – 31 March).
EQ	8.3	8.3.2.1	1x/5 yrs	2023	USFWS	EQ	High	T&E	Mgt, Habitat	VDYDA5 3237118	8.3.2.1: Conduct survey every five years to monitor existing habitat conditions within the Bat Management Zones. Survey should use existing habitat assessment methods to enable comparisons with previous surveys and thus monitor the effectiveness of habit improvements. Project includes development adaptive management recommendations for inclusion within INRMP.

EQ	8.3	8.3.2.2	Annual	2021 2022 2023 2024 2025	USFWS	EQ	High	T&E	Mgt, Habitat	VDYDA5 3217118 VDYDA5 3227118 VDYDA5 3237118 VDYDA5 3247118 VDYDA5 3257118	8.3.2.2: Annually improve five acres of bat habitat, e.g. removal of forest invasives, planting of bat-friendly trees, etc.
EQ	8.3	8.3.2.3	1x/2 yrs	2022 2024	USFWS	EQ	High	T&E	Mgt, Habitat	VDYDA5 3227118 VDYDA5 3247118	8.3.2.3: Perform monitoring of Indiana bat habitat and roosts within the floodplain forest every other year. This monitoring will include a brief visual survey of known roosting habitat to ensure that no disturbance is occurring in the vicinity of roost trees and an evaluation of the flyways to ensure they are being maintained.

EQ	8.3	8.3.2.4	Annual	2021 2022 2023 2024 2025	USFWS	EQ	High	T&E	Mgt, Habitat	VDYDA5 3217118 VDYDA5 3227118 VDYDA5 3237118 VDYDA5 3247118 VDYDA5 3257118	8.3.2.4: Based on foraging habitat study (2016) results, implement adaptive management to enhance Indiana bat foraging habitat and/or minimize any identified harmful impacts.
EQ	8.3	8.3.3.1	Annual	2021 2022 2023 2024 2025	USFWS	EQ	Medium	INRP	Mgt, Habitat	VDYDA5 3216119 VDYDA5 3226119 VDYDA5 3236119 VDYDA5 3246119 VDYDA5 3256119	8.3.3.1: Identify and implement appropriate methods to maintain the shallow water habitat at Scott Lake for bird species of concern.
SRM	8.3	8.3.3.2	Annual	2021 2022 2023 2024 2025	NRM, Wing Safety, USDA-WS	In house	Low	N/A	N/A	N/A	8.3.3.2: Regularly consult with BASH personnel to integrate mission and natural resources priorities.

EQ	8.3	8.3.3.3	Annual	2021 2022 2023 2024 2025	USFWS	EQ	Low	INRP	Mgt, Invasive Species	VDYDA5 3217120 VDYDA5 3227120 VDYDA5 3237120 VDYDA5 3247120 VDYDA5 3257120	8.3.3.3: Implement upland habitat management recommendations identified during surveys and other management activities.
EQ	8.3	8.3.3.4	Once	2021	USFWS	EQ	Medium	INRP	Mgt, Species	VDYDA5 3196120	8.3.3.4: Accomplish sensitive species plant survey and update vegetation inventory by habitat type. Project includes production of management recommendations.
EQ	8.3	8.3.3.5	Once	2022	USFWS	EQ	Medium	INRP	Mgt, Species	VDYDA5 3206120	8.3.3.5: Accomplish management methods IAW recommendations produced as a result of project survey VDYD511418 for sensitive plant species in semi-improved and unimproved areas of Scott AFB.
EQ	8.3	8.3.3.6	Once	2024	USFWS	EQ	Low	INRP	Mgt, Species	VDYDA5 3236120	8.3.3.6: Accomplish pollinator survey. Project includes production of management recommendations.

EQ	8.3	8.3.3.7	Once	2026	USFWS	EQ	Low	INRP	Mgt, Species	VDYDA53246120	8.3.3.7: Accomplish management methods IAW recommendations produced as a result of project survey VDYDA53236120 for pollinators
EQ	8.3	8.3.3.8	1x/5 yrs	2025	USFWS	EQ	Medium	INRP	Mgt, Species	VDYDA53236120	8.3.3.8: Accomplish migratory bird survey at recommended intervals that focuses on habitat utilization and development of management recommendations that are consistent with reduction of BASH.
SRM	8.4	8.4.1.1	Annual	2021 2022 2023 2024 2025	NRM/ CEIE	In house	Medium	N/A	N/A	N/A	8.4.1.1: Conduct public outreach and education by developing educational materials, (fact sheets, pamphlets, handbooks, educational displays, videos, media releases, etc.) to educate base personnel and the community regarding the problems, issues, and process of conserving sensitive species and their habitats at Scott AFB.

EQ	8.4	8.4.2.1	Annual	2021 2022 2023 2024 2025	USFWS	EQ	Medium	INRP	Mgt, Habitat	VDYDA5 3216119 VDYDA5 3226119 VDYDA5 3236119 VDYDA5 3246119 VDYDA5 3256119	8.4.2.1: Maintain aquatic vegetation on the lakes to less than 20 percent aerial coverage by routinely monitoring lakes to assess vegetative growth and the need for implementing pre-emptive control measures.
EQ	8.4	8.4.2.2	Annual	2021 2022 2023 2024 2025	USFWS	EQ	Medium	INRP	Mgt, Habitat	VDYDA5 3216119 VDYDA5 3226119 VDYDA5 3236119 VDYDA5 3246119 VDYDA5 3256119	8.4.2.2: Maintain current policy of pre-emptive vegetation control which includes spring treatment of duckweed and algae.
EQ	8.4	8.4.2.3	Annual	2021 2022 2023 2024 2025	CEO	EQ	Medium	INRP	Equipment Purchase / Maintain, CN	VDYDA5 321817 VDYDA5 322817 VDYDA5 323817 VDYDA5 324817 VDYDA5 325817	8.4.2.3: Maintain lake aeration.

SRM	8.4	8.4.2.4	Annual	2021 2022 2023 2024 2025	NRM, Wing Safety, USDA-WS	In house	Low	N/A	N/A	N/A	8.4.2.4: Annually assess deer population to determine harvest rates and any necessary changes to hunting procedures in coordination with USDA-WS.
EQ	8.4	8.4.3.1	1x/2 yrs	2021 2023 2025	USFWS	EQ	Low	INRP	Mgt, Habitat	VDYDA5 3216119 VDYDA5 3236119 VDYDA5 3256119	8.4.3.1: Conduct spring electrofishing inventory every two years of both Scott and Cardinal Lakes (April or May) for use in developing stocking requirements.
SRM	8.4	8.4.3.2	1x/2 yrs	2021, 2023, 2025	NRM	In house	Low	N/A	N/A	N/A	8.4.3.2: Use electrofishing inventory to determine the need for signs around the lake perimeters to encourage harvest of crappie and grass carp. Place signs as needed.

EQ	8.4	8.4.3.3	Annual	2021 2022 2023 2024 2025	USFWS	EQ	Low	INRP	Mgt, Habitat	VDYDA5 3216119 VDYDA5 3226119 VDYDA5 3236119 VDYDA5 3246119 VDYDA5 3256119	8.4.3.3: Accomplish annual assessment of water quality of Scott and Cardinal Lakes to determine the need for any adaptive changes to lake management methods.
EQ	8.4	8.4.3.4	1x/2 yrs	2021 2023 2025	USFWS	EQ	Low	INRP	Mgt, Species	VDYDA5 3216119 VDYDA5 3236119 VDYDA5 3256119	8.4.3.4: Accomplish fish stocking (every other year or as-needed)IAW electrofishing recommendations.
EQ	8.4	8.4.3.5	Annual	2021 2022 2023 2024 2025	USFWS	EQ	Medium	INRP	Mgt, Habitat	VDYDA5 3216119 VDYDA5 3226119 VDYDA5 3236119 VDYDA5 3246119 VDYDA5 3256119	8.4.3.5: Assess vegetative control along shorelines with respect to improving access by anglers in coordination with Grounds Maintenance.
SRM	8.4	8.4.3.6		TBD	Real Property	SRM	Low				8.4.3.6: Provide an American's with Disabilities Act-compliant dock.
SRM	8.5	8.5.1.1	Annual	2021 2022 2023 2024 2025	NRM	In house	Medium	N/A	N/A	N/A	8.5.1.1: Coordinate with USDA-WS to obtain Migratory Bird Treaty Act permit from USFWS and maintain related reporting.

SRM	8.5	8.5.1.2	Annual	2021 2022 2023 2024 2025	NRM	In house	Medium	N/A	N/A	N/A	8.5.1.2: Coordinate with USDA-WS to maintain Nuisance Wildlife Control Permit.
SRM	8.5	8.5.1.3	Annual	2021 2022 2023 2024 2025	NRM	In house	Medium	N/A	N/A	N/A	8.5.1.3: Coordinate with USDA-WS to obtain Depredation at Airports Permit from IDNR.
SRM	8.5	8.5.1.4	Annual	2021 2022 2023 2024 2025	NRM	In house	Medium	N/A	N/A	N/A	8.5.1.4: Coordinate with USDA-WS to maintain Deer Removal Permit.
SRM	8.5	8.5.2.1	Annual	2021 2022 2023 2024 2025	NRM	In house	Medium	N/A	N/A	N/A	8.5.2.1: Accomplish annual review and update of INRMP in coordination with Sikes Act partners.
EQ	8.5	8.5.2.2	Annual	2021-2025	NRM	In house	Low	N/A	N/A	N/A	8.5.2.2: Store and maintain data about natural resources, listed species, historical conditions, trends and current status to facilitate the determination of the need to modify current management methods.

N/A = Not Applicable

***Natural Resources Standard Titles by PB28 Code (excluding CZT/CZC titles)**

INRP	MMA	T&E	MNRA	WTLD
P&F, CN	Mgt, Species	Mgt, Habitat	Compliance Public Notification	Mgt, Wetlands / FloodPlains
Interagency/Intraagency, Government, Sikes Act	Interagency/Intraagency, Government, Sikes Act	Mgt, Species	Plan Update, Other	Monitor Wetlands
Interagency/Intraagency, Government, Sikes Act, CLEO	Outsourced Environmental Services, CN	Mgt, Invasive Species	Recordkeeping, Other	Interagency/Intraagency, Government, Sikes Act
Outsourced Environmental Services, CN	Supplies, CN	Mgt, Nuisance Wildlife	Outreach	Outsourced Environmental Services, CN
Supplies, CN	Supplies, CN, CLEO	Interagency/Intraagency, Government, Sikes Act		
Supplies, CN, CLEO	Vehicle Leasing, CN	Interagency/Intraagency, Government, Sikes Act, CLEO		
Equipment Purchase / Maintain, CN		Outsourced Environmental Services, CN		
Vehicle Leasing, CN		Supplies, CN		
Vehicle Fuel & Maintenance, CN		Supplies, CN, CLEO		
Mgt, Wildland Fire		Equipment Purchase / Maintain, CN		
Plan Update, INRMP		Vehicle Leasing, CN		
Plan Update, Other		Vehicle Fuel & Maintenance, CN		
Mgt, Habitat		Plan Update, Other		
Mgt, Species		Environmental Services, CN		
Mgt, Invasive Species				
Mgt, Nuisance Wildlife				
Recordkeeping, Other				

Environmental Services, CN				

11 REFERENCES

Standard References *(Applicable to all USAF installations)*

- AFMAN 32-7003, *Environmental Conservation*
- Sikes Act
- eDASH Natural Resources Program Page
- Natural Resources Playbook
- DoDI 4715.03, *Natural Resources Conservation Program*
- AFI 32-1015, *Integrated Installation Planning*
- AFI 32-10112, *Installation Geospatial Information and Services (IGI&S)*

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12 ACRONYMS

Standard Acronyms *(Applicable to all USAF installations)*

- eDASH Acronym Library
- Natural Resources Playbook – Acronym Section
- U.S. EPA Terms & Acronyms

Installation Supplement
Scott AFB-related acronyms include:

- 375 AW-375th Air Wing
- 375 AMW- 375th Air Mobility Wing
- 375 CES-375th Civil Engineering Squadron
- 375 CES/CEIE-375th Civil Engineering Squadron, Asset Management Flight, Environmental Element
- 375 CES/CEOE-375th Civil Engineering Squadron, Operations Flight, Maintenance Engineering Section
- 375 FSS-375th Force Support Squadron
- 375 MSG-375th Mission Support Group
- 375 SFS-375th Security Forces Squadron
- 1405 ATW-1405th Aeromedical Transport Wing
- AMC-Air Mobility Command
- ATC-Air Training Command
- DISA-Defense Information Systems Agency
- I-64-Interstate 64
- IDNR-Illinois Department of Natural Resources
- IEPA-Illinois Environmental Protection Agency
- INHS-Illinois Natural History Survey
- MATS-Military Air Transport Service
- MS4-Municipal Separate Storm Sewer Systems
- NLEB-Northern long-eared bat
- RRA-Resource Rich Area

- SDDC-Surface Deployment Distribution Command
- SFWA-State Fish and Wildlife Area
- SR-State Route
- UFC-Unified Facilities Code
- UNESCO-United Nations Educational, Scientific, and Cultural Organization
- USTRANSCOM-United States Transportation Command

13 DEFINITIONS

Standard Definitions *(Applicable to all USAF installations)*

- Natural Resources Playbook – Definitions Section

Installation Supplement

The Natural Resources Playbook definitions section is found here

A ANNOTATED SUMMARY OF KEY LEGISLATION RELATED TO DESIGN AND IMPLEMENTATION OF THE INRMP

Federal Public Laws and Executive Orders	
National Defense Authorization Act of 1989, Public Law (P.L.) 101-189; Volunteer Partnership Cost-Share Program	Amends two Acts and establishes volunteer and partnership programs for natural and cultural resources management on DoD lands.
Defense Appropriations Act of 1991, P.L. 101-511; Legacy Resource Management Program	Establishes the "Legacy Resource Management Program" for natural and cultural resources. Program emphasis is on inventory and stewardship responsibilities of biological, geophysical, cultural, and historic resources on DoD lands, including restoration of degraded or altered habitats.
EO 11514, *Protection and Enhancement of Environmental Quality*	Federal agencies shall initiate measures needed to direct their policies, plans, and programs to meet national environmental goals. They shall monitor, evaluate, and control agency activities to protect and enhance the quality of the environment.
EO 11593, *Protection and Enhancement of the Cultural Environment*	All Federal agencies are required to locate, identify, and record all cultural resources. Cultural resources include sites of archaeological, historical, or architectural significance.
EO 11987, *Exotic Organisms*	Agencies shall restrict the introduction of exotic species into the natural ecosystems on lands and waters which they administer.

EO 11988, *Floodplain Management*	Provides direction regarding actions of Federal agencies in floodplains, and requires permits from state, territory and Federal review agencies for any construction within a 100-year floodplain and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for acquiring, managing and disposing of Federal lands and facilities.
EO 11989, *Off-Road vehicles on Public Lands*	Installations permitting off-road vehicles to designate and mark specific areas/trails to minimize damage and conflicts, publish information including maps, and monitor the effects of their use. Installations may close areas if adverse effects on natural, cultural, or historic resources are observed.
EO 11990, *Protection of Wetlands*	Requires Federal agencies to avoid undertaking or providing assistance for new construction in wetlands unless there is no practicable alternative, and all practicable measures to minimize harm to wetlands have been implemented and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; and (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.
EO 12088, *Federal Compliance with Pollution Control Standards*	This EO delegates responsibility to the head of each executive agency for ensuring all necessary actions are taken for the prevention, control, and abatement of environmental pollution. This order gives the U.S. Environmental Protection Agency (US EPA) authority to conduct reviews and inspections to monitor federal facility compliance with pollution control standards.
EO 12898, *Environmental Justice*	This EO requires certain federal agencies, including the DoD, to the greatest extent practicable permitted by law, to make environmental justice part of their missions by identifying and addressing disproportionately high and adverse health or environmental effects on minority and low-income populations.

EO 13112, *Invasive Species*	To prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.
EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*	The USFWS has the responsibility to administer, oversee, and enforce the conservation provisions of the Migratory Bird Treaty Act, which includes responsibility for population management (e.g., monitoring), habitat protection (e.g., acquisition, enhancement, and modification), international coordination, and regulations development and enforcement.
United States Code	
Animal Damage Control Act (7 U.S.C. § 426-426b, 47 Stat. 1468)	Provides authority to the Secretary of Agriculture for investigation and control of mammalian predators, rodents, and birds. DoD installations may enter into cooperative agreements to conduct animal control projects.
Bald and Golden Eagle Protection Act of 1940, as amended; 16 U.S.C. 668-668c	This law provides for the protection of the bald eagle (the national emblem) and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the Act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the Act.
Clean Air Act, (42 U.S.C. § 7401– 7671q, July 14, 1955, as amended)	This Act, as amended, is known as the Clean Air Act of 1970. The amendments made in 1970 established the core of the clean air program. The primary objective is to establish Federal standards for air pollutants. It is designed to improve air quality in areas of the country which do not meet federal standards and to prevent significant deterioration in areas where air quality exceeds those standards.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (Superfund) (26 U.S.C. § 4611–4682, P.L. 96-510, 94 Stat. 2797), as amended	Authorizes and administers a program to assess damage, respond to releases of hazardous substances, fund cleanup, establish clean-up standards, assign liability, and other efforts to address environmental contaminants. Installation Restoration Program guides cleanups at DoD installations.
Endangered Species Act (ESA) of 1973, as amended; P.L. 93-205, 16 U.S.C. § 1531 et seq.	Protects threatened, endangered, and candidate species of fish, wildlife, and plants and their designated critical habitats. Under this law, no federal action is allowed to jeopardize the continued existence of an endangered or threatened species. The ESA requires consultation with the USFWS and the NOAA Fisheries (National Marine Fisheries Service) and the preparation of a biological evaluation or a biological assessment may be required when such species are present in an area affected by government activities.
Federal Aid in Wildlife Restoration Act of 1937 (16 U.S.C. § 669–669i; 50 Stat. 917) (Pittman-Robertson Act)	Provides federal aid to states and territories for management and restoration of wildlife. Fund derives from sports tax on arms and ammunition. Projects include acquisition of wildlife habitat, wildlife research surveys, development of access facilities, and hunter education.
Federal Environmental Pesticide Act of 1972	Requires installations to ensure pesticides are used only in accordance with their label registrations and restricted-use pesticides are applied only by certified applicators.
Federal Land Use Policy and Management Act, 43 U.S.C. § 1701–1782	Requires management of public lands to protect the quality of scientific, scenic, historical, ecological, environmental, and archaeological resources and values; as well as to preserve and protect certain lands in their natural condition for fish and wildlife habitat. This Act also requires consideration of commodity production such as timbering.
Federal Noxious Weed Act of 1974, 7 U.S.C. § 2801–2814	The Act provides for the control and management of non-indigenous weeds that injure or have the potential to injure the interests of agriculture and commerce, wildlife resources, or the public health.

Federal Water Pollution Control Act (Clean Water Act [CWA]), 33 U.S.C. §1251–1387	The CWA is a comprehensive statute aimed at restoring and maintaining the chemical, physical, and biological integrity of the nation's waters. Primary authority for the implementation and enforcement rests with the US EPA.
Fish and Wildlife Conservation Act (16 U.S.C. § 2901–2911; 94 Stat. 1322, PL 96-366)	Installations encouraged to use their authority to conserve and promote conservation of nongame fish and wildlife in their habitats.
Fish and Wildlife Coordination Act (16 U.S.C. § 661 et seq.)	Directs installations to consult with the USFWS, or state or territorial agencies to ascertain means to protect fish and wildlife resources related to actions resulting in the control or structural modification of any natural stream or body of water. Includes provisions for mitigation and reporting.
Lacey Act of 1900 (16 U.S.C. § 701, 702, 32 Stat. 187, 32 Stat. 285)	Prohibits the importation of wild animals or birds or parts thereof, taken, possessed, or exported in violation of the laws of the country or territory of origin. Provides enforcement and penalties for violation of wildlife related Acts or regulations.
Leases: Non-excess Property of Military Departments, 10 U.S.C. § 2667, as amended	Authorizes DoD to lease to commercial enterprises Federal land not currently needed for public use. Covers agricultural outleasing program.
Migratory Bird Treaty Act 16 U.S.C. § 703–712	The Act implements various treaties for the protection of migratory birds. Under the Act, taking, killing, or possessing migratory birds is unlawful without a valid permit.
National Environmental Policy Act of 1969 (NEPA), as amended; P.L. 91-190, 42 U.S.C. § 4321 et seq.	Requires federal agencies to utilize a systematic approach when assessing environmental impacts of government activities. Establishes the use of environmental impact statements. NEPA proposes an interdisciplinary approach in a decision-making process designed to identify unacceptable or unnecessary impacts on the environment. The Council of Environmental Quality (CEQ) created Regulations for Implementing the National Environmental Policy Act [40 Code of Federal Regulations (CFR) Parts 1500–1508], which provide regulations applicable to and binding on all Federal agencies for implementing the procedural provisions of NEPA, as amended.

National Historic Preservation Act, 16 U.S.C. § 470 et seq.	Requires federal agencies to take account of the effect of any federally assisted undertaking or licensing on any district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places (NRHP). Provides for the nomination, identification (through listing on the NRHP), and protection of historical and cultural properties of significance.
National Trails Systems Act (16 U.S.C. § 1241–1249)	Provides for the establishment of recreation and scenic trails.
National Wildlife Refuge Acts	Provides for establishment of National Wildlife Refuges through purchase, land transfer, donation, cooperative agreements, and other means.
National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. § 668dd–668ee)	Provides guidelines and instructions for the administration of Wildlife Refuges and other conservation areas.
Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. § 3001–13; 104 Stat. 3042), as amended	Established requirements for the treatment of Native American human remains and sacred or cultural objects found on Federal lands. Includes requirements on inventory, and notification.
Rivers and Harbors Act of 1899 (33 U.S.C. § 401 et seq.)	Makes it unlawful for the USAF to conduct any work or activity in navigable waters of the United States without a federal permit. Installations should coordinate with the U.S. Army Corps of Engineers (USACE) to obtain permits for the discharge of refuse affecting navigable waters under National Pollutant Discharge Elimination System (NPDES) and should coordinate with the USFWS to review effects on fish and wildlife of work and activities to be undertaken as permitted by the USACE.
Sale of certain interests in land, 10 U.S.C. § 2665	Authorizes sale of forest products and reimbursement of the costs of management of forest resources.
Soil and Water Conservation Act (16 U.S.C. § 2001, P.L. 95-193)	Installations shall coordinate with the Secretary of Agriculture to appraise, on a continual basis, soil/water-related resources. Installations will develop and update a program for furthering the conservation, protection, and enhancement of these resources consistent with other federal and local programs.

Sikes Act (16 U.S.C. § 670a–670l, 74 Stat. 1052), as amended	Provides for the cooperation of DoD, the Departments of the Interior (USFWS), and the State Fish and Game Department in planning, developing, and maintaining fish and wildlife resources on a military installation. Requires development of an INRMP and public access to natural resources and allows collection of nominal hunting and fishing fees. NOTE: AFI 32-7064 sec 3.9. Staffing. As defined in DoDI 4715.03, use professionally trained natural resources management personnel with a degree in the natural sciences to develop and implement the installation INRMP. (T-0). 3.9.1. Outsourcing Natural Resources Management. As stipulated in the Sikes Act, 16 U.S.C. § 670 et. seq., the Office of Management and Budget Circular No. A-76, Performance of Commercial Activities, August 4, 1983 (Revised May 29, 2003) does not apply to the development, implementation and enforcement of INRMPs. Activities that require the exercise of discretion in making decisions regarding the management and disposition of government owned natural resources are inherently governmental. When it is not practicable to utilize DoD personnel to perform inherently governmental natural resources management duties, obtain these services from federal agencies having responsibilities for the conservation and management of natural resources.
DoD Policy, Directives, and Instructions	
DoD Instruction 4150.07 *DoD Pest Management Program* dated 29 May 2008	Implements policy, assigns responsibilities, and prescribes procedures for the DoD Integrated Pest Management Program.
DoD Instruction 4715.1, *Environmental Security*	Establishes policy for protecting, preserving, and (when required) restoring and enhancing the quality of the environment. This instruction also ensures environmental factors are integrated into DoD decision-making processes that could impact the environment, and are given appropriate consideration along with other relevant factors.

DoD Instruction (DoDI) 4715.03, *Natural Resources Conservation Program*	Implements policy, assigns responsibility, and prescribes procedures under DoDI 4715.1 for the integrated management of natural and cultural resources on property under DoD control.
OSD Policy Memorandum – 17 May 2005 – *Implementation of Sikes Act Improvement Amendments: Supplemental Guidance Concerning Leased Lands*	Provides supplemental guidance for implementing the requirements of the Sikes Act in a consistent manner throughout DoD. The guidance covers lands occupied by tenants or lessees or being used by others pursuant to a permit, license, right of way, or any other form of permission. INRMPs must address the resource management on all lands for which the subject installation has real property accountability, including leased lands. Installation commanders may require tenants to accept responsibility for performing appropriate natural resource management actions as a condition of their occupancy or use, but this does not preclude the requirement to address the natural resource management needs of these lands in the installation INRMP.
OSD Policy Memorandum – 1 November 2004 – *Implementation of Sikes Act Improvement Act Amendments: Supplemental Guidance Concerning INRMP Reviews*	Emphasizes implementing and improving the overall INRMP coordination process. Provides policy on scope of INRMP review, and public comment on INRMP review.
OSD Policy Memorandum – 10 October 2002 – *Implementation of Sikes Act Improvement Act: Updated Guidance*	Provides guidance for implementing the requirements of the Sikes Act in a consistent manner throughout DoD and replaces the 21 September 1998 guidance Implementation of the Sikes Act Improvement Amendments. Emphasizes implementing and improving the overall INRMP coordination process and focuses on coordinating with stakeholders, reporting requirements and metrics, budgeting for INRMP projects, using the INRMP as a substitute for critical habitat designation, supporting military training and testing needs, and facilitating the INRMP review process.
USAF Instructions and Directives	

32 CFR Part 989, as amended, and AFI 32-7061, Environmental Impact Analysis Process (EIAP)	Provides guidance and responsibilities in the EIAP for implementing INRMPs. Implementation of an INRMP constitutes a major federal action and therefore is subject to evaluation through an Environmental Assessment or an Environmental Impact Statement.
AFI 32-1015, *Integrated Installation Planning*	This publication establishes a comprehensive and integrated planning framework for development/redevelopment of Air Force installations..
AFMAN 32-7003, *Environmental Conservation*	Implements AFPD 32-70, *Environmental Quality;* DoDI 4715.03, *Natural Resources Conservation Program*; and DoDI 7310.5, *Accounting for Sale of Forest Products*. It explains how to manage natural resources on USAF property in compliance with Federal, state, territorial, and local standards.
AFMAN 32-7003, *Environmental Conservation*	This Manual implements AFPD 32-70 and DoDI 4710.1, *Archaeological and Historic Resources Management.* It explains how to manage cultural resources on USAF property in compliance with Federal, state, territorial, and local standards.
AFI 32-10112 *Installation Geospatial Information and Services (IGI&S)*	This instruction implements Department of Defense Instruction (DoDI) 8130.01, Installation Geospatial Information and Services (IGI&S) by identifying the requirements to implement and maintain an Air Force Installation Geospatial Information and Services program and Air Force Policy Directive (AFPD) 32-10 Installations and Facilities.
AFPD 32-70, *Environmental Quality*	Outlines the USAF mission to achieve and maintain environmental quality on all USAF lands by cleaning up environmental damage resulting from past activities, meeting all environmental standards applicable to present operations, planning its future activities to minimize environmental impacts, managing responsibly the irreplaceable natural and cultural resources it holds in public trust and eliminating pollution from its activities wherever possible. AFPD 32-70 also establishes policies to carry out these objectives.
Policy Memo for Implementation of Sikes Act Improvement Amendments, HQ USAF Environmental Office (USAF/ILEV) on January 29, 1999	Outlines the USAF interpretation and explanation of the Sikes Act and Improvement Act of 1997.

B WILDLAND FIRE MANAGEMENT PLAN
Installation Supplement

Scott AFB does not currently have a Wildland Fire Management Plan. No prescribed burns are conducted on the installation.

C BIRD/WILDLIFE AIRCRAFT STRIKE HAZARD (BASH) PLAN
Installation Supplement

The Bird/Wildlife Aircraft Strike Hazard Plan can be found at this page

D GOLF ENVIRONMENTAL MANAGEMENT (GEM) PLAN
Installation Supplement

The Golf Environmental Management Plan can be found at this page

E INTEGRATED CULTURAL RESOURCES MANAGEMENT PLAN (ICRMP)
Installation Supplement

The Installation Cultural Resources Management Plan can be found at this page

F INTEGRATED PEST MANAGEMENT PLAN (IPMP)
Installation Supplement

The Integrated Pest Management Plan can be found at this page

G INRMP SUPPORTING PLANS AND REPORTS

The Indiana Bat Draft Recovery Plan can be found at this page

The Installation Indiana Bat Management Plan can be found at this page

The Survey for the Federally Endangered Indiana Bat and Threatened Northern Long-Eared Bat can be found at this page

The Bat (Chiroptera) Surveys for Midwest AFCEC Installations, 2019 can be found at this page

The Small Mammal Survey report can be found at this page

The Landbird Conservation and Management report can be found at this page

Ash Tree Management Recommendations can be found at this page

The Floodplain Analysis Report can be found at this page

The Endangered Species Management Plan can be found at this page

The Urban Forest Management Plan can be found at this page

The Natural Forest Inventory Report can be found at this page

The Invasive Species Management Plan can be found at this page

The Wildlife Hazard Assessment can be found at this page

The Integrated Contingency Plan (ICP) can be found at this page

The Hazardous Waste Management Plan can be found at this page

The Storm Water Pollution Prevention Plan (SWPPP) can be found at this page

The Installation Development Plan (IDP) can be found at this page

The Grounds Maintenance Performance Work Statement can be found at this page

H SPECIES KNOWN TO OCCUR AT SCOTT AFB

The Species Known to Occur at Scott AFB report can be found at this page

I APPROVED PLANTING LIST

	BOTANICAL NAME	COMMON NAME	USE
Large Trees	Acer rubrum	Red Maple	Buffer; open space; screen; walks
	Acer saccharinum	Sugar Maple	Open space; secondary/tertiary streets; walks
	Betula nigra	River Birch	Open space
	Liriodendron tulipfera	Tulip Tree	Buffer; open space specimen; walks
	Pinus sylvestris	Scotch Pine	Buffer; open space; screen; tertiary streets
	Psedotsuga menziesii	Douglas Fir	Buffer; open space; screen; tertiary streets
	Quercus rubra	Red Oak	Open space; secondary/tertiary streets; walks
	Quercus alba	White Oak	Buffer
	Quercus bicolor	Swamp White Oak	Buffer; screen; open space
	Taxodium distichum	Bald Cypress	Buffer; screen; open space

Small Trees	Amelanchierarborea	Serviceberry	Buffer; open space
	Cercis canadensis	Redbud	Buffer; foundation; open space; screen parking
	Cornus alternifolia	Pagoda Dogwood	Buffer; open space; screen; foundation
	Cornus florida	Flowering Dogwood	Buffer; foundation; screen
	Crataegus crus-galli	Cockspur Hawthorne	Buffer; foundation; open space; screen
	Crataegus lavallei 'thornless'	Lavalle Hawthorne	Barrier; parking lot
	Crataegus phaneopyrum 'thornless'	Washington Hawthorne	Barrier; buffer; open space; screen parking
	Koel reuteria paniculata	Golden Rain Tree	Barrier; buffer; open space
	Magnolia Soulangiana	Saucer Magnolia	Foundation; specimen
	Malus x spp.	Crabapple	Buffer; open space; screen; primary/secondary streets
	Prunus serrulata 'Kwanzan'	Kwanzan Cherry	Foundation; secondary streets

Large Shrubs	Cornus sericea	Redosier Dogwood	Buffer; open space; screen; mass
	Forsythia x intermedia	Karl Sax Forsythia	Buffer; open space
	Ilex spp.	Holly	Foundation; hedges; accent
	Juniperis chinensis	Chinese Juniper	Parking lot; foundation
	Ligustrum spp.	Privet	Foundation
	Pinus mugo var. mugo	Mugo Pine	Buffer; mass; screen
	Rhus typhina	Staghorn Sumac	Buffer; open space; mass
	Thuja occidentalis	American Arborvitae	Specimen; accent; hedges; foundation
	Viburnum burkwoodii	Birkwood Viburnum	Buffer; foundation; open space; screen
	Viburnum dentatum	Arrowwood Viburnum	Parking lot; foundation
	Viburnum p. tomentosum	Doublefile Viburnum	Buffer; open space; screen; foundation
	Viburnum rhytidophyllum	Leatherleaf Viburnum	Buffer; open space; screen; mass
Small Shrubs	Berberis thunbergii	Japanese Barberry	Foundation; parking lot
	Buxus m. koreana	Korean Boxwood	Foundation; mass

	Ilex glabra 'Compact'	Compact Inkberry	Bank cover; buffer; foundation; mass;screen
	Ilex spp. 'China girl holly'	Holly	Foundation; hedges; accent
	Ilex spp. 'China boy holly'	Holly	Foundation; hedges; accent
	Juniperis chinensis	Chinese Juniper	Buffer; foundation; parking lot; mass; screen
	Juniperis sabina	Savin Juniper	Foundation
	Kerria japonica	Japanese Kerria	Buffer; open space; mass
	Pinus mugo 'Compact'	Compact Mugo Pine	Foundation; mass
	Rhododendron spp.	Azalea	Foundation
	Rhus aromatica	Fragrant Sumac	Buffer; open space; mass
	Taxus c. 'Densiformis'	Dense Japanese Yew	Foundation; parking lot
	Thuja occidentalis globosa	Globe Arborvitae	Specimen; accent; hedges; foundation
Ground Cover	Euonymus f. 'Colorata'	Purpleleaf Wintercreeper	Foundation; parking lot; open space
	Juniperis horizontalis	Creeping Juniper	Foundation; parking lot; mass
	Juniperis chinensis	Chinese Juniper	Foundation; parking lot; mass
	Polygonum cuspidatum	Low Japanese Fleeceflower	Bank cover; buffer; open space; mass
	Polygonum reynoutria	Compact Fleeceflower	Bank cover; buffer; open space; mass
	Rhus a. 'Low Grow'	Low Grow Sumac	Bank cover; open space; mass

J OSD MEMORANDUM INTERIM POLICY ON MANAGEMENT OF WHITE NOSE SYNDROME IN BATS, 20 SEPTEMBER 2011

OFFICE OF THE UNDER SECRETARY OF DEFENSE
3000 DEFENSE PENTAGON
WASHINGTON, DC 20301-3000

SEP 2 0 2011

MEMORANDUM FOR DEPUTY ASSISTANT SECRETARY OF THE ARMY
(ENVIRONMENT, SAFETY AND OCCUPATIONAL HEALTH)
DEPUTY ASSISTANT SECRETARY OF THE NAVY
(ENVIRONMENT)
DEPUTY ASSISTANT SECRETARY OF THE AIR FORCE
(ENVIRONMENT, SAFETY AND OCCUPATIONAL HEALTH)

SUBJECT: Interim Policy on Management of White Nose Syndrome in Bats

White-nose Syndrome (WNS) is a disease associated with the *Geomyces destructans* fungus that is rapidly spreading south and west across North America and causing unprecedented mortality of hibernating bats in the United States. As it spreads, the challenges for understanding and managing the disease continue to increase. Although WNS affects bats during hibernation, the effects extend well outside the cave and onto the summer maternity range. Thus, the effects from WNS-associated mortality may be observed across the landscape.

It is incumbent on DoD to manage its natural resources to ensure no net loss to readiness. Similarly, DoD activities must comply with legal requirements to protect listed bat species under the Endangered Species Act (ESA). Bats perform vital ecological services, such as eating nocturnal insects. WNS threatens the recovery of federally listed bat species populations and may hasten the listing of additional bat species, thereby posing a direct threat to mission readiness. All nine threatened and endangered bat species in the U.S., including the Indiana and gray bats, can occur on or near DoD military installations. The Indiana bat hibernates in many WNS positive sites, and the endangered gray bat recently tested positive for the fungus that causes WNS, postponing the possible delisting of this species with potential long-term consequences for DoD.

Research indicates that WNS may be transmitted in two ways: bat-to-bat transmission is believed to be the primary route, and circumstantial evidence suggests humans may inadvertently carry WNS from site-to-site. Should WNS spread to caves located on military installations, these caves, along with surrounding areas, may become access-restricted, which could significantly reduce the number of caves available for training. It is imperative that installations develop strategies to mitigate potential military mission impacts.

All military installations and ranges with known populations of bats shall implement, to the extent feasible and when appropriate, strategies to help combat the spread of WNS. Specifically, affected military installations shall:

- Incorporate WNS management strategies into installation Integrated Natural Resources Management Plans, including strategies to identify, avoid, and mitigate effects prior to the arrival of WNS.

- Ensure procedures are in place to guarantee the cleaning and sanitization of any clothing and equipment that may have come in contact with the *Geomyces destructans* fungus.
- Ensure surveillance procedures are in place to monitor bats for any new or expanding occurrences of WNS.
- Consider the recommendations in the U.S. Fish and Wildlife Service's *National Plan for Assisting States, Federal Agencies and Tribes in Managing WNS in Bats*, as appropriate.
- Work with the U.S. Fish and Wildlife Service, National Park Service, U.S. Forest Service, and other related agencies regarding WNS reporting and the management of caves, mines, and other affected sites.
- Share up-to-date information with the U.S. Fish and Wildlife Service and state fish and wildlife agencies.

My point of contact is Mr. Peter Boice, who can be reached at 703-604-0524.

Maureen Sullivan
Director, Environmental Management
Office of the Deputy Under Secretary of Defense
(Installations and Environment)

K MEMORANDUM OF UNDERSTANDING BETWEEN THE U.S. DEPARTMENT OF DEFENSE AND THE U.S. FISH AND WILDLIFE SERVICE AND THE ASSOCIATION OF FISH AND WILDLIFE AGENCIES FOR A COOPERATIVE INTEGRATED NATURAL RESOURCE MANAGEMENT PROGRAM ON MILITARY INSTALLATIONS, 2013

The Sikes Act Tripartite MOU can be found at this page

L CLIMATE SOURCES DATA, METHODS, AND MODELS

The CSU CEMML Climate Change Project Draft Report for Scott AFB can be found at this page