U. S. AIR FORCE

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

42D AIR BASE WING

MAXWELL AIR FORCE BASE

U. S. AIR FORCE

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

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(*See INRMP signature pages for plan approval date*)

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.

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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 by the Natural Resources Subject Matter Expert (SME).

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 AFI 32-7064, *Integrated Natural Resources Management*, 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 sig ned 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 (AFI 32-7064).

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.

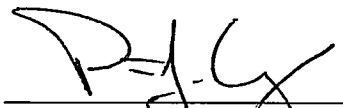
SIGNATURE PAGE

The Maxwell Air Force Base (MAFB) Integrated Natural Resources Management Plan (INRMP) has been prepared for the 42nd Air Base Wing (42 ABW) to maintain natural resources in support of the training mission. Significant natural resources include the presence of federal and/or state-listed protected species, fish and wildlife management plans, land management plans, and Waters of the United States (U.S.) to include wetlands on MAFB. The MAFB INRMP meets the intent of the Sikes Act (16 U.S.C. § 670a–670l, 74 Stat. 1052).

Where applicable, external resources, including Department of Defense Instructions (DoDI), Air Force Instructions (AFIs); Air Force (AF) Playbooks; federal, state, local and Final Governing Standards (FGS), biological opinion and permit requirements, are referenced. Certain sections of this INRMP begin with standardized, AF-wide "common text" language that address AF and Department of Defense (DoD) policy and federal requirements. This common text language remains standard throughout all plans. Immediately following the AF-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 maintained and updated by AF Installation Environmental Personnel or, if unavailable, by Installation Support Section (ISSs) resource specialists.

To the extent that resources permit, the U.S. Fish and Wildlife Service (USFWS), Alabama Department of Conservation and Natural Resources (ADCNR), and MAFB by signature of their agency representative, do hereby enter into a cooperative agreement for the conservation, protection, and management of the natural resources present on MAFB. This agreement may be modified and amended by mutual agreement of the authorized representatives of the 3 agencies. This agreement will become effective upon the date of the last signatory and shall continue in full force for a period of 5 years or until terminated by written notice to the other parties, in whole or in part, by any of the parties signing this agreement.
By their signatures below, or an attached sheet, all parties grant their concurrence with and acceptance of the following document.

Approving Officials:



PATRICK J. CARLEY, Colonel, USAF
Commander
42d Air Base Wing

5 MAY '20
Date

WILLIAM PEARSON Digitally signed by WILLIAM PEARSON
Date: 2020.03.19 15:47:02 -05'00'

NAME
U.S. Fish and Wildlife Service

Date

Christopher M. Blankenship Digitally signed by Christopher M. Blankenship
Date: 2020.04.08 11:22:18 -05'00'

NAME
Alabama Department of Conservation and Natural Resources

Date

ANNUAL REVIEW DOCUMENTS

These pages are used to certify the annual review and coordination of the Integrated Natural Resources Management Plan (INRMP) for Maxwell Air Force Base (MAFB) in Montgomery County, Alabama.

With the signature below, or with written or email correspondence verifying coordination with external entities, this acknowledges that the annual review and coordination of the INRMP has occurred for the specified year.

Year: 2020

[ ]	Date
Commander 42d Air Base Wing	
[ ]	Date
U.S. Fish and Wildlife Service	
[ ]	Date
Alabama Department of Conservation and Natural Resources	

Year: 2021

[ ]	Date
Commander 42d Air Base Wing	
[ ]	Date
U.S. Fish and Wildlife Service	
[ ]	Date
Alabama Department of Conservation and Natural Resources	

Year: 2022

[ ] Commander 42d Air Base Wing	Date
[ ] U.S. Fish and Wildlife Service	Date
[ ] Alabama Department of Conservation and Natural Resources	Date

Year: 2023

[ ] Commander 42d Air Base Wing	Date
[ ] U.S. Fish and Wildlife Service	Date
[ ] Alabama Department of Conservation and Natural Resources	Date

Year: 2024

[ ] Commander 42d Air Base Wing	Date
[ ] U.S. Fish and Wildlife Service	Date
[ ] Alabama Department of Conservation and Natural Resources	Date

EXECUTIVE SUMMARY

The Sikes Act Improvement Act (SAIA) of 1997, 16 United States Code (USC) §670a et seq., as amended, requires federal military installations with significant natural resources to develop a long-range Integrated Natural Resources Management Plan (INRMP) and implement cooperative agreements with other agencies. The INRMP serves as a key component of the Installation Development Plan (IDP), which provides background and rationale for the policies and programming decisions related to land use, resource conservation, facilities, and infrastructure development, and operations and maintenance to ensure they meet current requirements and provide for future growth. An INRMP is required by Department of Defense (DoD) and United States Air Force (USAF) Policy for Maxwell Air Force Base (MAFB) and its associated properties (Gunter Annex in Montgomery Alabama, and leased properties Vigilant Warrior Training Site located in Titus, Alabama, and Lake Martin Recreation Area in Dadeville, Alabama). The INRMP is the primary guidance document for managing natural resources on Maxwell-Gunter AFB, and its leased properties.

MAFB is located in the city of Montgomery and encompasses approximately 2,527 acres, with most of the land being improved or developed. Approximately 700 acres are occupied by buildings, structures, pavements, and landscaped resident housing. Aircraft runways, taxiways, and adjacent airfield account for 880 acres. Recreation areas, such as a golf course, picnic areas, playgrounds, and several ponds, account for the remaining 947 acres. MAFB also controls over 1,000 acres in easements, right-of-ways, and clear zones along with the main property to ensure mission sustainment and compatibility (MAFB. 2015):

- Gunter Annex of Maxwell AFB is located on the east side of the city of Montgomery or approximately 5 miles from MAFB. Gunter Annex consists of 377 acres that are fully developed into housing, industrial, academic and administrative facilities.
- Vigilant Warrior Training Site is 201 acres approximately 40 miles northeast of MAFB, and is leased property from Alabama Power Company. The improved and semi-improved property has field training facilities consisting of tents, dining facility, warehouses, bathhouses, and other related buildings that were constructed by the AF since 1985.
- Lake Martin Recreation Area is 46 acres of leased property on Lake Martin Reservoir, approximately 65 miles northeast of MAFB.

Implementation of the INRMP will help ensure that Maxwell AFB property and leased lands continue to support present and future mission requirements, while preserving, enhancing, and where possible, restoring ecosystem integrity. Over the long term, implementation of this and future INRMPs will guide base staff how to maintain or improve sustainability and biological diversity of all ecosystems on MAFB properties, support sustainable economies, human use, and the environment required for realistic military operations.

The INRMP clarifies DoD natural resource management on MAFB, Gunter Annex, and the 2 leased properties (Lake Martin and Vigilant Warrior Training Site), in accordance with federal, state, and local guidelines.

INRMP planning and decision-making is integrated with base comprehensive planning, proposed project planning, pest management planning, Bird/Wildlife Strike Hazard (BASH) reduction planning, airfield management planning, and cultural resources management planning. INRMP information was gathered throughout the preparation process from a cross section of MAFB staff; users of base lands; representatives from the surrounding communities; and local, regional, and national agencies and organizations through interviews, meetings, and written questionnaires.

This INRMP was developed and required as a result of the presence of the federally threatened species, Wood Stork (*Mycteria americana*), BASH, invasive species management, vegetation management, and outdoor recreation programs. The development of this INRMP was done in cooperation with the United States Fish and Wildlife Service (USFWS), Alabama Department of Conservation and Natural Resources (ADCNR), and a variety of documents, interviews with installation personnel, on-site observations, and communications with internal and external stakeholders. The details of this development process and the future review process are described in **Section 9.3** of the INRMP.

The SAIA of 1997, as amended, requires federal military installations with significant natural resources to develop a long-range INRMP and implement cooperative agreements with other agencies. The Natural Resources Management Goals presented in this INRMP are listed below:

Goal 1: Provide a natural resource management program within 42 CES/CEIE that supports the 42 ABW mission while protecting ecosystem diversity to the maximum extent possible and complying with applicable federal and state laws and USAF regulations and policies.

Goal 2: Remain in compliance with federal, state, and local laws and regulations governing natural resources.

Goal 3: Manage soil to minimize sediment loss and erosion, while protecting water quality.

Goal 4: Manage water resources so they remain resilient and with no net loss of acreage or functions and values.

Goal 5: Manage vegetation to promote a diversity of native species using cost effective and sustainable methods.

Goal 6: Manage fish and wildlife to maintain populations of game and non-game species consistent with 42 ABW mission and ecosystem management.

Goal 7: Manage endangered, threatened, and rare species habitat using an ecosystem approach, while maintaining the military mission at MAFB.

Goal 8: Minimize impacts of invasive plant and pest species with mechanical treatment and minimal chemical applications, utilizing an integrated pest management approach.

Goal 9: Enhance Natural Resources Programs with continual training opportunities.

Goal 10: Protect and conserve watershed habitats where it is compatible with the military mission.

Goal 11: Prevent MAFB properties from contributing to pollution through release of harmful substances or erosion debris into watersheds.

Goal 12: Reduce the risk of floodplain loss.

Goal 13: Avoid to the maximum extent possible, destruction, loss, or degradation of wetlands.

These goals are supported in the INRMP by objectives and projects, as well as management strategies and specific actions to achieve these goals. Goals and objectives are listed in **Section 8.0** of the INRMP, and projects and activities are summarized in **Tables 12 and 13** of **Section 10.0**. This INRMP provides a description of the installations and the military missions, the environment on each installation, and specific natural resource management designed for sustainable military training. The implementation of this INRMP will ensure the successful accomplishment of the military mission while promoting adaptive management that sustains ecosystem and biological integrity and provides for multiple uses of natural resources.

Specific goals in the MAFB INRMP are supported by its objectives and work plans, as well as management strategies and specific actions. Goals and objectives are listed in **Section 8** of this plan, and projects and activities are summarized in **Section 10.0** (detailed project and activity tables are in **Appendix B**).

1.0 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. This 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

The purpose of this INRMP (or "Plan") is to serve as the primary guidance document for managing natural resources at MAFB, including Gunter Annex, Vigilant Warrior Training Site, and Lake Martin Recreation Area. MAFB and associated property incorporates 2,904 acres of federally-owned land, and 241 acres of leased land under the command of the 42nd Air Base Wing Commander. MAFB must provide a variety of environmental conditions and habitats in which to train airmen. The management of MAFB must be conducted in a way that provides for a sustainable, healthy ecosystem, with no net loss in the capability of the installation to support military training and missions. Installation commanders use INRMPs to manage natural resources more effectively to ensure installation lands remain available and in good condition to ensure installation mission sustainment.

This INRMP is intended to be consistent with the Sikes Act Improvement Act (SAIA) of 1997, 16 United States Code (USC) §670a et seq., as amended, and AFI 32-7064, as required by the Department of Defense (DoD) and U.S. Air Force. This INRMP integrates all aspects of natural resources management with the rest of the MAFB mission, and therefore becomes the primary tool for managing the MAFB ecosystems and habitat while ensuring the successful accomplishment of the military mission at the highest possible levels of efficiency. The INRMP is the guide for the management and stewardship of natural resources present on MAFB property. A multiple-use approach will be implemented to allow for the presence of mission-oriented activities, as well as protecting environmental quality through the efficient management of natural resources.

There are significant natural resources present at MAFB and some unique management limitations. This plan is a dynamic document that integrates all aspects of natural resources management with each other and the rest of the installation's mission. Management strategies should be monitored and adjusted as needed. Goals and objectives of this plan must be given consideration early in the planning process for projects and mission changes on the installation. To achieve this end, the INRMP will be incorporated by reference into the MAFB Installation Development Plan (IDP), and INRMP digital maps will form the basis of A-2 maps (Management Areas). The interface of the INRMP with the IDP will be such that whenever the INRMP maps and associated databases are updated, the IDP A-2 maps will also be updated.

The INRMP and Critical Habitat Designation. Pursuant to Section 4(a)(3)(B)(i) of the Endangered Species Act (16 U.S.C. §1533(a)(3)(B)(i)) and 50 C.F.R. § 424.12.(h), the Secretary of Interior "shall not designate as critical habitat any lands or other geographical areas owned or controlled by the DoD, or designated for its use, that are subject to an integrated natural resources management plan prepared under section 101 of the Sikes Act (16 U.S.C. § 670a), if the Secretary determines in writing that such plan provides a benefit to

the species for which critical habitat is proposed for designation." The 2019 INRMP replaces the 2015 Natural Resources Plan (NRP) for MAFB.

1.2 Management Philosophy

The INRMP serves as a key component of the Installation Development Plan, which provides background and rationale for the policies and programming decisions related to land use, resource conservation, facilities and infrastructure development, and operations and maintenance to ensure that they meet current requirements and provide for future growth. The INRMP supports the mission by identifying the natural resources present on the installation, developing management goals for these resources, and integrating these management objectives into the military requirements for mission operations/support and regulatory compliance to minimize natural resource constraints.

This INRMP outlines the steps needed to fulfill compliance requirements related to natural resources management and fosters environmental stewardship. It is organized into the following principal sections:

- An overview of the current status and potential future conditions of the natural resources
- Identification of potential impacts to or from natural resources
- The key natural resource management areas addressed
- Management recommendations that incorporate the installation's goals and objectives for natural resource management areas
- Specific work plans for effective implementation of the INRMP

Management issues and concerns, as well as goals and objectives, are developed from analysis of all the gathered information, and are reviewed by MAFB personnel involved with or responsible for various aspects of natural resources management. The INRMP was developed using an interdisciplinary approach and is based on existing information of the physical and biotic environments, mission activities, and environmental management practices at MAFB properties. Information was obtained from a variety of documents, interviews with installation personnel, on-site observations, and communications with both internal and external stakeholders. Coordination and correspondence with these agencies is documented and satisfies a portion of the requirements of 32 Code of Federal Regulations (CFR) 989, *Environmental Impact Analysis Process (EIAP)*. Goals and objectives require monitoring on a continuous basis and management strategies are updated whenever there are changes in mission requirements, adverse effects to or from natural resources, or changes in regulations governing management of natural resources.

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

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

Biodiversity is the degree of variation of life within a given ecosystem, region, or even the entire planet. The DoD's challenge is to manage for biodiversity in a way that supports the military mission. An INRMP is identified by DoD as the primary vehicle for conserving biodiversity on military installations. Specific management practices identified in the MAFB INRMP have been developed to enhance and maintain biological diversity within the installation ecosystems. Ecosystem management includes biodiversity conservation and invasive species control as integral parts of ecosystem management. USAF installations should maintain or reestablish viable populations of all native species when practical and consistent with the military mission. USAF installations also should identify the presence of exotic and invasive species and implement programs to control and/or eradicate those species.

This plan presents both broad philosophical guidance as well as specific goals. INRMP planning and decision making is integrated with base comprehensive planning, proposed project planning, pest management planning, Bird/Wildlife Aircraft Strike Hazard (BASH) reduction, airfield management planning, golf course environmental management planning, and grounds maintenance planning. Interdisciplinary input from a wide variety of operational organizations on MAFB as well as from various Local, State, and Federal agencies was incorporated into this plan. This same cross-agency, cross-discipline approach will be used in preparing all major revisions of the INRMP. In recognition of the existing Cooperative Agreement between the DoD, DOI, and the State of Alabama, represented by the 42d Air Base Wing (ABW), USFWS, and ADCNR respectively, the Installation Natural Resources Manager will work with respective agency personnel for the purposes of protecting, developing, and managing the fish and wildlife resources on MAFB properties, thereby achieving the goals and objectives of the INRMP.

The INRMP is focused on supporting the base mission requirements while complying with the Sikes Act (SA), Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), Clean Water Act (CWA), federal natural resource conservation laws and regulation, and various Executive Orders including Executive Order (EO) 11988 *Floodplains Management*, EO 11990 *Protection of Wetlands*, EO 13186 *Responsibilities of Federal Agencies to Protect Migratory Birds*, EO 12962 *Recreational Fisheries*, EO

11989 *Off-Road Vehicles on Public Lands*, and EO 13112 *Invasive Species*. See Appendix A for a summary of key legislation related to the design and implementation of the INRMP.

Finally, when feasible, MAFB should develop joint control strategies with other federal, state, and local cooperating agencies and adjacent landowners to increase the effectiveness of control measures and for the benefits illustrated in **Figure 1**.

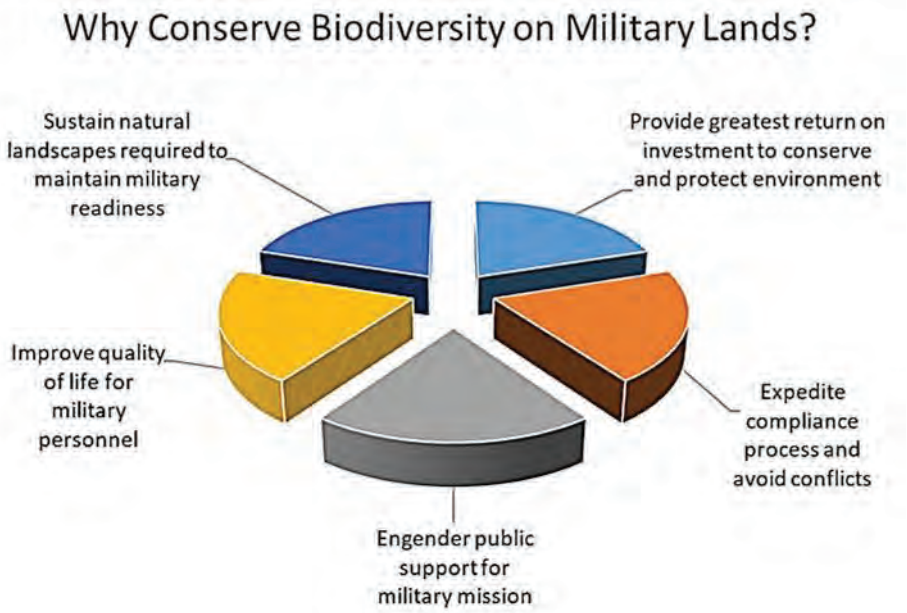


Figure 1. Why conserve biodiversity on Military Lands.

1.3 Authority

The USAF, USFWS and ADCNR determine the requirement for an installation INRMP based on Category I and II criteria. Category II installations do not require an INRMP because they do not have significant natural resources present to warrant such a plan. In consultation with USFWS and ADCNR, MAFB was designated a Category II installation by Air Education and Training Command (AETC) in January 2006. Due to sightings of the federally protected Wood Stork and outdoor recreation activities requiring conservation and management, the need for an INRMP is warranted to due to MAFB meeting Category I criteria (IAW AFI 32-7064).

The Sikes Act of 1960 (16 United States Code [USC] 670a-670o), as amended, provides for cooperation between the Department of Interior (DOI), DoD, and State agencies in planning, developing, and maintaining natural resources on military reservations. The Sikes Act Improvement Amendment as contained in the Fiscal Year (FY) 1998 National Defense Authorization Act specifically calls for the cooperative preparation and implementation of INRMPs on military installations.

DoDI 4715.03, *Natural Resources Conservation Program*, identifies the DoD policies and procedures concerning natural resources management and INRMP reviews, public comment, and endangered species consultation. INRMPs are required to be jointly reviewed by the USFWS, state fish and wildlife agency, and MAFB installation for operation and effect on a regular basis, but not less often than every 5 years. Minor updates and continued implementation of an existing INRMP do not require need for public comment. Major revisions to an INRMP do require an opportunity for public review. The degree of

endangered species consultation when updating or revising an INRMP depends upon specific projects identified in the MAFB INRMP and the amount of past consultation. Most updates and revisions will not require formal consultation. Endangered Species Act (ESA) Section 7 consultation is required for INRMPs that contain projects that may affect federally-listed species or designated critical habitat. The need for such consultation should become apparent during the review for operation and effect and implemented if necessary as part of an INRMP revision.

AFPD 32-70, *Environmental Quality*, discusses general environmental quality issues, including proper cleanup of polluted sites, compliance with applicable regulations, conservation of natural resources, and pollution prevention.

AFI 32-7064, *Integrated Natural Resources Management* implements the Sikes Act and the DoD directives by establishing the INRMP as the primary planning document for natural resources at AF installations. AFI 32-7064 establishes the Installation or Wing Commander as the signatory authority for approval of the INRMP. The commander's signature commits the AF to the goals and objectives of the INRMP. Once signed by the cooperating agencies (USFWS and ADCNR), the INRMP takes on the status of an interagency compliance agreement.

AFI 32-7065, *Cultural Resources Management*, provides guidance on the preservation of cultural resources at USAF installations.

Other applicable guidance includes, DoD Instruction 7000.14, *DoD Financial Management Policy and Procedures.* A complete list of applicable regulatory guidance is found in **Appendix A**.

Installation specific policies, including state and local laws and regulations are summarized in **Table 2**.

Table 2. Installation Specific Policies	
Installation Specific Policies (including State and/or Local Laws and Regulations)	
Base Recreation Access Policy	Recreational use is limited to active duty or retired military and their family members, Civil service and civilian personnel employed on MAFB and their families, and guests of the above.
Alabama Code Title 9	All fishing is done in accordance with Alabama Code Title 9, *Conservation and Natural Resources*, of the Alabama Administrative Code, as adopted by the Alabama Department of Conservation and Natural Resources.
Fishing Permits	A MAFB fishing permit is required for ages 16 - 65 fishing on the base in addition to any other permits or licenses required by the state. The following permits and licenses must be carried at all times when fishing: (a) valid Alabama Sport Fishing License; (b) monthly or annual fishing permit issued by 42nd Force Support Squadron.
Recreation Restrictions	Activities such as metal detecting, camping outside of designated areas, and other activities not covered in this section are prohibited without the approval of the NRM. Any activities from which an individual may make a financial profit from products or materials collected on Maxwell AFB are prohibited. Campfires are not permitted on Maxwell AFB except in designated Family Campground fire circles or areas specifically approved for special event bonfires. Gas-powered boats are not permitted on any base waterbodies. No wading or swimming is permitted in lakes and streams on the installation. Recreational off-road driving of any motorized vehicle, including ATVs and side-by-sides is prohibited at all times.
Aquatic Herbicide Applications	All applications will be performed by DoD or state certified pesticide applicators. Contractors are generally not permitted to mix or store pesticides on the installation (with exception of the Base Operating System contractor that manages MAFB CE Operations). If temporary contractors have a need to mix or store pesticides or herbicides on the installation, they must coordinate with, and be under the direction of, the CE Pest Management shop. Contractors must report pesticide usage and application to the CE Pest Management shop. Applicators will follow the storage, mixing, transport, application, and spill response procedures per US EPA and Alabama Department of Agriculture and Industries (ADAI) rules, regulations and label instructions. Pesticides (including aquatic herbicides) will not be applied directly to flowing water. Aquatic herbicides will not be applied during any wet weather or 12 hours before or after a rain event. Aquatic herbicides will only be applied when winds are less than 5 mph Aquatic herbicide applicators ensure daily that application equipment is in proper working order. Spill response and cleanup supplies will be maintained in all vehicles and pesticide storage areas.
Wetland and Waterway	Projects that impact wetlands or other Waters of the U.S. may require permits from the U.S. Army Corps of Engineers (USACE) and Alabama Department of Environmental Management

Table 2. Installation Specific Policies	
Installation Specific Policies (including State and/or Local Laws and Regulations)	
Protection Measures	(ADEM). Any required permitting will be coordinated through the installation CE Environmental Office, 42 CES/CEIE, which reserves the right to oversee and require correction of environmental protection measures. Environmental Awareness Training. Training that will include a discussion of Maxwell AFB wetland protection measures will be given to all equipment operators prior to initiation of the construction activity. Exclusion Period. Recommend no work be conducted between November 1 and June 1, unless approved by the MAFB environmental office, who may field verify soil saturation, visual ponding and expected surface disturbance. Recommend no work be conducted during rain events or within 12 hours of a rain event. Work during the wet season is subject to being temporarily postponed until conditions permit construction equipment use without damaging the soil or vegetation cover. A buffer area of a minimum of 50 feet in width shall be established to provide for undisturbed habitat adjacent to the wetland. Equipment parked overnight and/or fueled shall be at least 100 feet from a waterbody or in an upland area at least 100 feet from a wetland boundary Biological Monitor. If the work is within 50 feet of a wetland/drainage, MAFB Environmental Office reserves the right to require a biological monitor to be on site while work is conducted. Subsurface Protection. If the project site is within 50 feet of a wetland, the preconstruction clearing of vegetation will be done with hand equipment to ensure no subsurface disturbance below 6 inches occurs in or near the wetland. Construction Barriers. Orange barrier fences or pink flags will designate exclusion zones where construction activities cannot take place. A representative from MAFB Environmental office reserves the right to identify/flag areas where barrier fencing is needed to keep equipment out of wetland areas. Trenching Controls. In wetlands, the top 6 to 12 inches of the trench should normally be backfilled with topsoil from the trench. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance. Disposal of excavated material. All dredged or excavated material must be deposited and retained in an upland area unless otherwise specifically approved by MAFB. Excess soil protection. Recommend excess soil temporarily stored on-site during construction be covered with stabilization blankets/tarp and wattles to prevent exposure to the elements and to lessen chances of sedimentation due to storm water runoff and wind erosion. When the soil is revegetated the contractor/shop will remove the erosion control systems. Erosion Control Systems. Site-specific erosion control measures (i.e., hay bales, silt fencing) shall be implemented as specified in MAFB "Site Disturbance During Construction Activities & Stormwater Pollution Prevention," and as directed by the MAFB Environmental Office. Proper erosion and sediment control measures will be installed. The contractor/shop shall install and maintain erosion control systems such as gravel/sand bags, silt fence, straw bale barriers, erosion control/stabilization blankets, straw wattles, or etc. as needed to protect

Table 2. Installation Specific Policies	
Installation Specific Policies (including State and/or Local Laws and Regulations)	
	drainage ditches, storm drains, seasonal wetlands and water bodies from sedimentation resulting from construction activity. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate. Proper Structure Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety. Revegetation. All vegetated areas disturbed by construction shall be revegetated with approved sod or native plantings. A stabilization plan may be required by the MAFB Environmental Office. Options for large-scale revegetation may include approved seed and "certified weed free" straw mulch, or hydro-seeding and geo-textile fabric to prevent sediments from entering waterways Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).
Removal and Replacement of Landscaping Plants	Removal of native and ornamental trees and shrubs requires the approval of the MAFB NRM. When removal of vegetation becomes necessary, trees and shrubs will be replaced with equivalent plants or approved species on the MAFB Approved Plant List, where practicable. Replacement plantings may be relocated to nearby areas to eliminate incompatibility with facilities and mission needs. MAFB NRM can assist with suggested locations. Trees prone to disease or fruit-bearing trees that attract wildlife are prohibited. Replacement trees and shrubs should be followed by at least two years of maintenance (watering and weeding).
Invasive Plants	Planting species classified under the Alabama Invasive Plant Council (AIPC) inventory of invasive or potentially invasive plants is prohibited.
Wildlife Exclusion Zone Restrictions	Maintain airfield environment in accordance with MAFB Bird/Wildlife Aircraft Strike Hazard (BASH) Plan.

1.4 Integration with Other Plans

By its nature, an INRMP is multidisciplinary and provides the summary for natural resources at a specific installation. As a result, information from an INRMP is incorporated into other plans and these plans help identify management priorities and potential impacts to natural resources. The INRMP is integrated and mutually supportive with the following MAFB plans:

- Installation Development Plan (IDP) – provides the planning process designed to define MAFBs future physical state, determine a development strategy to support on-going and future mission growth. (MAFB 2015).
- Air Installation Compatible Use Zone (AICUZ) – provides noise levels around the airfield, ranges, and other types of training areas (MAFB 2015).
- BASH Hazard Reduction Plan – provides summary of the BASH program on MAFB, including techniques, processes, responsibilities and management recommendations (MAFB 2018a).

- Integrated Pest Management Plan (IPMP) for MAFB properties – plan for management of pest species, including nuisance wildlife and invasive species, to minimize impact to mission, natural resources and the environment (MAFB 2017a).
- Community Involvement Plan for the Environmental Restoration Program (ERP) at Maxwell Air Force Base – a guide for MAFB personnel, contractors and federal and State of Alabama environmental regulators for continued community outreach and participation in environmental cleanup activities (MAFB 2017b).
- Integrated Contingency Plan (including Spill Prevention, Control, and Countermeasures Plan (SPCC) for MAFB) – plan for prevention and management of spills (MAFB 2002b).
- Integrated Cultural Resources Management Plan (ICRMP) for MAFB properties – plan for management of cultural resources at MAFB, including archeological resources and historic structures (MAFB 2017).

2.0 INSTALLATION PROFILE

Office of Primary Responsibility	The Wing Commander 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/POC	42 CES/CEIEA Name: Beth Osgood Phone: (334) 953-6417 Email: Beth.osgood.ctr@us.af.mil
State and/or Local regulatory POCs (For U.S. installations, includes agency name for Sikes Act cooperating agencies)	USFWS Regulatory: Name: William Pearson Phone: (251) 441-5181 ADCNR Name: Taconya Goar Phone: (334) 353-7484 Name: Traci Wood Phone: (334) 353-0503 USACE Regulatory (Mobile District) Name: Craig Litteken Phone: (251) 690-2511 ADEM (Montgomery Office) Name: Debi Thomas Phone: (334) 271-7706
Total Acreage Management by Installation	3153 acres
Total Acreage of Wetlands	20.8 acres on Maxwell Main Base 15 acres on leased Vigilant Warrior property
Total Acreage of Streams, Lakes, Ponds, and other Waters of the U.S.	114.7 acres on Maxwell Main Base 5 acres on leased Vigilant Warrior property

Total Acreage of Forested Land	90 acres on Maxwell Main Base (consisting of 70 acres open green space and closed golf course area; 20 acres urban forest tracts in developed areas) 150 acres on leased Vigilant Warrior property
Total Floodplain Acreage	672 acres on Maxwell Main Base
Does Installation have Biological Opinions? (If yes, list title and date, and identity where maintained)	No
NR Program Applicability (Place a checkmark next to each program that must be implemented at the installation.	☒ Invasive Species ☒ Wetlands Protection Program ☒ Forest Management Program ☒ Grounds Maintenance Contract ☐ Wildland Fire Management Program ☒ Outdoor Recreation ☒ Integrated Pest Management Program ☒ Bird/Wildlife Aircraft Strike Hazard Program ☒ Cultural Resources Management Program

2.1 Installation Overview

2.1.1 Location and Area

Maxwell Air Force Base

Maxwell Air Force Base (MAFB) is located in Montgomery County, Alabama immediately south of the foothills of the Appalachian Mountains. It is located in the northwest section of the City of Montgomery, approximately one quarter mile west of the downtown area. MAFB is bordered on the east and south by the City of Montgomery, northeast by the Alabama River, and is 82 miles south of Birmingham. MAFB consists of improved or developed land, and comprises the main installation, along with Gunter Annex, and two leased properties - Vigilant Warrior Training Site, and Lake Martin Recreation Area (**Figure 2**).

Figure 2. MAFB, Gunter Annex, Vigilant Warrior and Lake Martin Recreation Area in Alabama.

MAFB consists of approximately 2,527 acres of land with nearly all being improved or developed in some manner. Occupied buildings, structures, pavements, and landscaped building make up approximately 700 acres, and the runways, taxiways, and adjacent infield account for approximately 880 acres. A golf course, playgrounds, picnic areas, and a few recreational lakes make up the remaining land. MAFB encompasses Gunter Annex, Vigilant Warrior Training Site, Lake Martin Recreation Area, Next Generation Radar (NEXRAD) which consist of over 1,000 acres of easements, right-of-ways, and clear zones (**Table 3**).

Table 3. MAFB Property Managed through Ownership, Lease, Easement or Right-of-Way

Property Area	Acres Owned	Acres Permitted (lease, easement, or right-of-way)
Maxwell Air Force Base	2,527	1,000
Gunter Annex	377	0
Vigilant Warrior Training Site	0	201
Lake Martin Recreation Area	0	46
Next Generation Radar (NEXRAD)	2	0
Total Acreage	**3,153**	

There are 3 access gates at MAFB, with the Maxwell Boulevard Gate being the primary main gate with 24-hour access.

Gunter Annex

Gunter Annex was formerly Gunter AFB until it was consolidated with Maxwell AFB in 1991. Gunter Annex is located approximately 10 miles east of the main base in the north-east suburbs of Montgomery, Alabama. Gunter Annex consists of approximately 377 acres of fully develop land with buildings and structures supporting Air University academic schools, combat information systems and network operations. There are 2 access gates for Gunter Annex, with the primary gate being, Congressman Dickenson Drive Gate.

Vigilant Warrior Training Site

The Vigilant Warrior Training Site in Elmore County, Alabama is located near Lake Jordan, and is approximately 18 miles north of MAFB. MAFB currently utilizes the Vigilant Warrior Training Site to support its mission of training airmen. The 201 acre semi-developed training site is leased by the Air Force from Alabama Power Company. Prior to the Air Force leasing the property, Alabama Power Company leased the site as a hunting area. Since the Air Force lease, the property has been used as a field training facility that includes semi-permanent tent sites, a warehouse, a camouflaged building, bathhouses, a dining facility, and other related structures. The remainder of the property is largely wooded with a network of trails traversing the site. There are two small streams that drain into nearby Lake Jordan. Alabama Power Company retains the authority to oversee natural resources on the property and must approve changes in proposed activities and facilities on the property.

Lake Martin Recreation Area

Lake Martin Recreation Area (LMRA) is leased from Alabama Power Company, consisting of 46 acres in Tallapoosa County Alabama. The site is located approximately one hour away from MAFB on Lake Martin Reservoir and includes picnicking, camping, RV sites, mobile home rentals, cabins, laundry facility, playground, swimming area, fishing area, boat ramp, boat rental, and boat storage areas. Active duty

military, reserve, National Guard, DoD civilians, retired military, retired DoD civilians, DoD contractors (listed) and dependents of listed personnel are authorized to use LMRA and make reservations at https://www.lifeatthemax.us/lake-martin/.

Next Generation Radar Site

MAFB operates the Next Generation Radar (NEXRAD) Doppler Weather Radar site, located approximately 45 minutes away from the main installation. NEXRAD is a radar tower designed to detect severe weather events such as tornados, hail, and excessive rain events that could cause significant flooding and snowfall amounts. There are no significant natural resources on this site.

2.1.2 Installation History

Maxwell Air Force Base

Maxwell Air Force Base (MAFB) is one of the most historic Air Force bases. Its history spans over a century of aviation in Central Alabama beginning with the Wright Brothers. MAFB was built on a site where the Wright Brothers conducted civilian flight school in 1910.

Wright Brothers Flyer

In 1918, the Army leased the property and established an aviation repair depot to ensure the supply of planes and engines. In 1920, the U.S. Government purchased the property, and, in 1921, Maxwell became the home of the 22nd Observation Squadron and the 4th Photo Section.

In 1928, it was announced that Maxwell would become the home of the Air Corps Tactical School, then located at Langley Field.

Additional acreage was acquired to house the facilities for the new school. In 1929, construction started on a school (Building 800), a hospital (Building 713), an observation and parachute building B (building 844), two-story duplex, NCO Quarters, hangars, and warehouses. In 1931, the government acquired an additional 600 acres north and east of the original field. Officers' quarters constructed in this area formed a suburban enclave separated from the main post. French Provincial Revival style dwellings lined curved streets. The officers' club, the bachelor officers' quarters, and the golf course also were built in this section.

During World War II, Maxwell was expanded, and barracks were constructed throughout the installations. At the end of World War II another significant mission change occurred for MAFB. On March 12, 1946, the Army Air Forces (AAF) renamed the AAF School and it became the Air University. Since then, Air University has become the Air Force's postgraduate academic center for professional officer and enlisted military education, professional continuing education, and professional specialized education (Kane, 2017).

Gunter Annex

Gunter Field (later Gunter Annex) was established in 1941 and was the first installation approved for Basic Flight Training. Students from the Army, Great Britain, France, and Canada attended Basic Flight Training or Primary Training for 10-weeks or 70 flying hours. During World War II, Gunter Field served as a flying school with over 400 aircraft, instructors, and support personnel assigned. After World War II, Gunter Field

training ended and flight training and aircraft were transferred to Spence Army Air Field, Georgia and Maxwell Army Air Base.

In 1948, Gunter Field was renamed Gunter Air Force Base (GAFB), and the Air University Extension Course Institute was established. In 1957, the Semi-Automatic Ground Environment or SAGE Data Center was established as an early Air Force continental air defense network.

In 1971, approximately 800 acres of leased land adjoining the eastern side of the base were returned to the City of Montgomery. This parcel of returned land included the former runways, and is now the Gunter Industrial Park. In 1973, Gunter AFB was re-designated Gunter Air Force Station (AFS). Gunter AFS was consolidated with Maxwell AFB in 1991 and is now known as Maxwell AFB Gunter Annex, under the host unit, 42 ABW, Maxwell AFB (Shaw, 2004).

2.1.3 Military Missions

Maxwell Air Force Base is a United States Air Force Education and Training (AETC) base, and headquarters to the 42d ABW and Air University (AU). MAFB's primary mission is to provide support to AU, the professional military education center of the Air Force, and to serve as a training site for over 90% of all Air Force officers. (USAF 2004a). MAFB is located in Montgomery County, within the city limits of Montgomery, Alabama, and comprises the Main Base and Gunter Annex. The host unit for Maxwell AFB and Gunter Annex is 42 ABW, which is responsible for providing base-level services and support. Tenant organizations at Maxwell AFB are the United States Air Force Historical Research Agency, the Community College of the Air Force, the Headquarters Air Force Reserve Officer Training Corps, the Maxwell Federal Prison Camp, and several other schools for education, graduate education, and professional continuing education for officers, noncommissioned officers, and civilians to prepare them for command, staff, leadership, and management responsibilities. In addition, AU is responsible for research in designated fields of aerospace, education, leadership, and management, and contributes to the development and testing of Air Force doctrine, concepts, and strategy (USAF 1994).

The 42nd ABW today provides personnel, financial, civil engineering, information technology, and police and fire protection services to numerous organizations besides Air University, such as the 908th Airlift Wing (Air Force Reserve Command), the National Headquarters of the Civil Air Patrol, and the Business Enterprise System Directorate, Air Force Life Cycle Management Center (Air Force Materiel Command).

Maxwell AFB is an operational airfield, serving four C-21 aircraft operated by the 54th Airlift Wing (AW) Flight and eight C-130 aircraft operated by the 908 AW. The wing supports more than 25,000 active duty, reserve, civilian and contractor personnel; students; family members, and military retirees and maintains over 4,100 acres of land and 859 buildings, including nearby Gunter Annex. The wing is the largest employer in Montgomery County, and contributes a total of nearly $2.56 billion in economic impact (indirect jobs created, annual base payroll, and annual contracts) in the Central Alabama region (Montgomery Area Chamber of Commerce Economic Development 2018).

Description of the major units and tenants at MAFB are provided below:

<u>42d Air Base Wing</u>

The 42nd Air Base Wing is assigned to AETC and is the MAFB host unit supporting all activities of the Air University, 908th Airlift Wing, BES Directorate, and subordinate tenant units (**Table 4**).

<u>Air University</u>

Air University conducts professional military education, graduate education, and professional continuing education for officers, airmen, and civilians to prepare them for command, staff, leadership, and management responsibilities. Specialized and degree-granting programs provide education to meet Air Force requirements in scientific, technological, managerial and other professional areas. In addition, Air University is responsible for research in designated fields of aerospace education, leadership and management, and contributes to the development and testing of Air Force doctrine, concepts and strategy.

Business and Enterprise Systems Directorate

The Business and Enterprise Systems Directorate at Gunter Annex is part of the Air Force Life Cycle Management Center and the information technology leader for the Air Force and Department of Defense (DoD). The system delivers information technology solutions to secure combat information systems and networks.

908th Airlift Wing

The 908th Airlift Wing is an Air Force Reserve unit that operates C-130 aircraft, providing world-wide airlift support.

42d Mission Support Group

The 42d Mission Support Group provides for the security and proper care of MAFB personnel and facilities. It includes the 42d Civil Engineer Squadron (CES), 42d Communications Squadron, 42nd Contracting Squadron, 42d Force Support Squadron (FSS), 42d Logistics Readiness Squadron, 42nd Security Forces Squadron, and 42d Operations Support Flight. The 42d CES includes the engineering and environmental flights which are responsible for planning, developing, and managing contract programs to construct, improve, and maintain over 3,000 acres of land.

42d Medical Group

The 42d Medical Group is responsible for providing medical and dental care to support all wing and associated units.

42d Civil Engineer Squadron

The 42d Civil Engineer Squadron (CES) is responsible for many installation functions including, facility maintenance, utilities, unaccompanied housing, engineering, fire and emergency services, readiness and emergency management, explosive ordinance disposal, and environmental management. They also plan, program and execute all construction activities on the installation.

Table 4. Listing of MAFB Tenants and Natural Resources Responsibilities	
Tenant Organizations	**Natural Resources Impact and Responsibility**
Air Force Historic Research Agency	Minimal natural resources impact MAFB Environmental Management System (EMS)
Air Force Legal Information Services	Minimal natural resources impact MAFB Environmental Management System (EMS)
Air Force Judge Advocate General's School	Minimal natural resources impact MAFB Environmental Management System (EMS)
Air Force Logistics Management Agency	Minimal natural resources impact MAFB Environmental Management System (EMS)
Air Force Program Executive Office Enterprise Information System	Minimal natural resources impact MAFB Environmental Management System (EMS)
Army and Air Force Exchange Service	Minimal natural resources impact MAFB Environmental Management System (EMS)
Civil Air Patrol National Headquarters	Minimal natural resources impact MAFB Environmental Management System (EMS)
Defense Commissary Agency	Minimal natural resources impact MAFB Environmental Management System (EMS)
Environmental Protection Agency National Air and Radiation Environmental Lab	Minimal natural resources impact MAFB Environmental Management System (EMS)
Federal Prison Camp	Minimal natural resources impact The Federal Prison Camp maintains its own EMS, operated independently of the Base EMS program
Air Force Counter-proliferation Center Headquarters	Minimal natural resources impact MAFB Environmental Management System (EMS)
Troy University	Minimal natural resources impact MAFB Environmental Management System (EMS)

2.1.4 Natural Resources Needed to Support the Military Mission

Natural resources needed to support the military mission include healthy vegetation for soil stabilization and adequate undeveloped open space. Undeveloped areas on the base are used for airfield buffering and ground-based contingency training and exercises. The abundance and health of natural resources on MAFB also provide outdoor recreation opportunities and general quality-of-life enhancements that contribute to the overall mission. A healthy natural environment and proactive natural resources management program will continue to enhance the viability of MAFB to support the Air Force mission.

This INRMP integrates aspects of natural resources management into the military mission. As such, it becomes the primary tool for ecosystem management at MAFB while ensuring the successful, efficient accomplishment of the military mission. A multiple-use ecosystem management approach will be implemented to accommodate mission-oriented activities and provide for good stewardship, thereby maintaining and improving the quality, aesthetic values and ecological relationships of the environment.

2.1.5 Surrounding Communities

Montgomery County, Alabama

Located in the south-central part of the state along the Alabama and Tallapoosa Rivers, Montgomery County is 793 square miles and has a population of 226,646 people. As the state capital and county seat, Montgomery is the largest city in the county and second largest city in the state. Mirroring larger cities in Alabama, Montgomery has experienced marginal population growth (0.24%) over the past decade. Montgomery's population over past few years has declined approximately 0.33%. MAFB is the leading employer and significant economic impact to Montgomery County and surrounding communities. Twenty-five percent (25%) of the jobs in the county are governmental entities, along with other categories such as, education (22.2%), retail (11.9%), manufacturing (11.5%), public administration (11.3%), entertainment (10.5), and other industries making up the Montgomery County workforce (U.S. Census Bureau 2017).

The general land use characterization of Montgomery County is mostly developed, with counties to the east-southeast of MAFB being a mixture of industrial, commercial, and residential. Counties to the northwest of MAFB are commercially developed along major roads and rural agriculture tracts and grazing parcels to the west and southwest. Counties with potential impact to MAFB properties include the following:

Elmore County, Alabama

Elmore County is approximately 622 square miles that was created from equal sections of Coosa, Autauga, Tallapoosa, and Montgomery Counties. Located in the east-central part of the state along the Tallapoosa and Coosa rivers, the county has a population of 81,667 people, making it the third fastest growing county in the state. Other population centers in Elmore County include Eclectic, Coosada, Tallassee, Elmore, Deatsville, Millbrook, and the county seat Wetumpka. The economy historically was based on agriculture, but 2016 Census workforce data for Elmore County was divided among categories such as: educational services (19.7%), manufacturing (12.6%), public administration (12.2%), and retail (10.7%), along with many other industrial services (U.S. Census Bureau 2017).

The MAFB Vigilant Warrior Training Site is located approximately 38 miles northeast of MAFB on the eastern shore of Lake Jordan near the communities of Titus and Wetumpka in Elmore County. Vigilant Warrior Training Site is leased from Alabama Power Company and semi-developed for military training. The surrounding area is primarily rural, forested, and undeveloped. A small number of permanent or seasonal residences are to the south of Vigilant Warrior along the shore of Lake Jordan, and recreational water activities in the surrounding areas center on the use of lake.

Autauga County, Alabama

Autauga County is 595 square miles located approximately 17.5 miles from MAFB. The Alabama River runs along the county's southern border, along with numerous creeks. The city of Prattville serves as the county seat and the largest city in the county with a population of 55,504 (U.S. Census Bureau 2017).

Autauga County hosts several parks and recreational areas for outdoor activities. The Robert Case Pine Hill Preserve in Autauga County is a 374 nature conservancy property developed to protect the federally endangered Alabama canebrake pitcher-plant (*Sarracenia rubra* ssp. *alabamensis*). The carnivorous pitcher plant is only know to grow in Autauga and Chilton counties, and believed to occur adjacent to MAFB in Montgomery and Elmore Counties.

Tallapoosa County, Alabama

Tallapoosa County is located in east-central Alabama approximately 70.6 miles from MAFB. Consisting of 701 square miles, Tallapoosa County has an estimated population of 40,681, with the largest city being Alexander City. Tallapoosa County is bisected by the Tallapoosa River with Lake Martin located in the

middle section of the river between Elmore and Coosa Counties. Farming was the primary occupation but began to shift to a more industrial economy in the twentieth century. Recent 2016 Census workforce data for Tallapoosa County is divided among categories: manufacturing (24.6%), educational services (23.5%), retail (9.2%), construction (7.6%), and arts (5.9%) along with many other industrial services. **Table 5** shows demographic information for Montgomery, Elmore, Autauga, and Tallapoosa Counties, AL as of 2016 (U.S. Census Bureau 2017).

Table 5. Local Area Demographics

Geographic Unit	Population	Median Household Income	Percent of Individuals Below Poverty Level
Montgomery, AL	226,646	$46,545	21.3%
Elmore, AL	81,667	$54,981	12.0%
Autauga, AL	55,504	$55,317	13.4%
Tallapoosa, AL	40,681	$42,181	18.3%

2.1.6 Local and Regional Natural Areas

There are several regional areas that have significant natural features in the area surrounding MAFB including parks, backwater lakes, impoundments, and the Alabama River. The Alabama River is an extensive navigable water feature that supports a wide variety of flora, fauna, and recreational activities. Northeast of MAFB is the Coosa River watershed that starts in Tennessee and eventually reaches the Tallapoosa River to form the Alabama River. There are 6 dam impounds (Weiss Lake, Logan Martin Lake, Neely Henry Lake, Lay Lake, Mitchell Lake, Lake Jordan) on the Coosa River for Alabama Power Company.

Approximately 8.3 miles southwest of MAFB on the backwaters of the Alabama River is The Army Corps of Engineers Gunter Hill Park. Gunter Hill is a popular campground that provides a natural setting that includes camping, boating, fishing, and hiking. Located on the Coosa River and 30 miles north of MAFB is Lake Jordan. The 6,800 acre impoundment is a popular natural setting with scenic views and water recreation area for boaters and anglers.

Powder Magazine Park is a community park near downtown Montgomery and adjacent to MAFB. The park provides a natural setting for scenic views, picnic areas, a historical structure, and boat ramp for access to the Alabama River. In 2011, the city of Montgomery initiated a Maxwell Boulevard Neighborhood Plan that would connect downtown Montgomery with MAFB along the Alabama River.

There are numerous parks, trails, lakes, water features and natural areas scattered throughout and near Montgomery County. Lake Martin is an important economic, recreation, and hydroelectric power site for the state of Alabama. MAFB leases 46 acres from the Alabama Power Company recreation area, and includes spots for day picnicking with grills, rough camping, 30 RV sites with water and electrical hook-ups, areas are run by the Montgomery Parks and Recreation Department (http://www.funinmontgomery.com/parks), and provide athletic and recreation amenities to the public. Parks and open space natural areas shape the physical environment of Montgomery County and enhance neighborhoods through natural resources conservation. Residents and visitors of Montgomery County have identified parks, trails, and recreational facilities as a valuable community asset.

2.2 Physical Environment

A brief summary of the natural environment at MAFB is provided in the following sub-sections. A complete, detailed summary is provided in **Appendix D** and a summary of special status, threatened, and endangered species is provided in **Appendix G**.

2.2.1 Climate

A summary of climate information such as temperature and precipitation of Montgomery County is provided in in **Appendix D.**

2.2.2 Landforms

Maxwell AFB runway is 170.8 ft above mean sea level (MSL) and located south of the Appalachian Mountains within the East Gulf Coastal Plain physiographic region and Coastal Plain province of the Atlantic Plain region (**Figure 6**).

The East Gulf Coastal Plain region covers the southern two thirds or 60% of the state and includes a wide variety of landscapes. It is characterized by low rounded or eroding hills and shallow valleys that gradually slope to the sea. The East Gulf Coastal Plain is separated from the other regions to the north by the Fall Line, which is the most important physiographic feature affecting the distribution of a number of Alabama's amphibians, reptiles, fishes, and mollusks. Landforms above the Fall Line are hilly, and streams above the Fall Line are generally swift with rocky bottoms. The land south of the Fall Line tends to be more flat, and streams below the Fall Line tend to be sluggish, with muddy or sandy bottoms. The Fall Line represents the approximate point where streams leave the upland valleys bounded by older, more resistant rocks in the northern part of the state to begin a gentle, winding path across a broader and more level flood plain. With less energy of flow below the Fall Line, rivers begin to drop some of their load of sediment carried down from the eroding uplands.

Gunter Annex in north Montgomery lies within the transitional Fall Line Hills sub-division of the East Gulf Coastal Plain. Maxwell main base lies within the Alluvial Deltaic Plain on the bank of the Alabama River. The topography of both MAFB and Gunter Annex is generally level with elevations averaging 168 feet (ft) above MSL at MAFB and 215 ft MSL on Gunter.

Vigilant Warrior Training Site and the Lake Martin Recreation Area in east central Alabama are found within the Piedmont Upland Physiographic region of the Appalachian Highlands (**Figure 6**). This region of mostly rolling hills extends into central Alabama from Georgia. It is somewhat mountainous near the northern boundary, but becomes less so toward the southern boundary. The areas around Vigilant Warrior Training Site and Lake Martin Recreation Area are relatively flat to moderately hilly. Elevations near Vigilant Warrior Training Site range from 200-350 ft MSL.

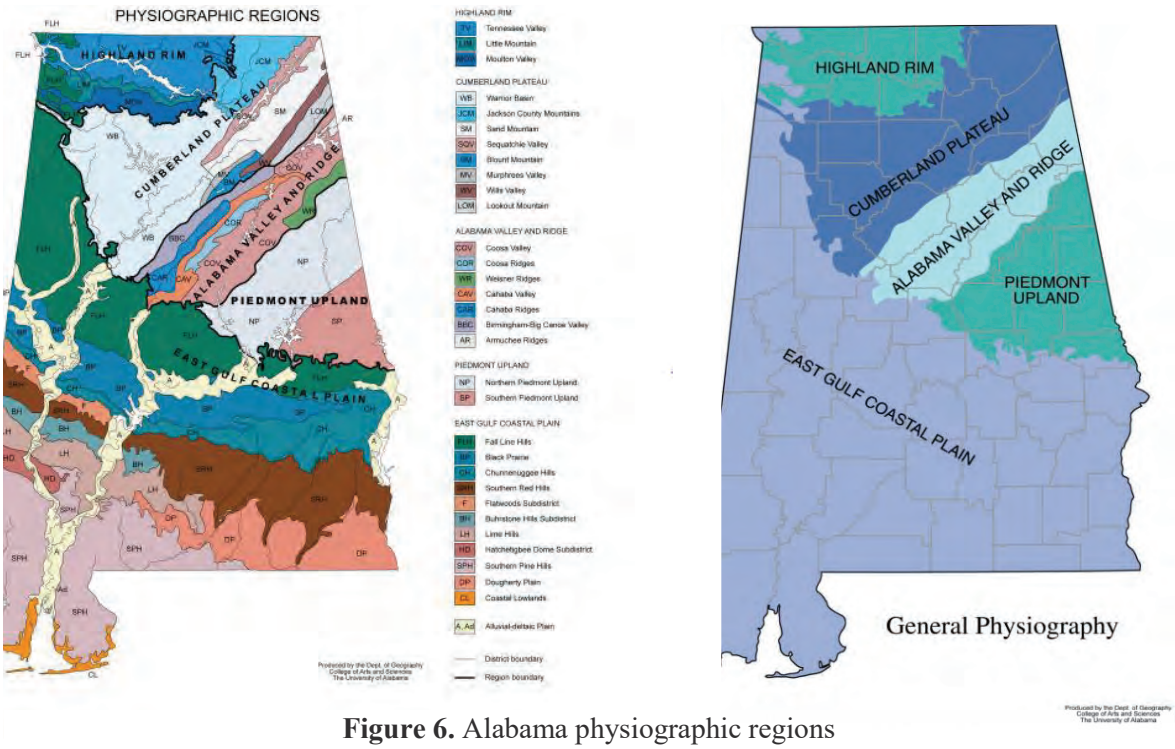


Figure 6. Alabama physiographic regions

2.2.3 Geology and Soils

The soil survey of Montgomery County, Alabama generally describes the Coastal Plains Region and most of the soils in this area are derived from marine and fluvial sediment that eroded from the Appalachian and Piedmont plateaus. Surficial geology is dominated by Quaternary Terrace and Alluvial deposits consisting of course sands, gravel, silts, and clays deposited over time by the Alabama River. (**Map C-17**).

Eight soil types have been identified and mapped on MAFB and associated property. On MAFB main base, most consists of Amite-Cahaba associated soils, which are typically found on level or sloping uplands of high stream terraces. The Cahaba-Wickham soils are typically found on level or gently sloping lowlands of floodplains and low stream terraces, and is present along the north and west base within the floodplain areas (**Map C-21**).

Gunter Annex has 6 soil types that have been mapped and belong to 2 main soil associations. Three of the 6 belong to the Amite Series, which covers about 95% of Gunter Annex. Developed mainly from old alluvium washed from well-drained upland soils, the Amite Series is deep and consists of a reddish-brown to grayish-brown surface layer and a red to strong brown, friable, sandy clay loam subsoil. On average, a soil profile for this series consists of dark-gray, sandy loam topsoil 3-4 inches thick (MAFB 2007 and **Map C-18**).

The soils of the Vigilant Warrior site include sandy loams of the Redbay, Orangeburg, Faceville, and Bowie series. The parent material of soils is moderate sands and sandy clays of the Coastal Plain. The Faceville series is highly to very highly erodible, while the other soil types are low to moderately erodible. A small amount of mixed alluvial soils is also present along the streambeds having mixed textures and variable drainage conditions. The soils are predominantly poorly-drained, with slow runoff and slow internal drainage (MAFB 2008 and **Map C-19**).

The predominant soil type at the Lake Martin Recreation Area is the Wedowee Series. This type of soil consists of very deep, well-drained, moderately permeable soils that formed from weathered igneous and metamorphic rocks of the Piedmont uplands. These soils are on narrow ridges and on side slopes of uplands. They are gravelly sandy loam soils, which are strongly acidic and moderately eroded.

Detailed characteristics of the soil series are provided in **Appendix D.1.3.**

2.2.4 Hydrology

2.2.4.1 Maxwell AFB

The hydrology and water management on Maxwell AFB property is complex due to both natural and man-made influences (**Map C-21**). The water table at MAFB ranges in depths from 4-40 ft. below the ground surface. The Eutaw formation is part of the Tuscaloosa Group aquifer system, and is the principal aquifer supporting the Montgomery County area and MAFB. The Eutaw aquifer formation depth is 100-200 ft. below ground surface and well yields typically produce 350-600 gallons per minute in support of domestic and stock use (Knowles et al. 1963).

Most of the ground water used at MAFB occurs under artesian conditions, with water-table conditions occurring in the Pleistocene terrace deposits and recent alluvium, and outcrop areas of the Eutaw formation. Ground water in Montgomery County is of chemical quality that is satisfactory for most uses, although locally it is high in iron or chloride content and is hard. Water from the Eutaw formation a few miles southwest of Montgomery's West well field is very high in chloride content. Eutaw formation water moves toward the cone of depression in the piezometric surface and is produced by pumping in the West well field. Much additional ground water could be pumped from the Eutaw formation, especially south of Montgomery's West well field. Additional water also is available from the upper part of the Coker formation. Before large groundwater developments are planned, well spacing and pumping rates should be studied in order to determine maximum development permitted by the supply use (Knowles et al. 1963). MAFB receives its potable water from the Montgomery Water Works and Sanitary Sewer Board (MWWSSB). MAFB has 3 wells that are used exclusively for irrigation of training fields and campus landscaping.

Watershed, Surface Water, and Drainage

Maxwell AFB is located on the western bank of the Alabama River within the Alabama Cahaba River Basin. The surface drainage patterns on MAFB are generally from the southwest to northeast towards the Alabama River. Due to the predominance of impermeable surfaces located throughout MAFB, localized ponding occurs during heavy rain events.

A network of existing inverts and storm water channels currently controls storm water runoff from MAFB. Due to the large amount of impermeable surfaces throughout the MAFB property, the volume of storm water runoff can be relatively high. The surface drainage patterns on MAFB are generally from southwest to northeast towards the Alabama River. Storm water from MAFB is routed to 4 outfalls that discharge to the river, and several other outfalls that discharge to other surrounding drainage ways. A majority of this storm water runoff flows through the on-base drainage system and pond prior to discharging into the Alabama River. Prominent water features on the base include lakes and drainage basins associated with the

river floodplains, several small ponds on the golf courses, and 2 small manmade fishing lakes on the southwest side of the base.

Any proposed construction in the developed areas of MAFB would have negligible impact on surface hydrology, and would include best management practices (BMPs) to alleviate runoff, sedimentation, and erosion. National Pollutant Discharge Elimination System (NPDES) permitting for point and stormwater discharges has been delegated to the State of Alabama. Individual and general stormwater permits require the applicant to develop and implement a pollution prevention plan and in some instances, monitor discharges for specific pollutants. Alabama Department of Environmental Management (ADEM) Municipal Separate Storm Sewer System (MS4) Phase II NPDES General Permit issued to MAFB covers the Phase II Stormwater Program (MAFB 2005).

The installation operates a pumping station that withdraws surface water from the Alabama River for golf course irrigation. Water withdrawal is reported annually to the Alabama Department of Economic and Community Affairs, as required.

Impoundments

There are a number of impoundments and open-water bodies on MAFB. The largest are 13 base recreational lakes and ponds, 6 streams and drainages and 19 wetlands. Of the total base acreage, lakes and ponds comprise approximately 115 acres, streams and drainages are 5.5 acres, and wetlands cover approximately 21 acres of land (**Figure 7**).

Figure 7. Impoundment on MAFB.

2.2.4.2 Gunter Annex

Watershed and Drainage

Gunter Annex is located within the Alabama Cahaba River Basin on the western bank of the Alabama River. Surface drainage patterns on Gunter Annex generally flow from northeast to southwest towards Three Mile Branch. Most stormwater is collected in surface drains where it flows into Montgomery municipal underground drainage ways off the installation. Due to the high proportion of impermeable surfaces on Gunter Annex, the volume of stormwater is moderate to high, and localized ponding will occur during heavy rain events. There is a 2,000 foot perennial stream section not owned by Gunter Annex on the western boundary that borders Three Mile Branch Creek. This perennial stream is the main surface water in the area, and flows north to join the Galbraith Mill Creek and eventually discharges into the Alabama River (**Map C-22**). Due to urban development, Three Mile Branch Creek along Lower Wetumpka Road has been listed by ADEM for exceeding the Clean Water Act Section 303(d) Total Maximum Daily Loads (TMDL) for pesticide (Dieldrin), siltation and the bacterium Escherichia coli.

The groundwater resources at Gunter Annex are highly responsive to surface water conditions due to extremely permeable soils at shallow depths (3.5 - 40 ft. below ground surface). Installation water level measurements indicate that groundwater flow varies across the installation, from a westerly flow in the western portion near Three Mile Branch Creek, to a north and northwest flow in other sections of the installation. Recharge occurs by precipitation falling on any exposed portions of the surface and from the terrace deposits at higher elevations. Gunter Annex obtains its water supply from the Eutaw, Gordo, and upper and lower Coker aquifer systems, and since there are no water production wells on the installation, Gunter Annex receives its water supply from MWWSSB (MAFB 2002b).

Any proposed construction would have negligible impact on surface hydrology, and would include best management practices (BMP) to alleviate runoff, sedimentation, and erosion. National Pollutant Discharge Elimination System (NPDES) permitting for point and stormwater discharges has been delegated to the State of Alabama. Individual and general stormwater permits require the applicant to develop and implement a pollution prevention plan and in some instances, monitor discharges for specific pollutants. Alabama Department of Environmental Management (ADEM) Municipal Separate Storm Sewer System (MS4) Phase II NPDES General Permit issued to Gunter Annex covers the Phase II Stormwater Program (MAFB 2005).

Impoundments

There are no impoundments at Gunter Annex.

2.2.4.3 Vigilant Warrior Training Site

Watershed and Drainage

Vigilant Warrior Training Site located near Lake Jordan, is part of the Coker and Gordo Formations which are found at the surface and overlay metamorphic water-bearing rocks. Groundwater is closely tied to the regional geology, and the Coker aquifer is the primary water source for Elmore County. Estimated well yields for the Coker Formation are 0.1-0.5 million gallons per day (Jennings et al. 2008). In elevations below 300 ft. mean sea level (MSL), water permeability drops and wells produce less than 0.1 million gallons per day (MAFB 2008). Larger water yields may occur in cavities, and permeability may increase near stream sites. Regional recharge areas for groundwater occur to the north and northeast.

According to the Elmore County Water Authority, groundwater quality is determined by aquifer characteristics, and is considered good in the area. Potable water has low chloride levels and low hardness at 0-6 parts per million (ppm), but iron and manganese content may be elevated in the area (**Map C-23**).

Surface Water

Surface water is the prevailing hydrology feature at Vigilant Warrior Training Site, but restricted to 2 small streams associated with Lake Jordan and the Alabama Coosa River Drainage Basin. Additional Vigilant Warrior property drainage information can be found in the Biological Survey for Vigilant Warrior, Elmore County Alabama (MAFB. 2016). According to the National Oceanic and Atmospheric Administration (NOA) National Weather Service, precipitation averages 52 inches annually in the river basin, and surface water is affected by stream and tributary influences. Seasonal variations in precipitation will affect stream flow, with flow being lowest in October and typically increases in November-January due to winter rain and decreased evaporation. Peak stream flows and surface water coincides with spring rains and diminishes during the summer months due to reduced rainfall and increased evaporation.

Impoundments

There are no impoundments at the Vigilant Warrior Training Site.

2.2.4.4 Lake Martin Recreation Area

Watershed and Drainage

Lake Martin Recreation Area is located on the Lake Martin Reservoir and was formed by the construction of the Martin Dam in 1926 on the Tallapoosa River. Built on the Cherokee Bluffs geological formation, alluvial deposits, and Coastal Plains physiographic sediment, Martin Dam created what was considered the world's largest artificial lake (**Map C-24**).

Groundwater is closely tied to the regional geology, and the Metasedimentary aquifer that overlies the Eutaw and Gordo Formations, along with the Tallapoosa River, are the primary water sources for Tallapoosa County. Estimated well yields for the Eutaw Formation are >1500 gallons per day at 400 ft. mean sea level (MSL). Larger water yields may occur in cavities, and permeability may increase near stream sites. Regional recharge areas for groundwater occurs to the north and northeast (Scott et al. 1987).

According to the Tallapoosa County Water Authority, groundwater quality is determined by aquifer characteristics, and is considered good in the area. Potable water has low chloride levels at concentrations ~500 milligrams per liter.

Surface Water

Surface water is the prevailing hydrology feature at Lake Martin Recreation Area, along with aquifer recharge occurring primarily in outcrop formations. According to the National Oceanic and Atmospheric Administration (NOA) National Weather Service, precipitation averages 50 inches annually, and surface water is affected by outcrop and tributary influences. Seasonal variations in precipitation are uniform throughout the area, with mean annual rainfall from 6.9 inches in March to 3.4 inches in October.

Impoundments

There are no impoundments at the Lake Martin Recreation Area.

2.3 Ecosystems and the Biotic Environment

2.3.1 Ecosystem Classification

The biotic environment can be divided and classified based on climate, geologic structures, and undisturbed vegetative communities. MAFB and its properties are classified using the National Hierarchical Framework of Ecological Units (Cleland et al., 1997), also known as Bailey's Ecoregions, which starts with the broad category Domain, and narrows down to the Division, Province, and Section. MAFB, Gunter Annex, Vigilant Warrior Training Site, and the Lake Martin Recreation Area are located in the Humid Temperate Domain, Subtropical Division, and Coastal Plain-Middle Section ecosystem. MAFB and Gunter Annex are on the northern edge of the Outer Coastal Plain Mixed Province, with Vigilant Warrior Training Site and Lake Martin Recreation Area on the Southeastern Mixed Forest Province. The specific Coastal Plain-Middle Section of MAFB properties is described below.

Coastal Plain-Middle Section

Coastal Plain-Middle Section falls within the Coastal Plain Mixed and Southeastern Mixed Forest Provinces, with the predominant landform consisting of moderately dissected, irregular plains of marine origin formed by deposition of continental sediments onto submerged, shallow continental shelf, which was later exposed by sea level subsidence. Elevation ranges from 80-650 ft. (25-200 m). Local relief ranges from 100-300 ft. (30-90 m).

Ecoregions are in part defined by shared biotic and abiotic characteristics, representing practical units on which to base conservation planning. Moreover, the hierarchical nature of Bailey's Ecoregion Classification allows for conservation management to be planned and implemented at a variety of geographical levels, from small scale programs focused on discrete sections, to much larger national or international projects that target divisions (Cleland et al., 1997). Rock units in this section consist primarily of those from the Mesozoic (40%) and Cenozoic (60%) rock unit eras. The Mesozoic rock strata consist of Cretaceous marine sediments (sands and clays). Cenozoic strata consists of Tertiary marine deposits (siliceous strata with lignitic, sandy, and argillaceous deposits).

Climate in this Section is typified by annual precipitation levels ranging from 40-60 inches (1,020-1,520 mm). Temperature averages 60-68°F (16-20 C), and the growing season lasts about 200-280 days. (Cleland et al., 1997). Vegetation communities in this Section are oak-hickory-pine forest, blackbelt forest, and oak-hickory forest. The predominant vegetation form is evergreen, needle-leaved forest with cold-deciduous, broad-leaved trees. The principal forest cover type consists of loblolly pine (*Pinus taeda*) and shortleaf (*Pinus echinata*) pine with hardwoods, including sweetgum, (*Luquidambar sturaciflua*) flowering dogwood (*Cornus florida*), elm (*Ulmus Americana*), red cedar (*Juniperus virginiana*), southern red oak (*Quercus falcata*), and hickories (*Carya* spp.). In central Alabama the hardwood component may be dominant, depending on soil moisture regime and past disturbance. A narrow band of oak-hickory forest type occurs along the extreme western edge of the Section, adjacent to flood plains of the Mississippi River and along major river bottoms.

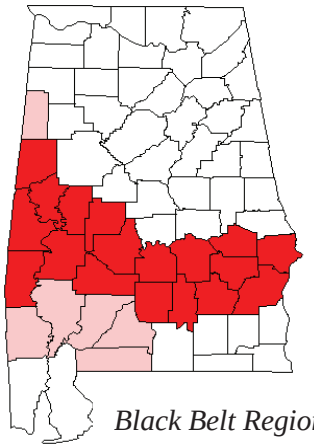
Common large to medium sized mammals in this Section include, white-tailed deer, black bear, bobcat, gray fox, raccoon, gray squirrel, fox squirrel, eastern chipmunk, white-footed mouse, pine vole, short-tailed shrew, and cotton mouse. The turkey, ruffed grouse, bobwhite, and mourning dove are game birds in various parts of this Section. Songbirds include the red-eyed vireo, cardinal, tufted titmouse, wood thrush, summer tanager, blue-gray gnatcatcher, hooded warbler, and Carolina wren. The herpetofauna include the box turtle, common garter snake, and timber rattlesnake (Cleland et al. 1997).

2.3.2 Vegetation

The vegetation on MAFB and associated properties includes terrestrial plant communities, as well as wetlands communities, and threatened, endangered, or sensitive plant species. The historic vegetation at MAFB properties is similar to what is described for the Bailey's ecoregion provinces discussed in **Section 2.3.1** of this report.

2.3.2.1 Historic Vegetation Cover

Historically, the ecoregions of Alabama were a mosaic of ecotypes, predominantly comprised of long-leaf pine (*Pinus palustris*) forested systems along with fragmented Black Belt region prairies. This forested system of the Coastal Plain occurred mostly throughout rolling uplands, while short-grass prairie lands, or the Black Belt region, were found along sloping low terraces with good soil and drainage. The Black Belt region is a wide belt of rich topsoil that runs from east to west, and encompasses over 18 Alabama Counties.

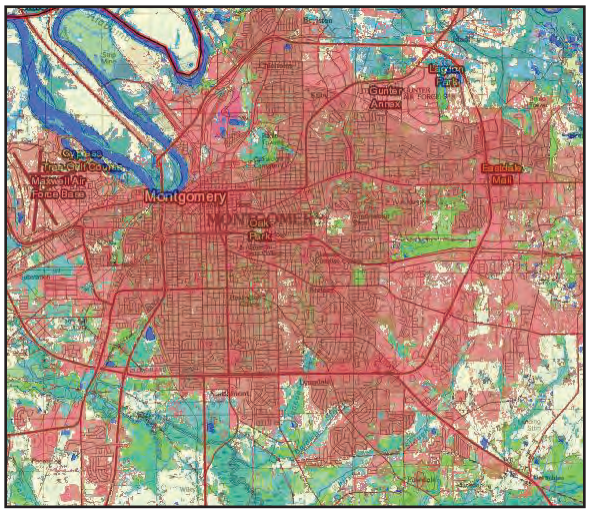


Black Belt Region, AL

Fire is possibly the most important natural process affecting the composition, density, and vegetation structure of the long-leaf pine ecosystem. Where fire is more frequent the region may develop a relatively pure canopy of Long-leaf pine characterized by an open woodland structure with scattered over story trees and an herbaceous-dominated understory. Long-leaf pine distribution boundaries described, indicate where the system formed the historical landscape matrix, with smaller patches of the system present in limited areas both north and south of the boundaries.

With the advent of settlements by European immigrants in the mid-1800s, fire suppression and overgrazing by livestock began to transform the Coastal Plain region into urban development, agricultural, and grazing livestock/shrubland (**Figure 8**). In the late 1800s, these rich, vast stands of longleaf pine fed the expanding timber industry in Alabama. By the late 1920s, the old-growth forests were virtually gone and timber growers replaced longleaf pine with faster-growing shortleaf, slash, and loblolly pine varieties (MAFB 2015).

Source: Fletcher Hales 1949



Source: USGS National Gap Analysis

Figure 8. Montgomery County Urban Development 1842 – 2018.

2.3.2.2 Current Vegetation Cover

A complete list of plant species detected in Montgomery, Tallapoosa, and Elmore Counties are listed in **Appendix D.1.2.**

2.3.2.2.1 Maxwell Air Force Base

Vegetation communities on MAFB did not have distinctive characteristics, and can be split between 2 small fragmented plant communities. MAFB is within the Eutaw Belt of the Central Pine Belt region, and dominated by bottomland and floodplain forests and floodplain marsh communities. The urban forest areas consist of hardwoods and hardwood dominated lowland areas (wetlands or floodplains), with maintained grassy areas of varying species, types, condition class, site indices, stocking levels, and operating conditions. Almost all the areas that were former crop fields or former farmsteads still clearly exhibit the effects of that disturbance through reduced native plant diversity and missing native species. There are no natural wooded or forested communities (with the exception of the 2 small tracts mentioned in section 2.3.2.2) or federally-listed endangered, threatened, or proposed species or their designated critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS) on MAFB.

The result of landscaping and urban forestry activity, planted trees include both native and non-native species. Mature canopy trees occur around the historic Officer's housing areas, with live oaks dominating. More recently planted trees are found in the industrial and administrative areas east of the airfield. Dominant tree species on base include slash pine, loblolly pine, live oak, water oak, pin oak, southern red oak, pecan, and sweetgum. On the golf courses, maturing trees help to create pleasing visual impact, define corridors of play, and protect golfers from stray shots. Dominant tree species on the golf course include: slash pine, loblolly pine, bald cypress, Chinese tallow tree, and water oak.

Open space must be maintained around the airfield, and these mowed grass areas have become pseudo-meadow habitats. Dominant field species include: crimson clover, Kentucky tall fescue, low-hop clover, bahia grass, and crabgrass. Other dominant vegetation in the wetland areas and along the shores of open waters, include soft rush, red maple, floating seed box, alligator weed, buttonbush, bald cypress, and black willow.

<u>Bottomland and Floodplain Forest Community</u>

Bottomland forests are deciduous or mixed deciduous evergreen on terraces and levees within floodplains and shallow depressions. They are softwood or hardwood forest tree species occurring in soils that are inundated with moisture due to their proximity to streams. According to the Nature Conservancy, urban development and agriculture has caused significant southern floodplain forests quality habitat loss, and warrant conservation concern (MAFB 2002c).

- Dominant species in the floodplain forests include: green ash, sycamore, southern hackberry, and sweetgum
- Dominant species in the canopy include: sycamore, green ash, and silver maple
- Dominant species in the understory include; bald cypress, water hickory, box elder, American holly, and honey locust
- Other common species include: Bradford pear, pecan, mountain laurel, crape myrtle, southern magnolia, sweet gum, live oak, and over 150 other species of cultivated plants and shrubs

<u>Floodplain Marsh Community</u>

Floodplain marsh communities are characterized as a wetland community in river floodplains, and dominated by herbaceous vegetation and shrubs. Most floodplain marsh communities are freshwater (salinity less than 0.5 parts per thousand), and permanent standing water may prevent most tree and shrub growth, and represented as small, isolated patches within or adjacent to floodplain forests.

- Dominate species in floodplain marsh communities are sedges, grasses, forbs and include: coastal cockspur, bagpod, catchfly grass, woolgrass and water pepper
- Other dominant invasive plant communities: Chinese tallow, bamboo, kudzu, mimosa, chinaberry, Japanese Honeysuckle, Japanese climbing fern, Chinese privet, Japanese privet, Johnson grass, Dallas grass

There is currently an ongoing initiative to survey and treat invasive species occurring at MAFB. Due to installation anthropogenic disturbance, and spread of invasive species along the Alabama River, desirable native plant species were displaced. Subsequently, the disturbed areas allowed for the propagation of terrestrial and aquatic invasive plant species such as alligator weed, hyacinth, water primrose, and Chinese tallow. The priority non-native species targeted are listed in **Table 6**. In 2002, the Natural Heritage survey areas focused on linear features (i.e., roads, ditches, mowed rights-of-way) and expanded to improved and non-improved locations. Not all target species were located on MAFB but are known to occur in Montgomery County (**Table 6**).

Table 6. Potential and Documented Non-native Species in Montgomery County and MAFB			
Scientific Name	**Common Name**	**Documented in**	
		Montgomery Co.	**MAFB**
Flora			
*Triadica sebifera**	Chinese tallow tree*	X	X
*Ligustrum sinense**	Chinese privet*	X	X
*Albizia julibrissin **	Mimosa*	X	X
*Lonicera japonica**	Japanese honeysuckle *	X	X
*Sorghum halepense**	Johnson grass*	X	X
*Alternanthera philoxeroides**	Alligator weed*	X	X
*Melia azedarach**	China berry*	X	X
*Phyllostachys aurea**	Bamboo*	X	X
*Ligustrum japonicum**	Japanese privet*	X	X
*Pyrus calleryana**	Bradford pear*	X	X
*Lespedeza cuneata**	Chinese privet*	X	X
Paspalum dilatatum	Dallasgrass	X	X
Pueraria montana	Kudzu	X	X
Myriophullum spicatum	Eurasian Water Milfoil	X	
Rosa spp.	Invasive roses	X	
Hydrilla verticillata	Hydrilla	X	
Imperata cylindrica	Cogongrass	X	
Solanum viarum	Tropical soda apple	X	
Sturnus vularis	European starling	X	X
Passer domesticus	House sparrow	X	X
Solenopsis invicta	Red imported fire ant*	X	X

Source: Alabama Invasive Plant Species Council 2016
* = MAFB target invasive species

2.3.2.2.2 Gunter Annex

Gunter Annex is situated within the Eutaw Belt sub-region of the central Pine Belt. Due to permanent development across the installation, virtually no original vegetation or naturally wooded areas exist. Presently, vegetation on Gunter Annex mainly consists of urban or improved vegetative communities. Such plantings include ornamental trees and shrubs as the dominant vegetation and other common plant species (MAFB 2002c).

- Dominant species include: crape myrtle, Bradford pear, loblolly pine, hackberry, and various oak species
- Non-dominant species include: cherry, catalpa, sycamore, southern magnolia and pecan
- Other dominant invasive plant community: Chinese tallow

2.3.2.2.3 Vigilant Warrior Training Site

Vigilant Warrior Training Site is located in the Southern Inner Piedmont Sub-ecoregion (Griffith et al. 2001) of the Coastal Plain Province, and is an unmanaged forest with numerous trails and obstacle course. In December 2016, CCR Environmental, Inc. conducted a Biological Survey for Vigilant Warrior, and identified 4 primary vegetative communities; upland pine forest, upland hardwood forest, bottomland hardwood forest, and the woodland seep forest types. The 2016 Biological Survey is maintained in 42 CES/CEIE, Base Environmental Office.

Upland Pine Forest Community

The upland pine forest ecosystem is rolling terrain with a combination of well-drained loose soils supporting a shrub layer of grasses and herbs between widely spaced pines. The longleaf pine community has been degraded because of fire suppression, forest removal, and is being invaded with non-native plants. Herbaceous cover varies, from sparse to abundant, dependent upon the density and shading effects, and promotes many different species of forbs and grasses (MAFB 2002c, MAFB 2016).

- Dominant species in the upland pine forest include: southern red oak, water oak, and loblolly pine
- Other common species include: mockernut hickory, chinquapin, swamp dogwood, flowering dogwood, little-hip hawthorn, persimmon, honey locust, black walnut, red cedar, sweetgum, wax-myrtle, black cherry, Darlington's oak, post oak, winged sumac, sassafras, Chinese tallow, loblolly pine, sourwood, American holly, red maple, beautyberry, blackgum, sweetgum, dwarf pawpaw, American beech, white oak, basswood, winged elm and over 70 other species of cultivated plants, vines, and shrubs
- Other dominant invasive plant community: Chinese tallow, mimosa, and chinaberry

Upland Hardwood Forest Community

Upland hardwood forest communities are located on elevated slopes and characterized by overstory, shade tolerant deciduous trees with shrubs and herb type groundcover vegetation. Known for species diversity, upland hardwood forest communities do not tolerate fire and many native species will not re-establish if fire occurs. Upland hardwood forests are also significant protecting watersheds and minimizing soil erosion.

- Dominant species include: dwarf pawpaw, water oak, and sweetgum
- Other common species include: pignut hickory, flowering dogwood, persimmon, American holly, tulip-poplar, loblolly pine, black cherry, southern red oak, Darlington's oak, water oak, post oak, winged sumac, American beech, white oak, basswood, and sassafras
- Other dominant invasive plant species: Chinese tallow

Bottomland Hardwood Forest Community

According to the USDA Forest Service 2015 Forest Inventory, bottomland hardwood forest communities occupy approximately 2.7 million acres of land in Alabama. They occur along low-lying lands of floodplains, wetlands, streams and rivers. Due to routine flooding, stream deposits, and natural weathering, these ecosystems are comprised of alluvial soils that support many different species of deciduous and evergreen hardwoods, shrubs, and wildlife. Bottomland hardwood forests play an important role in controlling soil erosion, maintaining water quality, recharging groundwater, and preventing flood damage.

- Dominant species include: basswood, American beech, and white oak
- Other common species include: pignut hickory, persimmon, sweetgum, tulip-poplar, ironwood, loblolly pine, southern red oak, and water oak
- Other dominant invasive plant species: chinaberry

Woodland Seep Community

Woodland seep communities are typically small areas of saturated herbaceous wetlands in upland mixed-pine forests that occur along steep slopes, where groundwater discharges, or close to stream headwaters. Seeps are typically dominated with rare and unusual flora and fauna species, and vegetation litter due to soil saturation and downed trees.

- Dominant species include: blackgum, American holly, red maple, beautyberry, net leaf-chain fern, and slender spikegrass
- Other common species include: swamp dogwood, persimmon, sweetgum, tulip-poplar, sweetbay magnolia, swamp gum, loblolly pine, southern red oak, water oak, and black willow
- Other dominant invasive plant species: chinaberry, Chinese allow, Mariana maiden fern, mimosa, Japanese honeysuckle, autumn olive, Japanese climbing fern, and Chinese privet

2.3.2.2.4 Lake Martin – Gunter Recreation Area

The Lake Martin – Gunter Recreation Area is located in the Southern Inner Piedmont Sub-ecoregion (Griffith et al. 2001) of the Coastal Plain Province. It is a forested area with numerous trails. In 2002, the Nature Conservancy completed a Natural Community and Rare Plant and Animal Survey for MAFB, Gunter Air Force Base, and Maxwell – Gunter Lake Martin Recreation Area in 2002. Four natural vegetation communities were identified in the biological survey that occurred which are listed in **Table 7**.

Table 7. Vegetation Communities found on MAFB and Lake Martin-Gunter Recreation Area			
Location	**Community**	**Common Names**	**Scientific Names**
MAFB	Forest	sycamore	*Platanus occidentalis*
		green ash	*Fraxinus pennsylvanica*
		southern hackberry	*Celtis laevigata*
		sweetgum	*Liquidambar styraciflua*
MAFB	Herbaceous Vegetation	swamp smartweed	*Polygonum hydropiperoides*
		dotted smartweed	*Polygonum punctatum*
		catchfly grass	*Leersia lenticularis*
		whitegrass	*Leersia virginica*
Lake Martin – Gunter Recreation Area	Woodland	longleaf pine	*Pinus palustris*
		shortleaf pine	*Pinus echinata*
		Virginia pine / blackjack oak	*Pinus virginiana / Quercus marilandica*
		chestnut oak / Blue Ridge blueberry	*Quercus prinus* / *Vaccinium pallidum*
Lake Martin – Gunter Recreation Area	Forest	red maple	*Acer rubrum* var. *trilobum*
		blackgum / cinnamon fern	*Nyssa sylvatica / Osmunda cinnamomea*
		slender spikegrass	*Chasmanthium laxum*
		greater bladder sedge / Lescur's sphagnum	*Carex intumescens / Sphagnum lescurii*
Source: The Nature Conservancy Natural Community and Rare Plant and Animal Survey, 2002			

Seep Forest Community

This community is typically seepage-influenced forested wetlands in the Cumberland Plateau, Ridge, and Valley regions of Alabama. It often occurs along streamhead swales or on broad sandstone ridges where soils are sandy and saturated due to a combination of perched water table and seepage flow. Seeps are typically dominated with rare and unusual flora and fauna species, and some may lack a canopy causing them to be dominated by shrubs or herbs.

- Dominant species include: blackgum, Lescur's sphagnum, red maple, cinnamon fern, greater bladder sedge and slender spikegrass
- Other common species include: red maple, blackgum, tulip tree, sweetgum, American holly, American hornbeam, bigleaf magnolia, winterberry, hazel alder, great laurel, black chokeberry, poison ivy, climbing hydrangea, royal fern, slender woodoats, and the New York fern.
- Dominant invasive plants species include: Chinese tallow, mimosa, and chinaberry

Longleaf Pine Woodland Community

This is one of several associations representing longleaf pine stands of interior regions of the southeastern United States, including the Piedmont, Cumberland Plateau, and Southern Ridge and Valley. This community is dominated by pine and occurs on rolling sometimes mountainous upland slopes in Alabama. Vegetation is usually variable and dependent on previous disturbances and frequency of fire and the pine canopy can be open or closed depending on the vegetation composition.

- Dominant species include: longleaf pine, shortleaf pine, blackjack oak, chestnut oak, Blue Ridge blueberry and Virginia pine.
- Other common species include: iron oak, scarlet oak, eastern black oak, white oak, Spanish oak, blackgum, sourwood, red maple, sassafras, sand hickory, mockernut, sparkleberry, deerberry, evergreen shrub, North American prairie grass, silver bluestem, and dwarf violet iris.
- Dominant invasive plant species include: Japanese climbing fern

2.3.2.3 Future Vegetation Cover

The majority of vegetation on MAFB and Gunter Annex is landscaped lawns and improved grounds with planted shade trees and ornamental shrubs. Native vegetation species are non-existent at Gunter Annex and rare at MAFB, except along undisturbed areas adjacent to the Alabama River. Vigilant Warrior Training Site and Lake Martin Recreation Area vegetation is mostly native in undisturbed areas, with disturbed vegetation communities comprised of early successional and invasive weed species (MAFB 2002c and MAFB 2016). Historically, vegetation cover at MAFB and throughout Alabama has been influenced by prolonged fire suppression, clear cutting, human disturbances, disease, and climate change. Future vegetation species cover and habitat quality will continue to be altered and shaped by climate change, anthropogenic disturbance, timber harvesting, non-native species and disease. Predicting future vegetation cover is difficult due to land use patterns influenced by physical properties placed on the environment such as population growth and development, natural resources demand, technology, and regulatory compliance.

Models and scenarios are available to predict vegetation species biodiversity dynamics and distribution, with most recognizing climate change as the primary influence affecting future desirable vegetation regimes. According to the U.S. Environmental Protection Agency (US EPA) 2016 Edition of Climate Change Indicator in the United States Report (https://www.epa.gov/climate-indicators), Alabama is expected to have an additional 30-60 days of temperatures above 95°F in the next 50 years compared with 15 days today. During the next few decades, warmer temperatures and precipitation change are likely to alter current vegetation dynamics. Temperature change is expected to promote droughts, floods, alter wildlife diversification, and modify the composition of vegetation cover throughout the state. Frequent droughts are predicted to reduce vegetation productivity and likely increase the damage from insects and pathogens. As the climate is expected to warm over the decades, forests in southern Alabama are projected to have more white pines and oaks, and fewer loblolly pines (EPA 2016). For more information on estimated future climate change, see **Section 2.2.1**. The National Land Cover Database (NLCD: https://pubs.usgs.gov/fs/2012/3020/fs2012-3020.pdf) is a spatial reference tool that utilizes historical biotic and abiotic datasets and field experiments to predict future land cover change.

Anthropogenic disturbance such as agriculture, controlled burns, logging and development over extended periods of time are not fully understood when predicting future vegetation cover and population structure. Warwick and Clarke (1995) revealed that vegetation distinctness decreased with anthropogenic disturbance in communities, and that taxonomic changes were more sensitive to disturbance than was vegetation range. Anthropogenic disturbance may result in vegetation cover that is composed of species very similar to each other due to the disturbed environment only supporting specific species. Disturbed environments may

become difficult growing conditions, allowing exotic plant species to colonize and outcompete native species.

MAFB and associated properties future vegetation cover will be defined by mission goals and objectives, and support the Installation Development Plan (IDP). Since most of the land on MAFB and Gunter Annex is developed, future vegetation cover opportunities will be limited to urban type ornamental vegetation. Future vegetation cover at Vigilant Warrior Training Site and Lake Martin Recreation Area will include maximizing current vegetation resources and land use techniques prior to any development. The Montgomery area has a large number of native trees, shrubs, and groundcovers that have demonstrated their hardiness and ability to thrive without supplemental water.

Appendix G contains a listing of recommended and prohibited plant material which incorporates both native plants and those that have proven themselves adaptable to the central Alabama climate and the soil conditions on MAFB and Gunter Annex. If base personnel or organizations desire to plant species that are not specified on the lists, approval shall be obtained prior to planting. Approval may be obtained from the installation Natural Resources Manager (42 CES/CEIEA).

The following species listed in **Appendix G** are not to be planted on base for a variety of reasons. Some of the listed species can become invasive under favorable conditions and tend to out-compete native species. Others are not drought-tolerant during Alabama's hot summers or are not well-suited to MAFB or Gunter Annex soil. Still others are toxic and can pose a risk to human health, especially in military family housing areas. Trees and shrubs that are prone to disease, have weak wood, or tend to have poor growth habits in our area are also discouraged. Fruit-bearing trees that may attract birds or wildlife near the airfield are prohibited.

In addition to the undesirable plants listed in **Appendix G**, planting any invasive plants or noxious weeds is prohibited. Refer to the lists of invasive plants and noxious weeds at the following web sites:

- Alabama Invasive Plant Council, http://www.se-eppc.org/alabama/
- USDA Natural Resources Conservation Service (NRCS), Alabama State-listed Noxious Weeds, http://plants.usda.gov/checklist.html.

Even though a plant may be included on the list of acceptable plants, it is still important to place the right type of plant in the right location in order for it to add to the beauty and function of the installation. Careful consideration should be given to:

- Amount of sunlight needed by the plant
- Mature size of the plant
- Compatibility with existing plantings
- Proximity to buildings, sidewalks, utilities, and other structures
- The "curb appeal" and view near the proposed planting location
- Amount of water or runoff expected for the location

2.3.2.4 Turf and Landscape Areas

Maxwell AFB

Turf and landscaped areas on MAFB have been developed extensively in the past, and occur in and around the flightline, main base, family housing areas, and along principal transportation corridors. Maintaining the airfield grass height and surrounding landscape features in accordance with specifications in Maxwell's Bird/Wildlife Aircraft Strike Hazard (BASH) Plan is an important mission requirement. Most landscaping in improved areas is turf of bermuda grass, St. Augustine grass, bahia grass, and crabgrass. Tree cover and

shrubbery is composed of crape myrtle, bradford pear, southern magnolia, water oak, southern red oak, loblolly pine, sweetgum, and live oaks. Open space areas or semi-improved areas (e.g., airfield) include Bahia grass, crimson clover, tall fescue, low-hop clover, Johnson grass, and crabgrass. On the golf course, dominant grass species include, Tifgreen II Hybrid Bermuda with maturing trees to define corridors of play, and protect golfers from stray shots. Dominant tree species on the golf course include: slash pine, loblolly pine, bald cypress, Chinese tallow tree, and water oak.

Gunter Annex

Turf and landscape characteristics at Gunter Annex are similar to MAFB.

Vigilant Warrior Training Site

Vigilant Warrior Training Site is a remote, mostly undeveloped training area with no turf or landscaped areas.

Lake Martin Recreation Area

Lake Martin Recreation Area is a semi-improved campground with marina facilities to access Lake Jordan. The majority of the area is woodlands with no turf or landscaped areas that are considered improved which require maintenance.

2.3.3 Fish and Wildlife

Maxwell Air Force Base, Gunter Annex, Vigilant Warrior Training Site and Lake Martin Recreation Area.

MAFB properties provide a variety of terrestrial habitats as well as limited aquatic habitats. Wildlife surveys, both formal and informal, have been conducted over the years including a Natural Community and Rare Plant and Animal Survey (Alabama Natural Heritage Program 2002), Threatened and Endangered Species Survey (Woolpert 1994), Wildlife Hazard Assessment (USDA 2017), and Bat Acoustic Survey (Hauar et al. 2017). In summary, these surveys conclude the following fish and wildlife occur at MAFB properties: 14 species of terrestrial mammals at MAFB, 2 at Gunter Annex, 8 at Vigilant Warrior Training Site, and 4 at Lake Martin Recreation Area. All mammal species identified were common across the region and no protected species or critical habitat identified on MAFB properties. Twelve bat species, >31 avian species, 29 herpetofaunal species, 16 fish species, and 27 insect families were identified. For additional details regarding historical surveys as well as species of fish and wildlife occurring on MAFB properties and species that have the potential to occur can be found in the 2002 Alabama Natural Heritage Program Survey (MAFB 2002c). Fish and Wildlife management information on MAFB properties can be found in **Section 7.2**.

2.3.4 Threatened and Endangered Species and Species of Concern

Alabama does not maintain a legal equivalent to the federal Endangered Species Act, so Alabama species do not have regulatory protection as state endangered or threatened species. USFWS maintains the state list of flora and fauna designated as endangered, threatened, and commercially exploited for the State of Alabama, through the Environmental Conservation Online System (ECOS) at, https://ecos.fws.gov/ecp/. Some State species do receive protection through the Alabama Regulations on Game, Fish, and Fur Bearing Animals. These are the only regulations affording state protection for species in Alabama and are administered by the ADCNR. Protection and management of state-protected fauna are controlled under the Protected Nongame Species Regulation, Alabama Administrative Code (AAC) 220-2-.92,

(http://www.alabamaadministrativecode.state.al.us/docs/con_/220-2.pdf). Federal status, as a threatened or endangered species, is derived from the Endangered Species Act (ESA) of 1973 (16 U.S. Code [USC] §1531 *et seq*.) and is administered by the USFWS. Protected species identified on MAFB properties should be reported to the installation natural resources manager to determine resident or transient status.

Bald eagles, osprey, wood stork, little blue heron, Alabama map turtle, black-knobbed sawback turtle, speckled kingsnake, and the American alligator could potentially be found on MAFB property. Habitat areas for these species are semi-improved recreation areas along the Alabama River which could include installation lakes and wetlands, though base activities and potential impacts are usually minimal. The loggerhead shrike, wood thrush, redheaded woodpecker, prothonotary warbler, and brown-headed nuthatch are birds of moderate conservation concern and may be found on MAFB property.

Federally-listed wildlife species with known occurrence in Montgomery, Elmore, and Tallapoosa Counties are listed in **Table 8**. Priority species were identified based on their regulatory status, known occurrence on or near MAFB, Gunter Annex, Vigilant Warrior Training Site, Lake Martin Recreation Area, or highly likely occurrence on MAFB property.

Petitioned species that may occur on or near MAFB main base include, Rayed creekshell (*Anodontoides radiatus*), Black-knobbed Map turtle (*Graptemys nigrinoda*), Alabama Map turtle (*Graptemys pulchra*), Apalachicola Wild Indigo (*Baptisia megacarpa*), Impressed-nerved sedge (*Carex impressinervia*), Harper's Heartleaf (*Hexastylis speciosa*), Alligator snapping turtle (*Macrochelys temminckii*), and Tricolored bat (*Perimyotis subflavus*).

Petitioned species that may occur on or near MAFB - Gunter Annex include, Rayed creekshell (*Anodontoides radiatus*), Black-knobbed Map turtle (*Graptemys nigrinoda*), Alabama Map turtle (*Graptemys pulchra*), Apalachicola Wild Indigo (*Baptisia megacarpa*), Impressed-nerved sedge (*Carex impressinervia*), Harper's Heartleaf (*Hexastylis speciosa*), Alligator snapping turtle *(Macrochelys temminckii*), and Tricolored bat (*Perimyotis subflavus*)

Petitioned species that may occur on or near Vigilant Warrior Training Site include, Coal darter (*Percina brevicauda*), Petition, AL, Delicate spike (*Elliptio arctata*), Alabama rainbow (*Villosa nebulosa*), Coosa creekshell (*Villosa vanuxemensis umbrans*), Alabama Map turtle (*Graptemys pulchra*), Alligator snapping turtle (*Macrochelys temminckii*), and Tricolored bat (*Perimyotis subflavus*).

Petitioned species that may occur on or near Lake Martin Recreation Area include, Alabama spike (*Elliptio arca*), Delicate spike (*Elliptio arctata*), Tallapoosa orb (*Quadrula asperata archeri*), Alligator snapping turtle (*Macrochelys temminckii*), and Tricolored bat (*Perimyotis subflavus*)

Table 8. Species Listed by USFWS and ADCNR as Federal and/or State Listed for Montgomery, Elmore, and Tallapoosa Counties.				
Common Name	**Scientific Name**	**Federal Status**	**State Status**	**Suitable Habitat and Potential Occurrence on MAFB Properties**
BIRDS				
Wood stork	*Mycteria americana*	T	--	**Yes** – Forages in prairie ponds, flooded pastures, ditches, and other shallow standing water, including salt water; usually roosts communally in tall snags; breeds in Mexico and moves into Gulf States in search of mudflats and other wetlands. Stopover habitat located in wetlands; occurs in and around Montgomery, Elmore, and Tallapoosa Counties.
Bald eagle	*Haliaeetus leucocephalus*	BGPA	--	**Yes** – Found in forested habitats with large old-growth trees adjacent to shorelines and large bodies of open water with an abundant food supply; occurs in and around Montgomery, Elmore, and Tallapoosa Counties.
Red-cockaded woodpecker	*Picoides borealis*	E	--	**No –** A cavity nester exclusively found in mature pine trees, preferring long-leaf pine but will use other species of southern pine; due to fire suppression and forest removal on MAFB properties, the species has been extirpated from those locations.
MOLLUSKS				
Narrow pigtoe	*Fusconaia escambia*	T	--	**No** – A freshwater bivalve found within the East Gulf Coastal Plain Physiographic Region rivers that drain southeastern; historically known to occur in Montgomery County.
Choctaw bean	*Villosa Choctawensis*	E	--	**No** – A small, sub-elliptical, brown with low rounded posterior ridge bivalve; occurs in large freshwater creeks and rivers of silty-sand and moderate currents. Found in southeastern U.S., and listed in Montgomery County.
Southern kidneyshell	*Ptychobranchus jonesi*	E	--	**No** – Imperiled freshwater bivalve historically endemic to eastern Gulf of Mexico drainages; known to occur in high-quality habitats of the Choctawhatchee River tributaries, and historical range included Montgomery County.
Southern sandshell	*Hamiota australis*	T	--	**No** – Dark brown to black small to medium sized mussel that is long and elliptical; occurs in medium-sized creeks and rivers with slow to moderate currents of Alabama drainages.
Southern clubshell	*Pleurobema decisum*	E	--	Critical Habitat Elmore County; no suitable habitat on MAFB properties
Fuzzy pigtoe	*Pleurobema strodeanum*	T	--	**No** – Fresh water bivalve endemic to the U.S; occurs in Coosa River, a tributary of the Alabama River, Montgomery County.
Southern acornshell	*Epioblasma othcaloogensis*	E	--	Critical Habitat Elmore County; no suitable habitat on MAFB properties

Table 8. Species Listed by USFWS and ADCNR as Federal and/or State Listed for Montgomery, Elmore, and Tallapoosa Counties.				
Common Name	**Scientific Name**	**Federal Status**	**State Status**	**Suitable Habitat and Potential Occurrence on MAFB Properties**
Upland combshell	*Epioblasma metastriata*	E	--	Critical Habitat Elmore County; no suitable habitat on MAFB properties
Finelined pocketbook	*Lampsilis altilis*	T	--	Critical Habitat Elmore County; no suitable habitat on MAFB properties
Ovate clubshell	*Pleurobema perovatum*	E	--	Critical Habitat Elmore County; no suitable habitat on MAFB properties
Triangular kidneyshell	*Ptychobranchus decisum*	E	--	Critical Habitat Elmore County; no suitable habitat on MAFB properties
Alabama moccasinshell	*Medionidus acutissimus*	T	--	Critical Habitat Elmore County; no suitable habitat on MAFB properties
Coosa moccasinshell	*Medionidus parvulus*	E	--	Critical Habitat Elmore County; no suitable habitat on MAFB properties
Southern pigtoe	*Pleurobema georgianum*	E	--	Critical Habitat Elmore County; no suitable habitat on MAFB properties
PLANTS				
Alabama Canebrake pitcher-plant	*Sarracenia rubra*	E	--	**No** – The insectivorous plant occurs in swamps, seeps, and bogs that prefers acidic soils in full sunlight; occurs in Montgomery and Elmore Counties.
Georgia rockcress	*Arabis georgiana*	T	--	**No** – Found on rocky slopes of hardwood forests along streams or eroded river banks; Occurs in Montgomery, Elmore, and Tallapoosa Counties.
Little amphianthus	*Amphianthus pusillus*	T	--	**No** – Small aquatic herb that grows on weathered granite outcrops and vernal pools; occurs in Tallapoosa County.
White fringeless orchid	*Platanthera integrilabia*	T	--	**No** – A perennial herb that grows in forested areas with wet soil and obtains nutrients from fungus; occurs in Tallapoosa County.
Kral's water plantain	*Sagittaria secundifolia*	T	--	**No** – Only found in rocky creeks in Tallapoosa County
SNAILS				
Tulotoma snail	*Tulotoma magnifica*	T	--	**No** – A large operculate with spiral lines on globular knob-like shell. Found in Montgomery and Elmore Counties in Coosa-Alabama River.
Rough hornsnail	*Pleurocera foreman*	E	--	**No** – Elongated pyramid shaped shell that is yellow-brown in color and endemic to the Coosa River. Critical Habitat Elmore County.
Interrupted rocksnail	*Leptoxis foreman*	E	--	**No –** Distinguished by having folds and longitudinal ridges on the sub-globose shell. Dark brown or olive color. Critical Habitat Elmore County.
MAMMALS				
Indiana bat	*Myotis sodalist*	E	--	**No** – Small bat with dull chestnut to bronze color on basal side with cinnamon color on underpart of body.

Table 8. Species Listed by USFWS and ADCNR as Federal and/or State Listed for Montgomery, Elmore, and Tallapoosa Counties.				
Common Name	**Scientific Name**	**Federal Status**	**State Status**	**Suitable Habitat and Potential Occurrence on MAFB Properties**
Northern Long-eared bat	*Myotix septentrionalis*	T	--	**No –** Medium size bat that is dusky-brown in color with noticeably large distinguished long ears: occurs in Tallapoosa County.
Tri-colored bat	*Perimyotis subflavus*	C	--	**Yes -** Small yellowish-brown insectivorous bat with tri-colored fur. Schwab, N.A. 2018. Tetra Tech Inc. Bat Acoustic Survey confirmed species.
REPTILE				
Gopher tortoise	*Gopherus Polyphemus*	C	--	**No** – Gray or dark brown large tortoise with large hind feet and gular projection beneath the head: occurs in Montgomery County.

Source: USFWS, 2018
Notes:
T – Threatened
E – Endangered
C - Candidate
BGPA - Bald and Golden Eagle Protection Act

2.3.5 Wetlands and Floodplains

2.3.5.1 Wetlands

The U.S. Army Corp of Engineers (USACE) defines wetlands as "those areas that are inundated or saturated with ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 CFR 328). Wetlands are an important natural system because of the diverse biological and hydrologic functions they perform. These functions include water quality improvement, groundwater recharge, pollution treatment, nutrient cycling, provision of wildlife habitat and niches for unique flora and fauna, storm water storage, and erosion protection. As a result, wetlands are protected as a subset of the "waters of the United States" under Section 404 of the CWA. The term "waters of the United States" has broad meaning under the CWA and incorporates deep water aquatic habitats and special aquatic habitats (including wetlands). "Jurisdictional" waters of the United States are areas regulated under the CWA and also include coastal and inland waters, lakes, rivers, ponds, streams, intermittent streams, vernal pools, and "other" waters that if degraded or destroyed could affect interstate commerce.

Section 404 of the CWA authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredged or fill materials into the waters of the United States, including wetlands. Therefore, even an inadvertent encroachment into wetlands or other waters of the United States resulting in displacement or movement of soil or fill materials has the potential to be viewed as a violation of the CWA if an appropriate permit has not been issued by the USACE. In addition, wetlands are protected under EO 11990 (43 Federal Register 6030) the purpose of which is to reduce adverse impacts associated with the destruction or modification of wetlands.

The wetlands also contribute to the food chain because they typically provide for dense, high-quality wildlife vegetation. Amphibians, which are very important in the ecology due to their position in the food chain and their important biomass, are dependent on wetlands. Frequent small wetlands can be just as important as large ones and allow for a wider dispersal of amphibians across the landscape. The wetlands and surrounding vegetation of the floodplain (marsh, submerged vegetation, wet meadow, etc.) are an important part of amphibians' habitat in their life cycle; they use both the aquatic environment and the terrestrial environment, making them very sensitive to water level variation. Water level fluctuations offer food and shelter against potential predators. The variation in water level can affect these habitats, therefore affecting amphibians. Periodic drying of smaller wetlands prevents the establishment of fish, which can eat amphibian eggs. In addition, the presence of wetlands plays a valuable role in decreasing pollution in the runoff to streams and drainage. The natural filtering system of wetlands decreases contaminant flow into water bodies.

Woolpert (1994) conducted an inventory in accordance with USFWS classification system of the wetlands at MAFB, Gunter Annex, Vigilant Warrior Training Site, and Lake Martin Recreation Area. The wetland survey was updated by MAFB Environmental Office in 2009, and confirmed 14 jurisdictional wetlands during the inventory (**Map C-21**, **C-22**, **C-23, and C-24**). These sites are described as forested and scrub-shrub type wetlands and considered an important constraint to MAFB future development (HQ AETC 2009). Wetlands and floodplain maps for MAFB property can be found on Alabama Department of Economic and Community Affairs (ADECA 2018; County Flood Map Information and Status).

Maxwell AFB

The results of the survey provided a quality ranking for the wetlands on the MAFB, as well as a description of vegetation found in each wetland area. These results assisted in the management of information to improve and protect wetlands. As a part of the management system, the wetlands will be routinely monitored for changes in vegetation, hydrology, and size. Management practices to improve the quality of or expand wetlands focus on wetlands connected to other wetlands or watersheds extending beyond the base boundary. MAFB maintains and remains in compliance with Stormwater and Wastewater Discharge Permits issued by the City of Montgomery.

Gunter Annex

There are no wetlands areas identified on Gunter Annex (MAFB 1994b).

Vigilant Warrior Training Site

There are two wetland areas identified at Vigilant Warrior Training Site associated with the two woodland seeps/streams (MAFB. 2016).

Lake Martin Recreation Area

There are no wetland areas identified on Lake Martin Recreation Area (MAFB 2002c).

2.3.5.2 Floodplains

Floodplains are defined by the United States Geological Survey (USGS) as, "the flat or nearly flat land along a river or stream or in a tidal area that is covered by water during a flood." These areas must be reserved to discharge the 100-year flood without cumulatively increasing the water surface elevation more than a designated height. When a floodplain is established, no additional obstruction (e.g., a building) should be placed in the floodplain that will increase the 100-year floodwater surface elevation. Executive

Order (EO) 11988 requires all Federal agencies to provide leadership and take action to reduce the risk of flood loss; to minimize the impacts of floods on human safety, health, and welfare; and to restore and preserve the natural and beneficial values served by floodplains, specifically the 100-year floodplain, in managing Federal lands and conducting Federal activities and programs affecting land use. Air Force installations have the responsibility to determine if proposed actions will occur in a floodplain, evaluate and document the potential effects, and consider alternatives to avoid these effects and incompatible development in the floodplain.

Portions of MAFB property fall within the 100-year floodplain (areas with a 1% chance of being inundated by floodwater in a given year). Most 100-year floodplains are in the northeast section of the installation, along the Alabama River. The largest 100-year floodplain is associated with recreation area, two golf courses (1 previously closed), surface lakes and Federal Prison Camp facilities.

Vigilant Warrior Training Site is not located within an identified 100-year floodplain zone (MAFB 2002c).

Maxwell Air Force Base

On MAFB, approximately 672 acres (21% of total acreage) of floodplain marshes and floodplain forest communities land lies within an identified 100-year floodplain zone of the Alabama River (MAFB 2015). The floodplain elevation varies slightly in different locations on base from 156-158 ft. above mean sea level (FEMA 2015), and covers a large area in the northeast portion of the base, and extends along the south and west perimeters of the base. The majority of the floodplain communities have been impacted by base development and mostly occur on land used for recreation, including the golf course. Other areas susceptible to flooding on the base include the Federal Prison Camp and immediate surrounding facilities (**Map C-21**).

Gunter Annex

A small section of land on the western section of the installation along the Three Mile Branch is identified as a floodplain (**Map C-22**).

Vigilant Warrior Training Site

There are no floodplain areas identified on the Vigilant Warrior Training Site.

Lake Martin Recreation Area

There are no floodplain areas identified on Lake Martin Recreation Area.

2.3.6 Other Natural Resources Information

Riparian areas are located along the margins of water bodies and support vegetation that typically prefers moist soil, higher humidity, periodic inundation, and sloping soils. They provide highly valuable habitat because of the access to water, density of cover, and diversity of plant species. It is not uncommon to find bird species in a region that only forage and nest in riparian areas. Some species require specific riparian zone widths to successfully breed. There are ongoing projects aimed at removing invasive vegetation and restoring native trees to riparian areas at several locations at MAFB (**Figure 13**).

Riparian areas have been surveyed and mapped throughout MAFB and are presented in **Map C-21**. The width of the riparian zone at MAFB varies depending on several factors including stream bank slope, area of typical inundation, and interpretation of relative change in plant series. Riparian areas on the base typically mimic the floodplain boundaries as seen in **Map C-21**. Approximately 21% of the total acreage is classified as floodplains covering the total of 672 acres. The riparian areas along drainages in the bottomland hardwood habitats are broad based on the lack of topographical change in the area. The riparian areas in the southwest portion of the installation are narrow because of the slopes and dry uplands, and play an important role similar to wetlands in the protection of streams and drainages from the contaminants in runoff.

Figure 13. MAFB riparian area.

2.4 Mission and Natural Resources

2.4.2 Land Use

Current and historic information pertaining to land uses on the installation and in the surrounding communities is necessary to properly manage natural resources and assess future management activities. This section describes land uses associated with the surrounding community and with MAFB. An overview of the MAFB, its infrastructure and aerial image is provided in **Map C-9**. A summary of land use categories and infrastructure at MAFB is provided in **Table 9**. MAFB contains 2138 acres of improved grounds including: 501 acres of high-intensity development, 430 medium-intensity development, 49 acres of low-intensity development, 1158 acres of developed open areas, and 4073 acres of unimproved areas.

The main base cantonment area is centrally located and encompasses 720 acres. The airfield, which includes the parking ramp, maintained cleared areas, taxiways, and runways, encompasses approximately 1,110 acres. Private family housing (262.09 acres) is located in the southeastern corner. The golf course (280 acres) is located north to northeast of the cantonment area. Other land use areas primarily on the eastern side of MAFB include, housing, medical, training, industrial, academic and administrative. The remaining, unimproved areas occur in the eastern, southwestern, and northwestern sections of the base, with a small amount along the ridge north of the airfield.

A complete, detailed inventory of potential habitats and their acreages on MAFB and its properties is provided in **Table 10**.

Table 9. Distribution of Developed Lands (Acreage).				
Land Use Description	**MAFB**	**Gunter**	**Vigilant Warrior**	**Lake Martin**
Academic	108.52	19	N/A	N/A
Administration	151.06	85.99	N/A	N/A
Airfield	698.08	N/A	N/A	N/A
Airfield Operations & Maintenance	39.55	N/A	N/A	N/A
Ammunition Storage	7.67	N/A	N/A	N/A
Community (Commercial & Services)	160.22	43.52	N/A	N/A
Governmental	52.91	12.4	N/A	N/A
Housing	262.09	69.47	N/A	N/A
Industrial	86.26	8.67	N/A	N/A
Medical	18.74	N/A	N/A	N/A
Open Space	282.82	78.42	2.0	N/A
Outdoor Recreation	504.68	35.58	25.0	46
Training	118.21	N/A	201 (50 developed, 150 wooded)	N/A
Utility	4.43	0.33	N/A	N/A
Open Water	121.27	N/A	N/A	N/A
Total	2616	377	201	46
Source: Installation Development Plan, 2015				

2.4.3 Current Major Mission Impacts on Natural Resources

There are a variety of mission-related activities on MAFB and Gunter Annex that have the potential to adversely impact the environment. The most significant constraints are related to environmental, BASH, future development, potential threatened and endangered species, and water quality. For more discussion of threatened and endangered species and water quality see **Sections 2.3.4, 2.4.3.4,** and **7.4**.

2.4.3.1 Air Quality

In accordance with Federal Clean Air Act (CAA) requirements, the air quality in a given region or area is measured by the concentration of various pollutants in the atmosphere. Concentrations are normally expressed in units of parts per million (ppm), milligrams per cubic meter (mg/m3), or micrograms per cubic meter (µg/m3). Air quality is determined by the type and amount of pollutants in the atmosphere, the size and topography of the air basin, and local and regional meteorological influences.

The Alabama Department of Environmental Management (ADEM) provides ambient air quality standards for the state, which are the same as the NAAQS for the criteria pollutants presented in the State of the Air in Alabama (citation 2018, http://adem.alabama.gov/programs/air/airquality/2018AmbientAirPlan.pdf).

Six air quality monitoring stations are currently located within Montgomery County. Primary onsite emissions sources at the 42nd ABW include the following:

- Vehicle operation and maintenance (including aerospace ground equipment [AGE])
- Combustion sources (jet engine tests, boilers, water heaters, aircraft arresting barrier engines, diesel-fired generators and fire pumps)
- Fuel-storage/transfer operations (fuel-storage tanks)
- Operational sources (solvents, cleaners, antifreeze, and other materials containing volatile organic compounds [VOCs] and hazardous air pollutants [HAPs])

MAFB and Gunter Annex operate under a True Minor Air Permit issued by the ADEM. True Minor Sources for self-imposed limits that, when followed, will ensure the Base's Emissions will remain below Title V levels. MAFB and Gunter Annex have no permitted point sources. MAFB has the freedom to adjust, modify or move equipment as long as total capacity remains below max capacity set forth in ADEM Permit No. 335-3-15-03 for each bubble source category.

Air quality is important to the health of fish and wildlife species and their habitats. Due to minimizing or eliminating excessive or potentially polluting air emissions on MAFB, there are no air sources known to negatively affect the natural resources on the installation or surrounding area.

2.4.3.2 Water

MAFB and Gunter Annex are supplied with potable water by the City of Montgomery, which obtains its water from the Montgomery Water Works & Sanitary Sewer Board (MWSSB). MAFB and Gunter Annex water is obtained from both underground aquifers (Eutaw aquifer) utilizing well fields and surface water, such as the Tallapoosa River. The C.T. Perry Water Purification Plant located on the Tallapoosa River has a capacity of 60 million gallons per day, and is the primary water source for Montgomery County.

2.4.3.3 Wastewater

Wastewater at MAFB is collected in the sanitary sewer system and piped to the MWWSSB Towassa Water Pollution Control Plant where it is treated and discharged to the Alabama River. Gunter Annex utilizes the MWWSSB Econchate Wastewater Treatment Plant to treat sanitary sewage prior to discharge to the Alabama River (MAFB 2005). The only pre-treatment of sanitary and other wastewater on the installation occurs through oil-water separators and grease traps before disposal into the sanitary sewer system. Final Pre-Treatment Permits for both Maxwell and Gunter are maintained with MWWSSB. The City of Montgomery regulates the use of drinking water by MAFB and Gunter Annex to determine discharge of wastewater to the Montgomery sanitary wastewater collection system. Storm water infiltration into the sanitary sewers does not occur frequently, but excessive flow during and after rainfall has been known to cause localized flooding and exceed the specified maximum flow rates (MAFB 2015).

Vigilant Warrior Training Site has a septic system with maintained grass field area in cantonment area, and Lake Martin Recreation Area operates septic systems on site.

2.4.3.4 Stormwater Runoff

MAFB and Gunter Annex operate under one MS4 Phase II NPDES Permit for storm water discharge. Maxwell has 24 outfall locations and Gunter Annex has 12 outfall locations that are inspected as reported in the annual MS4 Reports. Currently, no effluent sampling is required.

Stormwater management and spill prevention is important and monitored at all MAFB locations. To ensure mission sustainment, MAFB land use changes follow strict requirements to preserve high quality water or sensitive water resources (streams, wetlands, lakes, soil erosion, etc.).

2.4.3.5 Erosion and Erosion-Sensitive Soil

Best Management Practices (BMPs) must be implemented with all ground-disturbing activities to prevent soil erosion and to protect surface waters on MAFB. Soil erosion control measures are implemented during all construction projects and monitored by quality assurance and environmental personnel.

2.4.3.6 Aircraft Safety

The USAF has defined 5 mishap classifications; class A-E. Each classification may drive a mishap investigation according to the mishap classification and injury or property damage. Class A mishaps result in a fatality or permanent total disability; total cost in excess of $2 million for injury, occupational illness, and property damage; or destruction or damage beyond repair to military aircraft. Class B mishaps result in a permanent partial disability; total cost in excess of $500,000 but less than $2 million for injury, occupational illness, and property damage; or hospitalization of 5 or more personnel. Class C mishaps result in total damages between $50,000 and $500,000, and Class D is any nonfatal injury or occupational illness that does not meet the definition of Lost Time. The fifth mishap category, Class E Events, comprises incidents resulting in total damages between $2,000 and $50,000. Class E Events include BASH (Wildlife Strikes) and HAP (high accident potential) reports.

Accident Potential Zones (APZs), extending immediately beyond the ends of runways and along the approach and departure flight paths have significant potential for aircraft accidents. Development restrictions within APZs are intended to preclude incompatible land use activities from being established in these areas. At MAFB, the areas extend longitudinally 15,000 ft. from the threshold beyond either end of the east-west runway are designated APZ's. APZs are 3000 ft. laterally centered on the runway center line. Currently, incompatible land use exists in these areas. State, County, and Municipal regulations are attempting to curb incompatible development through land use zoning practices (MAFB 2018b).

BASH is defined as the threat of aircraft collision with birds and other wildlife during flight operations and is a safety concern at all airfields due to the frequency of aircraft operations and the possibility of encountering birds at virtually all altitudes. Most birds fly close to ground level; correspondingly, more than 95% of all reported bird strikes occur below 3,000 feet above ground level (AGL). At most military installations, about half of reported bird strikes occur in the immediate vicinity of the airfield and another 25% occur during low-altitude local training exercises. Reported strikes to 42nd ABW aircraft primarily occur in low-altitude training areas and transition areas. Bird strike hazards are also a potential concern within the immediate vicinity of the main airfield and enroute to other locations.

2.4.4 Potential Future Mission Impacts on Natural Resources

Known future mission impacts at MAFB would include continuation of current impacts as previously described, and additional impacts due to new missions or mission components. MAFB and Gunter Annex are developed near to capacity and mostly landlocked within environmental constraints. Space is a major constraint for future initiatives, making it difficult to incorporate additional initiatives or activities requiring land development. Development and relocation of missions to MAFB or Gunter Annex may be further constrained by limited perimeter standoff and infrastructure access. Most future initiatives for MAFB and Gunter Annex involve updating and renovating current infrastructure to support current missions.

An Air University “AU 2030” future development plan is currently being formulated, with potential realignment of academic schools within AU, including possible relocation of some academic functions between Maxwell’s main base and its Gunter Annex. The AU 2030 plan, if adopted, may propose new lodging, academic and support facilities, but these would be constructed in already-developed areas of Maxwell and Gunter Annex, and would not be anticipated to have major impacts on natural resources.

Both the AU 2030 Plan and other construction- related activities that might be planned for MAFB or Gunter Annex would undergo a separate NEPA process, and fall into 4 main categories:

- Renovation or replacement of aging facilities
- Short-term facilities construction intended to streamline operations and comply with minimum antiterrorism standards set forth by the DoD
- Airfield-related maintenance and infrastructure alterations to support more aircraft and to enable compliance with airfield safety requirements
- Demolition projects required to enable the execution of short-term construction and infrastructure alterations

Current and future mission impacts at Vigilant Warrior Training site include impacts to stream and wetland areas and trail maintenance. Currently, trails are highly erodible, and degraded due to heavy cadet foot and utility vehicle traffic and seasonal rainfall. Mission activities should avoid disturbing these areas to minimize erosion and run-off. A comprehensive maintenance and management plan is needed.

There are no known projected changes in mission or potential impacts at Lake Martin Recreation Area.

3.0 ENVIRONMENTAL MANAGEMENT SYSTEM

The Environmental Management System (EMS) for MAFB is part of the overall Air Force management system, and includes organizational structure, planning, responsibilities, practices, procedures and processes, and resource allocation for developing, implementing, achieving, reviewing, and maintaining environmental commitments. The International Standards Organization (ISO) 14001 EMS model used by the USAF and other federal agencies leads to continual improvement based upon a cycle of plan, do, check, act (**Figure 13**).

- Planning, including identifying environmental aspects and establishing goals [plan];
- Implementing, including training and operational controls [do];
- Checking, including monitoring and corrective action [check]; and
- Reviewing, including progress reviews and acting to make needed changes to the EMS [act].

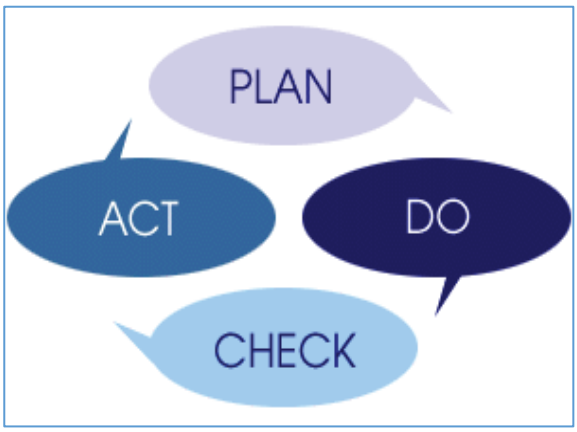


Figure 13. EMS Process from U.S. Environmental Protection Agency.

The EMS is continually updated through this cycle, fine-tuning its management of operations that may harm the environment. This continual improvement cycle is a fundamental attribute of the EMS that allows the system to adapt to the dynamic nature of the organization's operations (**Figure 13**). The INRMP process is this process: develop an INRMP and identify specific actions, implement the plan and do the actions, conduct annual and 5-year review to monitor implementation, and modify plan accordingly.

This INRMP directly supports MAFB EMS process. Maxwell currently has no Environmental Action Plans (EAPs) related to natural resources. Annual review of the INRMP in conjunction with the USFWS,

ADCNR, and other agencies will be conducted in order to support the concept of EMS. Annual reviews and monitoring of implementation are discussed in **Section 9.3**.

4.0 GENERAL ROLES AND RESPONSIBILITIES

The INRMP has been organized to ensure the implementation of year-round, cost-effective management activities and projects that meet the requirements of MAFB. Various organizations on MAFB are responsible for the implementation of the INRMP and are described in the following subsections. Due to the nature of MAFB and associated properties, the responsibilities are spread across multiple organizations within the AF (**Table 10**).

Table 10. Organizational INRMP Responsibility.	
Office/Organization Job Title (Listing is not in order of hierarchical responsibility)	**Natural Resources Impact and Responsibility**
Installation Commander (42 ABW Commander)	The Wing Commander oversees the installation properties and is responsible for the goals and objectives of the INRMP. The MAFB Wing Commander is responsible for the following aspects of the INRMP: • Approve INRMP • Certify the annual review of the INRMP as valid and current; or delegate the certification of the annual INRMP review to the appropriate designee • Control access to and use of installation natural resources • Ensure the implementation of the INRMP to the fullest extent practicable based on funding and manpower availability
AFCEC Natural Resources Media Manager/SME/Subject Matter Specialist (SMS) (AFCEC/TDNC)	The AFCEC/CR Environmental Quality (EQ) is the primary source of funding to support the management of natural resources at MAFB. This budget is managed by AFCEC/TDNC and AFCEC/CZOW. AFCEC/CR EQ provides funding for natural resource surveys, environmental monitoring projects, and compliance related projects. SME/SMS are the natural resources program managers for the entire Air Force and/or West Region. They provide technical assistance and guidance to AF NRMs on natural resources issues; advocate for resources required to implement approved INRMPs; and administer the reimbursable forestry, agricultural and grazing, and fish and wildlife account programs as well as dispersed outdoor recreation programs. ISS Media Manager provide and manage contracts, interagency agreements, and cooperative agreements for natural resources programs (AFI 32-7064).
Installation Natural Resources Manager/POC (42 CES/CL; 42 CES/CEIEA)	The Natural Resource Manager (NRM) is the technical point of contact on all natural resource related activities for MAFB and associated properties. The NRM Program Manager tracks DoD and USAF policies and helps program funding requirements for projects identified as a priority in the MAFB INRMP. The development of projects included in the INRMP and any deviations from those projects will be submitted to the AFCEC/CZOW Natural Resource Program Manager for review and concurrence. Decisions resulting from those reviews will be a cooperative effort between the AFCEC/CZOW NR Program Manager and installation's Natural Resources Manager (or Environmental Manager (EM) when applicable). Responsibilities include the following: • Ensure INRMP is jointly reviewed by the USFWS and ADCNR for operation and effect on a regular basis, but not less often than every five years • Conduct annual review of the INRMP in coordination with USFWS and ADCNR, including updates and adjustments to goals and objectives as conditions change. Record annual reviews through documentation to reflect Commander approval • Project 5 year goals for the implementation of the MAFB INRMP. Identify objectives which will support each goal

Table 10. Organizational INRMP Responsibility.	
Office/Organization Job Title (Listing is not in order of hierarchical responsibility)	**Natural Resources Impact and Responsibility**
	• Request appropriate funding from AFCEC to achieve project objectives • Manage available manpower to implement MAFB INRMP • Review USAF Form 813s and other EIAP documentation to determine natural resource impacts
Installation Security Forces (42 ABW/SFS)	Enforcement of laws and AFIs to support natural resource management.
Installation Unit Environmental Coordinators (UECs): see AFI 32-7001 for role description	Serve as EMS conduit between the installation environmental function and the unit. UECs manage and monitor the EMS requirements for the unit by attending Cross Functional Team (CFT) and working group meetings as requested, and advice work area supervisors on EMS policy.
Installation Wildland Fire Program Manager	Planning and coordination of prescribed fire actions and wildfire rehabilitation.
Pest Manager (42 CES/CEOIE)	Lead applicator for pesticides, aids reduction of medically important pests and in non-native plant control, especially in BASH related areas. Coordinates with NRM to ensure Installation Pest Management Plan (IPMP) and INRMP are mutually supportive.
Range Operating Agency	Management of small arms range. Oversight by 42nd SFS, 42nd CES, and 42 FSS respectively to ensure environmental compliance. 42d CES/CEIEA performs inspections for solid waste management, HazMat, water quality, and other aspects as appropriate.
Conservation Law Enforcement Officer (CLEO)/Alabama Dept. of Conservation and Natural Resources (ADCNR)	Enforcement of all conservation laws and regulations including, Endangered Species Act, Migratory Bird Treaty Act, Clean Water Act, and many other DoD, AF, and MAFB Directives.
National Environmental Policy Act/Environmental Impact Analysis Process (EIAP) Manager	Review and coordination for INRMP preparation. Signatory of the INRMP per The Sikes Act Section 16 U.S.C. § 670a (a)(2), DODI 4715.03, and AFI 32-7064. Advise protocols and need for surveys of special status species and assess potential impacts from base projects and activities.
National Oceanic and Atmospheric Administration (NOAA)/ National Marine Fisheries Service (NMFS)	Review and coordination for INRMP preparation, if applicable. Signatory of the INRMP per The Sikes Act Section 16 U.S.C. § 670a (a) (2), DODI 4715.03, and AFI 32-7064. Advise protocols and need for surveys of special status species and assess potential impacts from base projects and activities.
U.S. Forest Service	May support wildland fire functions; advise on forestry management, if applicable.

Table 10. Organizational INRMP Responsibility.	
Office/Organization Job Title (Listing is not in order of hierarchical responsibility)	**Natural Resources Impact and Responsibility**
U.S. Fish and Wildlife Service	Review and coordination for federally-listed species and Sikes Act compliance, issues depredation permits, and assists with INRMP preparation. Signatory of the INRMP per The Sikes Act Section 16 U.S.C. § 670a (a) (2), DODI 4715.03, and AFI 32-7064.
Alabama Department of Conservation and Natural Resources	Review and coordination for state-listed species, hunting and fishing and INRMP preparation. Signatory of the INRMP per The Sikes Act Section 16 U.S.C. § 670a (a) (2), DODI 4715.03, and AFI 32-7064.
Alabama Forestry Commission	May provide support/advise on Urban Forestry management and forest health issues
Civil Engineer (42 CES/CL)	Responsible for providing the Civil Engineer Environmental Flight with oversight and management assistance to ensure the INRMP is implemented and executed. Serve as designated Government employee responsible for inherently governmental functions of natural resource management.
Legal Office (42 ABW/JA)	Ensuring that the implementation of the management objectives contained within the MAFB INRMP meet all of the Sikes Act, DoD, and AF regulatory and statutory requirements that pertain to natural resources management.
Environmental Manager (42 CES/CEIE)	Provides support to MAFB and associated properties for environmental issues, such as hazardous material and hazardous waste management, air emissions, water quality, cultural resources management and other environmental requirements.
Safety Officer (42 ABW/SE)	In conjunction with the Flight Safety Representatives at MAFB, is responsible for implementing all activities presented in this Plan that pertain to the BASH Reduction Program.
Public Affairs Office (42 ABW/PA)	Review and coordinate/approve documents for public release. Assist as needed with public review process for INRMP, NEPA/EIAP process, and any other public notification, comments, or responses related to natural resources.
Environment Safety, and Occupational Health Council	Active leadership within the Environment, Safety, and Occupational Health Council (ESOHC) is critical for the overall success of the Maxwell Air Force Base INRMP. The ESOHC consists of squadron and unit level commanders whose operations may impact environmental resources on MAFB properties, and is chaired by the Wing or Vice Commander. Specifically, the ESOHC is responsible for the following: • Establish overall policy for the natural resources program at MAFB • Provide support of INRMP goals and objectives • Represent their organizations at the MAFB ESOHC management review process and conduct periodic internal reviews of their organization

5.0 TRAINING

AF 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.

- 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 School, 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 AF 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 base 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. Other training, such as DoD Records Management or management of sensitive data, may be needed by personnel who support natural resources management.

6.0 RECORDKEEPING AND REPORTING

2.4.1 Natural Resource Constraints to Mission and Mission Planning

Constraints are considered to be anything that causes restrictions on the mission. In some cases, the presence of protected species, water resources, or sensitive habitats may limit the types or degree of activities in the area, but rarely are mission activities completely restricted due to natural resource issues. Early consideration of these issues in planning (i.e., EIAP) typically results in solutions where the mission can proceed unimpeded, either through modifications in location or timing or by obtaining permits through the appropriate regulatory agency that allow the potential for negative impact to resources (i.e., Section 7, Section 404, Section 401, etc.).

The environmental requirements developed through EIAP or other regulatory requirements are mandatory. MAFB personnel may be held liable for violations of environmental statutes and regulations. Failure to follow these requirements may constitute a violation of federal and state environmental laws. Adherence to requirements helps maintain quality environments for future missions, and ensures that MAFB is in compliance with all applicable state and federal regulations.

- MAFB main base is constrained due to extensive development and lack of land available for future mission expansion (MAFB Installation Development Plan, 2015). The largest natural resource constraint on the installation is a 672 acre 100-year floodplain associated with the Alabama River and its West End Ditch tributary. There are also 14 jurisdictional wetland areas listed on the installation that lie within the 100-year floodplain. In addition, 71 acres are mission constrained due to floodplains and Environmental Restoration Program (ERP) mitigation efforts regulated by Air Force Instruction 32-7020, *The Environmental Restoration Program*, 2014.
    - MAFB has approximately 41 acres available for future development.
    - The city of Montgomery has adopted long-range plans for neighborhoods that border MAFB. The long-rang plans are in place to support the installation's airfield environment and to avoid incompatible development and minimize encroachment. (https://datausa.io/profile/geo/montgomery-county-al/)
- On Gunter Annex, 377 acres are developed and 29 acres are considered undeveloped due to environmental constraints and a floodplain along the Three Mile Branch Creek.
    - Gunter Annex has approximately 15 acres available for potential future development. This area is identified for minor modifications and in-fill development (MAFB. 2015).
    - Gunter Industrial Park is adjacent to the installation.

The most significant constraints on MAFB are related to its floodplain, wetlands and riparian areas, water quality protection, forestry management, and reducing BASH risk. Current restraints relating to threatened and endangered species relate to (1) watershed management for the wood stork, (2) watershed management near the airfield, (3) modify drainage on west side of airfield, and (4) any new activities or infrastructure. For more discussion of threatened and endangered species see **Sections 2.3.4** and **7.4**.

If the mission changes significantly in the future, the sustainability challenges could increase. Additional infrastructure development or a significant increase in on-the-ground training could pose challenges for the long-term sustainability of MAFB and Gunter Annex.

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. Most required records are maintained in the base Environmental Office, 42 CES/CEIE, or on the Air Force eDASH site, according to the approved file plan.

6.2 Reporting

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

7.0 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.

The guiding philosophy of this INRMP is to take an ecosystems approach to managing the natural resources present on MAFB property (see **Section 1.2**). Ecosystem management provides a framework to link the military mission to local, regional, and global ecological integrity. Sustaining ecosystem integrity is the best way to protect and enhance biodiversity, ensure sustainable use, and minimize the effort and cost of management. Ecosystem management is based on clearly stated goals and objectives, and associated activities and projects. This INRMP identifies goals and objectives and presents the means to accomplish them, as well as the methodologies to monitor results.

This section summarizes each technical area of natural resources management. In a given section, relevant management strategies, practices, guidelines, BMPs, and priorities will be presented, as applicable to the technical topic. Goals and objectives are presented below by section. Activities (recurring, in-house tasks) and projects (discrete and/or contracted tasks) associated with those goals and objectives are presented in in **Section 10.0, Tables 12 and 13** respectively**.** Laws and regulations are not summarized in each sub-section, although primary legal drivers are identified. A complete summary of all relevant laws, regulations, EOs and policies is provided in **Section 14.0**.

Programmatic Management

Programmatic management includes environmental awareness, public outreach, GIS data management, INRMP annual reviews, adaptive management, and other objectives relating to implementing a natural resources management program.

7.1 Fish and Wildlife Management

The current INRMP will serve as MAFB's wildlife management plan. Wildlife management program plans will be integrated and coordinated with land use, installation landscape activities, and species of concern, outdoor recreation, pest management, and water management programs. Wildlife resources at MAFB are managed using concepts of multiple use and sustained yield, in accordance with the military mission. There is no hunting on MAFB properties. The primary goal of this plan is to maintain, develop, and restore, as necessary, a diverse viable habitat that supports wildlife populations and is consistent with the military mission. Secondary and tertiary objectives may include the establishment of Watchable Wildlife Areas, a natural interpretive garden to increase awareness of local flora and fauna, and the completion of interpretive stations on existing and future walking trails. Additionally, development of interpretive materials describing the natural history and uniqueness of indigenous and non-indigenous species will benefit the mission. This will provide installation personnel with a sense of appreciation for the local regimes and their impact on the environment.

Fish and wildlife management at MAFB properties will focus on maintaining and restoring natural habitat favorable for indigenous fish and wildlife in a manner consistent with the military mission and all applicable laws and regulations. Information pertaining to fish and wildlife species known or with the potential to occur at MAFB is summarized in **Sections 2.3.4** and **7.4**, with protected species summarized in **Section 2.3.4**, and species lists provided in **Table 8**. In addition to general fish and wildlife management, there are

additional management needs associated with minimizing BASH-related risk at MAFB since the military mission involves flight operations.

MAFB supports numerous native species including a federally-listed species, candidate species, and federal species of concern (see **Section 7.4**). Currently, no mission activities appear to adversely impact wildlife populations on MAFB.

7.1.1 Management Strategies for Wildlife

Wildlife management involves manipulating various aspects of an ecosystem to benefit chosen wildlife species. Management of habitats generally is focused to benefit native species, particularly rare species and game species. The natural resource manager will manage the wildlife and its habitat on MAFB property by implementing the strategies listed below.

- Evaluate possibilities and potential benefits of traditional silvicultural practices that have a positive effect on wildlife populations, such as prescribed burning and forest thinning. Create wildlife openings in forested areas that lack adequate cover. These openings are created by removing the most merchantable trees and felling and leaving non-merchantable trees. Large mast-producing trees are left standing within the openings. The felled trees provide immediate cover within the branches and treetops. Subsequent growing seasons encourage thick cover excellent for wildlife
- Maintain intact, healthy habitat and enhance or restore degraded habitat, without increasing BASH risk
- Minimize BASH risk by deterring hazardous birds and other wildlife from the airfield and its critical zone
- Maintain populations of wildlife away from the airfield on MAFB by minimizing negative impacts and by providing healthy, diverse habitat and corridors for wildlife to move between those habitats
- Conduct periodic fish surveys to determine species diversity, relative abundance, population abundance, age class structure, and size structure in order to determine prey items available at lakes. Surveys would help determine proper fisheries management and stocking of the lakes in the future to benefit desirable wildlife species on the installation while maintaining or improving the existing fishery
- Implement yearly lake-fertilization program, as advised by ADCNR, Alabama Cooperative Extension Service, or other partner agencies, in order to increase lake productivity
- Install habitat structures to attract fish and provide cover for forage species
- Manage invasive aquatic vegetation to maintain properly balanced aquatic ecosystem
- No exotic plants or animals will be introduced on MAFB property without written approval
- Hunting is prohibited on MAFB property. However, “hazing” and depredation on the airfield will be conducted as necessary, in accordance with the 42 ABW/SE BASH Plan to ensure permitting requirements are met
- Develop and implement MAFB Recreational Fishing Plan (Recreational fishing is addressed further in **Section 7.2.1**)
- Preserve snags and large trees (away from the airfield) for cavity-nesting species unless removal is required for safety or mission considerations
- Protect riparian forest and wetlands, as many indigenous and rare species are dependent on them.
- Consider prescribed burns to enhance native prairie grassland habitat, as compatible with airfield management practices and wildland fire management plans
- Minimize the amount of herbicide used for invasive species control, particularly in or around surface waters and wetlands, by using mechanical methods to the extent possible to avoid impacts to fish and wildlife habitat

- Mow and burn open fields between 15 September and 15 April to avoid impacting nesting and migratory birds when possible
- Maintain grass heights between 7-14 inches in the airfield impact area during the growing season to discourage assembly of small, flocking birds

7.1.2 Nuisance Wildlife and Diseases

Nuisance wildlife problems will be evaluated by the NRM in conjunction with base pest management personnel, if appropriate. Any solutions to nuisance wildlife problems will follow the IPMP and BASH plan.

Canada geese are one of the main nuisance species and BASH threats for the airfield environment. In the past, large numbers of geese have created health and safety hazards on the airfield, golf course, and the Family Camping and picnic area. During their annual molting period in the early summer, USDA will assist with the removal, if needed.

Other than those that present a BASH risk, there are nuisance wildlife species such as stray dogs, raccoons, squirrels, snakes, opossums, fox, armadillo, beaver, and various species of rodents typically controlled by MAFB Pest Management. Larger animals such as coyote, white-tail deer, and American alligator are controlled by USDA or other State or Federal agency in coordination with 42 ABW/SE and NRM personnel.

Diseases affecting fish and wildlife may occur on the installation. Any large-scale fish and wildlife deaths and unnatural behavior occurring on the installation will be reported, recorded, and investigated by the NRM in conjunction with USFWS, USDA, and ADCNR, as needed.

Invasive species of animals living on MAFB include feral cats, European starlings, house sparrows, pigeons, and imported fire ants (see **Table 6** in **Section 2.3.2.2.1** for complete list of invasive species). European starlings and pigeons are a BASH issue. Feral cats and free-roaming cats also pose a threat to native species.

7.1.3 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MTBA) prohibits, unless permitted by regulations, the pursuit, hunting, take, capture, killing or attempting to take, capture, kill, or possess any migratory bird included in the Migratory Bird Treaty, including any part, nest, or egg of any such bird (16 USC § 703). The DoD has a Memorandum of Understanding (MOU) with the USFWS pursuant to EO 13186, which outlines a collaborative approach to promote the conservation of migratory bird populations. This MOU specifically pertains to natural resource management activities, including, but not limited to, habitat management, erosion control, forestry activities, invasive weed management, and prescribed burning. It also pertains to installation support functions, operation of industrial activities, construction and demolition activities, and hazardous waste cleanup. In February 2007, the USFWS finalized regulations for issuing incidental taking permits to the DoD. If any of the Armed Forces determine that a proposed or an ongoing military readiness activity may result in a significant adverse effect on a population of migratory bird species, then they must confer and cooperate with the USFWS to develop appropriate and reasonable conservation measures to minimize or mitigate identified significant adverse effects (50 CFR Part 21, for MOUs see https://www.denix.osd.mil/nr/legislationandpolicy/lawsandstatutes/sikesact/). Maxwell will protect nesting migratory birds, if possible given airfield constraints. Currently, no activities at Maxwell AFB are expected to impact any species of migratory birds.

7.1.3.1 Partners in Flight

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

7.2 Outdoor Recreation and Public Access to Natural Resources

The goal of MAFB is to maintain a program that will provide quality outdoor recreation facilities for its military, civilians and dependents while protecting the outdoor recreation resources from overuse and damage. The quality of the outdoor recreational experience will be achieved by the development, management and maintenance of the improved, semi-improved and unimproved multi-use lands on base. Rules and regulations regarding use of natural resources for dispersed outdoor recreation are identified in **Table 2**.

The 42 ABW/CES, 42 ABW/FSS, as well as, 42 ABW/SFS and other installation agencies interact to achieve the goal of providing quality outdoor recreation to base personnel and dependents. The 42 SFS ensure that recreation facilities are protected from vandalism and abuse, and that patron use of recreational facilities are coordinated with the 42 SFS to ensure minimum impact to security. 42 FSS provides coordination and integration of recreation facilities and activities on base.

Outdoor recreation and public access management should ensure that the resources of MAFB are managed and conserved so that assigned personnel will have maximum opportunities to satisfy their outdoor recreation needs. Recreation benefits include fostering social interaction, excitement, mental and physical relaxation, and opportunities for gaining knowledge or curiosity. The need for outdoor recreation resources and opportunities at MAFB is very similar to that expressed throughout the surrounding region. Preferred outdoor recreation activities for both MAFB and off-base populations include walking, bicycling, canoeing/kayaking, picnicking, jogging/running and swimming.

MAFB is a closed base. In general, public access to MAFB natural resources, outdoor recreation areas, and facilities is restricted. This policy is a necessary requirement of base security to insure the successful completion of the base missions. Safety considerations must be made when developing dispersed outdoor recreation opportunities in natural resource management areas. Wildlife may be found just about anywhere on base and participation in dispersed outdoor recreation activity carries with it the inherent risk of an encounter.

Privately owned off road vehicles (e.g., four wheelers, ATVs, dirt bikes, go-carts, etc.) or any motorized privately owned vehicles (POV) are restricted to street use and are not allowed within the natural areas of MAFB. The only authorized off road vehicle (ORV) use on base is related to military security and training. ORV use in natural resource areas degrades habitat, creates air and soil erosion, and conflicts with natural resource management goals and objectives. For example, protection of wetland areas, restoration of native prairies, wildlife habitat enhancement and watchable wildlife programs, or the maintenance of grasslands

to encourage and increase ground nesting neo-tropical migratory bird populations on the installation are disturbed by unauthorized ORV use.

AFI 32-7064 requires the classification of AF managed property into the following categories to describe outdoor recreation opportunities. MAFB maps of classification areas are provided in **Appendix C-25, C-26, C-27, and C-28.**

- Class I areas (general outdoor recreation areas) are suitable for intensive recreation activities such as camping, winter sports, and water sports, and usually have additional amenities and infrastructure in place that can better support more intensive activities.
    - All such areas on MAFB and Lake Martin Recreation Area are open year-round to all military personnel, their guests and dependents, retired military and their guests, and civilian personnel employed by MAFB. No clearance must be obtained prior to using these areas.
    - For Lake Martin Recreation Area, reservations are required through the 42d FSS (Live at the Max, https://www.lifeatthemax.us/maxwell-outdoor-recreation/) for cabins and group picnic sites on a first-come, first-served basis with priority for military personnel. The usage or number of users per area is based on carrying capacity of the area. Installation population is made aware of available outdoor resources by special briefings, newspaper articles, flyers, pamphlets and public on-line websites.
- Class II areas (natural environmental areas) can support dispersed recreational activities, such as hunting, fishing birding, hiking, sightseeing, jogging, climbing, and riding. These areas have the landscape, terrain and soils to withstand and absorb moderate traffic impacts.
    - These areas on MAFB, Gunter Annex and Lake Martin Recreation Area are open to all military personnel, DoD and retired military and their escorted guests and dependents, and authorized public by MAFB providing security posture as appropriate. These areas are open only for fishing in accordance with the current INRMP or proposed fishing plan.
- Class III (special interest areas) contain valuable archeological, botanical, ecological. Geological, historic, zoological, scenic, or other features that require protection.
    - No areas above are found within the boundaries of MAFB properties.

7.2.1 Fishing Program

Recreational fishing is permitted at the 2 small base lakes on the western edge of the base (Numbers 1 and 2) and the three larger lakes on the golf course near the river. Lakes 1 and 2 were constructed in 1960, and lake 2 was renovated in 1979. The lakes are utilized by Canada geese, ducks, beavers from the adjacent off-base West End Ditch, river otters from the Alabama River, and native reptiles and amphibians, including an abundant turtle population. Much of the wildlife utilizes shelter in the adjacent West End Ditch. The base property around these 2 lakes is kept largely cleared to minimize BASH concerns near the airfield.
The 2 western lakes contain sport fish, including largemouth bass, bluegill, red ear sunfish, and catfish. This species combination provides several types of recreational angling opportunities while efficiently utilizing the various components of the fish food chain. Gar have also been introduced in the lakes, presumably due to backwater flooding of lake 1. Though flooding has occasionally introduced other species, this is a rare occurrence for lakes 1 and 2. Therefore, recreational fishing populations can normally be maintained in these western lakes. Fishing at these locations consists of a put-and-take program. The lakes have been stocked occasionally as funding is available.

The primary factors in the lakes' ability to produce optimum sustainable fish crops are depth, fertility, food source, cover, species mix, and proper harvest. Suitable water supply (springs or surface runoff) and easy

access also contribute to the desirable recreational characteristics of the lakes. In Oct 2013, a survey was performed on lakes 1 and 2, including an electrofishing technique to stun the fish and observe a sample of the fish population. The southernmost pond (#1) averages 5-6 feet deep, which should be sufficient to buffer the stressful effects of seasonal air temperature extremes, rapid air temperature changes, and excessive sunlight penetration. This lake appears to be fertile, supporting a balance of sport fish species, with bass and bream predominating. The average depth of lake #1 is suitable for the production of the featured fish species. Additional underwater structures for fish habitat and reproduction would improve this lake, and stocking of additional fish was recommended. In the spring of 2014, threadfin shad were stocked in the pond to provide a food source, and in the fall of 2014, additional adult bass were stocked.

Procedures and acceptable species for the stocking of sport fish should be reviewed for compliance with environmental regulations and guidelines such as EO 11987 (*Exotic Organisms*). After a lake has been stocked, fishing may be prohibited for a period of time. After that, fishing will be permitted as catch-and-release until the population is considered stable and has a sufficient number of large adults, as determined by the NRM.

The northernmost lake (#2) is only 2-3 feet deep over much of the pond area. Bass, bullhead catfish, channel catfish, and sucker fish were present. However, periodic early summer fish kills, presumably due to oxygen depletion during lake turnover seem to indicate that this lake is not deep enough or sufficient to support an expanding fish population. Therefore, fishing is allowed, but the fish population is not actively managed in lake #2. None of these factors should change to any appreciable degree in the foreseeable future.

Recreational fishing is also allowed at the three larger lakes along River Road. These three lakes are backwaters of the Alabama River, and are located within the floodplain of the river. An elevated road separates these lakes from the Alabama River. Two 30-inch, gated culverts pass under the road and allow controlled water addition and accompanying fish from the river. These culverts could be opened when the river is rising but not expected to overflow the road. The yearly inundation by flood waters of the Alabama River, plus the influx of fish through the culverts, precludes an effective fish management program in these lakes. The present practice of allowing fishermen use of these lakes should continue.

All of these 5 larger base lakes are developed open recreational areas, which are accessible to all personnel with base access. All anglers age 16 and older who wish to fish on base are required to obtain a base fishing permit ($3.00/month or $13.00/year), and anglers fishing in lakes 3, 4, 5, and the Alabama River must possess a valid State of Alabama Fishing license (https://www.outdooralabama.com/license-information). State fishing licenses and base fishing permits are available at the Maxwell Equipment Checkout and Outdoor Recreation office, located in building 851. The appropriate fees are submitted to the State of Alabama for the state fishing licenses. A small administrative fee is retained by Air Force Services Agency for issuing fishing permits through the Outdoor Recreation office. The remainder of the base fishing permit fees are deposited into the AF account for fish and wildlife management (57 5095), and are used for conservation and outdoor recreation efforts on MAFB as funds are available.

When fishing permits are issued through the Services Outdoor Recreation Office, anglers are informed of fishing policies. If any incidents of non-compliance are suspected or encountered, Security Forces are contacted. If necessary, Security Forces contacts the appropriate Alabama Department of Conservation and Natural Resources personnel for any potential enforcement action.

Management Goals:

- Continue to allow recreational fishing in the larger base lakes (#1-5)
- Control invasive species at base lakes #1 and #2
- Improve habitat for sport fish and fish spawning in lakes #1 and #2. Restock sport fish as appropriate and as funding is available

- Develop Recreational Fishing Plan
- Monitor and control bank erosion as needed

7.2.2 Golf Environmental Management Program

The Cypress Tree Golf Course at MAFB is comprised of one 18-hole course, three putting greens, a chipping green, and a driving range. The River Course (East Course), which lies along the river at the eastern border of the base primarily within the 100-year floodplain, was closed and is now open green space and training area. The University Course (West Course) lies northwest of Chennault Circle, partially within the 100-year floodplain. The University Course greens have recently been refurbished.

Regular maintenance tasks performed on the golf course that may impact natural resources may include:

- Applying insecticides, herbicides, and fertilizers
- Mowing grass at different heights and directions
- Aerifying and top-dressing greens
- Thinning grass
- Watering/irrigating coordinated on a timely basis with the application of pesticides and fertilizers
- Planting trees, pruning tree limbs and removing dead trees
- Improving drainage of playing areas

Some of the goals of Golf Course Grounds Management include:

- Provide for attractive, unobstructed views across the course and down the fairways
- Supply an adequate amount of water for irrigation to sustain and enhance the growth of vegetation while not misusing water resources
- Achieve proper fertilization, irrigation, suggested planting, and weed/brush control on a timely basis with respect to weather and the onset of the golf season
- Require the mowing of roughs and pruning of trees to maintain aesthetic qualities

The course is mowed and irrigated on a daily basis and fertilized monthly. The golf course superintendent tracks and reports fertilizer, pesticide, herbicide, and fungicide use. The Cypress Tree Golf Course Pest Management Plan is contained within the 42d ABW Pest Management Plan. Additional information regarding golf course maintenance and management can be obtained through 42 FSS.

7.2.2.1 Golf Course Environmental Management (GEM) Plan

In June 2008, the Golf Course Environmental Management (GEM) Plan was created with assistance from the Air Force Center for Engineering and the Environment (AFCEE, June 2008). The stated golf course environmental policy is "…to employ only those management practices that minimize or eliminate the potential for negative impacts to the environment and the surrounding community, ensure compliance with all appropriate regulations, and to regularly reevaluate our processes to achieve the highest standards of environmental excellence."

Maxwell's GEM Plan is incorporated into this plan by reference. Some of the objectives highlighted in the GEM plan include the following:

- Maintain compliance with all appropriate regulations for preservation of wetlands, floodplains, and water quality, and ensure that all water bodies continue to be free of pollutants due to golf course management practices
- Minimize or eliminate the potential for BASH concerns as a result of golf course management practices
- Eliminate the use of potable water for irrigating any of the golf course grounds

- Prevent introduction and establishment of invasive species to reduce their impact on the environment, economy, and health of the United States
- Protect customers, employees, and installation personnel at all times from preventable health and safety hazards including mosquitoes that may carry harmful pathogens

A project was completed in 2013 to upgrade the pumping station along the Alabama River to allow for irrigation of the golf course from the river. This has greatly reduced the use of potable water for golf course irrigation. Currently, there is no limit on water withdrawal from the river.

7.3 Conservation Law Enforcement

Enforcement of the fish and wildlife rules and regulations is an important part of a successful natural resources program. MAFB anglers are provided Fishing Regulations and additional information can be found at the ADCNR website (http://www.eregulations.com/alabama/guide/). The 42nd Security Forces Squadron (42 SFS) provides enforcement support. MAFB does not specifically employ natural resources law enforcement personnel or game wardens. 42 SFS and the NRM enforce Air Force and installation policies and procedures for protecting natural resources including the fishing programs. If a wildlife violation is identified, 42 SFS will contact the appropriate State or Federal agency and detain the offender(s) until an enforcement officer arrives. ADCNR game wardens and USFWS agents have access to MAFB property for enforcement of State and Federal wildlife laws and regulations.

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

The Endangered Species Act (Public Law 3-205) requires military installations to protect and conserve federally-listed endangered and threatened plants and animals and their habitats. When practical, species proposed for listing (i.e., candidate-species) will be given the same protection as species which are already listed. Although installations are not obligated under the Endangered Species Act to do so, AFI 32-7064 encourages protection of state-listed species to the maximum extent practicable.

Two federally protected species were noted as having potential of inhabiting areas on or near MAFB property. According to USFWS Alabama Ecological Services Field Office website, (https://www.fws.gov/daphne/es/specieslst.html#Montgomery), 13 priority special status wildlife species and 2 priority special status plant species have been identified for either Montgomery, Elmore, and Tallapoosa Counties, although only one species has been documented at MAFB. The following sub-sections outline priority special status species with potential to occur on MAFB property.

7.4.1 Federal Special Status Species

MAFB is required to manage for federally-listed and when practical, candidate species. Failure to protect federally-listed species could lead to an ESA violation, which could negatively impact training land availability. Details regarding potentially occurring federally-listed species and management techniques are provided. One federally-listed priority wildlife species has been known to occur at MAFB property, the wood stork.

Wood stork: The wood stork a long-legged wading bird with white and black plumage, a short black tail, a dark gray head and neck and a thick black bill which curves slightly. Nesting is restricted to Florida, Georgia and South Carolina. After breeding, birds will migrate northward to the Atlantic and Gulf coasts. Its habitat includes freshwater and estuarine wetlands and nests in cypress or mangrove swamps.

Wood Stork
Source: USFWS

The wood stork is not known to breed in Alabama, though there is evidence suggesting the species bred in Macon County (Dusi et al. 1968). In September 2017, MAFB confirmed sightings of the wood stork in wetland areas along River Road (**Figure 15**). These observations are likely from post-breeding dispersal from colonies in Florida, Georgia, and South Carolina. There are accounts of post-breeding aggregations in Alabama numbering above 50 with a few reports of aggregations in excess of 100 birds. These dispersing individuals are in search of foraging sites, which may include natural wetlands and artificial water habitats. Preferred feeding areas typically support water depths less than 50 cm (often 10 - 30 cm) and are generally open (i.e., sparse tree canopy). Major food items are aquatic organisms, mostly fish (Coulter et al., 1999). Based on the general sightings of many bird enthusiasts and ornithologists, July and August seem to support some of the larger numbers of post-breeding aggregations relative to other months for Alabama.

The installation has provided awareness training to airfield personnel, base leadership, and Unit Environmental Coordinators to protect these birds if seen again on MAFB property. If wood storks are discovered on MAFB property, the person should not disturb the bird and should immediately notify the NRM. Appropriate notifications will be made through MAFB chain of command that human activity should cease until bird(s) exit the area. If frequency of sightings increases, formal surveys may be recommended in the future. The following management strategies for wood storks are recommended by USFWS:

- Protect foraging, nesting, and roosting habitat.
- Develop baseline contaminant information.
- Develop an understanding of how man-made wetland systems affect wood stork health and develop management strategies for these wetlands to benefit the recovery of the wood stork.

Figure 15. Wood stork (*Mycteria americana*) sightings at River Road on MAFB.

Bald Eagle: Bald eagles, recently delisted under the ESA, remain protected under the Bald and Golden Eagle Protection Act (BGEPA). Bald eagles are known to nest near MAFB property, and individuals may use the installation in a transient manner, or for foraging along adjacent waters. There are no documented nesting locations on MAFB property. The following management strategies for bald eagles are recommended:

- Continue informal surveys by NRM and USDA representative to monitor for potential occurrences or nesting sites on MAFB property
- Encounters with bald eagles should be avoided, both within the vicinity of a nest and as part of BASH risk reduction activities
- Modifications to aerial structures and electrical transmission lines should incorporate proven design techniques that discourage bald eagle use and eliminate or reduce bald eagle hazards
- Limit use of pesticides as described in the IPMP, in order to limit indirect impacts to eagles

Red-cockaded woodpecker: The red-cockaded woodpecker is a foraging bird usually found in mature pine forests, preferring longleaf pine. It's the only woodpecker to excavate cavities in living pine trees. Usually found in pine forests throughout the southwestern U.S, it plays the role of keystone species in its ecological niche. Maxwell AFB does not have large areas of pine forests that would be attractive habitat for the red-cockaded woodpecker, and no occurrences have been documented through previous surveys. No specific management strategies are required at this time. Periodic surveys, both formal and informal, should continue to monitor for favorable habitat and the potential presence of this species. General management strategies could include:

- Frequent prescribed burning of foraging habitat during the growing season

Red-cockaded Woodpecker
Source: Michael McCloy

- Landscaping, whenever possible, should use existing natural vegetation and not involve extensive hardwood tree plantings
- Reestablish native longleaf pine ecosystems, if feasible

Indiana Bat
Source: Ann Froschauer/ USFWS

Indiana bat: The Indiana bat is a small social bat with mouse-like ears found over most of the eastern half of the United States. It eats a variety of flying insects including pest species. These creatures hibernate in caves during winter and follow this with a summer migration to wooded areas to roost in dead or dying trees. They are found over most of the eastern portion of the U.S. However, the 2019 U.S. Air Force Bat Acoustic Survey did not indicate the presence of the Indiana Bat at MAFB. Periodic surveys, both formal and informal, should continue to monitor for favorable habitat and the potential presence of this species. No specific management plan is needed at this time.

Northern Long-eared Bat
Source: NY Dept. of Env.

Northern long-eared bat: The northern long-eared bat is a medium sized bat with noticeably long ears and feeds in the understory of forested areas to eat moths, flies and other small insects. During the winter it will find caves to hibernate in and migrate to wooded areas for summer to roost in living and dead trees. Its range is much of the eastern and north central U.S. and parts of Canada. However, the 2019 U.S. Air Force Bat Acoustic Survey did not indicate the presence of the Northern long-eared bat at MAFB. Periodic surveys, both formal and informal, should continue to monitor for the potential presence of this species. No specific management plan is needed at this time.

Tri-colored Bat
Source: USFWS

Tri-colored bat: The tri-colored bat is a small bat that is yellowish or reddish brown, typically found roosting singly and appearing rounded or hunched. The forearms are distinctly pink in color. Species is widely distributed throughout the eastern half of the United States and Canada, and as far south as Honduras. This species was detected through the 2019 acoustic survey. Management strategies include:

- Protect trees during the summer when bats are known to roost in foliage, except where public or worker safety concerns exist.
- Avoid disturbance around roosting locations.

Gopher Tortoise
Source: Randy Browning/ USFWS

Gopher tortoise: The gopher tortoise is an important keystone species found in upland habitat throughout the southwestern U.S, valued for their burrowing which provide refuge for about 360 other species. It can live up to 80 years in the wild and are primarily herbivorous, eating grasses, mushrooms, berries and flowers. They enjoy the same type of habitat as the red-cockaded woodpecker. Suitable habitat is not generally found on Maxwell AFB, and the species has not been identified in previous surveys. Periodic surveys, both formal and informal, should continue to monitor for favorable habitat and the potential presence of this species. No specific management strategies are required at this time.

Loggerhead shrike: The loggerhead shrike is one of 30 species of true shrikes whose range extends throughout North America. It occupies ecotones and open grassland habitats. Insects make up the bulk of its diet but it will also feed on vertebrate prey which it impales on sharp objects. The southern portion of its range is where it can be found year round, the northern portion of its range are classified as migratory where they are present in the summer months. The following management strategies are recommended:

- Improve foraging habitat by halting conversion of native prairie and rangeland
- In areas where shrikes are known to inhabit, advise slower driving speeds to avoid deadly collisions with the birds

Loggerhead Shrike
Source: Michael Smith/

Brown headed nuthatch: The brown headed nuthatch is a small bird who feeds on insects from foliage and is endemic to the southeastern pine ecosystem where it nests in open canopied, mature longleaf pine habitats. Because it relies on snags for nesting it has the potential to be a good indicator species for the health of the pine forests it is associated with. The following management strategies are recommended:

- Mechanical treatments such as fire can be used to suppress understory encroachment

Brown Headed Nuthatch
Source: Matt Tillet

Red headed woodpecker: The red headed woodpecker is a noticeable bird due to its red-colored head, activity, and harsh calls. It is located throughout the eastern portion of the U.S, its range extending northward for breeding. It feeds on insects, worms, spiders, and plants through opportunistic foraging techniques. It habitat includes open pine woods, forest edges, and orchards. The following management strategies are recommended:

- Keep a good availability of trees with dead limbs or dead trees, especially hardwoods or pines
- Keep an open understory with a good number of mast trees, producing nuts and acorns

Red headed Woodpecker
Source: Mark and Sue Siekierski

Wood thrush: The wood thrush is a songbird found throughout North America who inhabits mainly deciduous woodlands and breeds in the understory. These birds will forage from the ground seeking insects and in shrubs and trees seeking berries. The following management strategies are recommended:

- Maintain large and un-fragmented forest blocks
    - Patches of 150 acres or larger will generally provide thrushes with high to moderate levels of habitat suitability
- Promote understory growth through natural disturbance or management
- Limit over-browsing by deer, livestock, and other ungulates

Wood Thrush
Source: Jeff Moore/ Macaulay Library

Prothonotary warbler: The prothonotary warbler is a songbird whose decline coincides with the clearing of southeastern swamp forests. Its bright yellow color makes it stand out amongst its habitat as it forages for insects and snails. It breeds in swampy habitats, sharing the areas with the red-headed woodpecker. Its distribution includes the southeastern U.S., extending northward for breeding. The following management strategies are recommended:

- Increase habitat availability by retaining trees or snags with cavities suitable for nesting
- When possible, increase the width of all forested-riparian areas

Prothonotary Warbler
Source: Matthew Orselli

Alabama canebrake pitcher plant: The Alabama canebrake pitcher plant is a carnivorous herb whose historical range includes Alabama. Its trap leaves function as capsules to drown insects in a mixture of rainwater and enzymes in the pitcher. It grows in hillside seeps, bogs, and close to streams in longleaf pine forests in central Alabama, especially those that are open and fire-maintained. Although the Alabama canebrake pitcher plant has not been identified on MAFB property, the species has potential to occur adjacent to the installation (**Figure 12**), and surveys should be conducted to provide an overall assessment and ecosystem management strategy if found. This species has not been identified on Maxwell AFB through previous surveys; therefore, no specific management plan is required at this time. Periodic surveys, both formal and informal, should continue to monitor for favorable habitat and the potential presence of this species.

Alabama canebrake pitcher plant
Source: USFWS

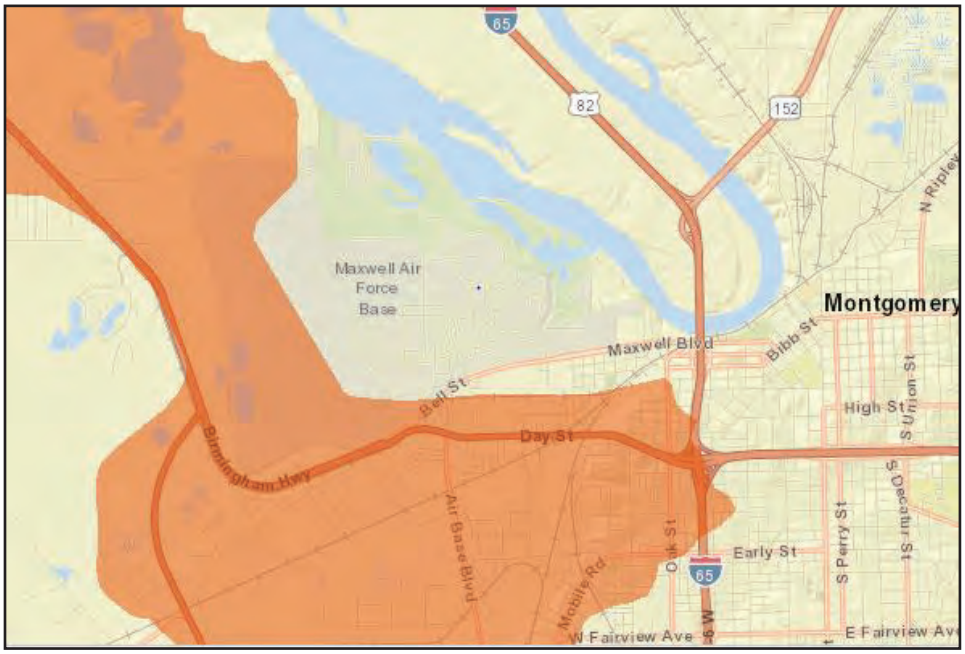


Figure 12. Alabama canebrake pitcher plant location range.
Source: USFWS

Georgia rockcress: the Georgia rockcress is a perennial herb that inhabits shaded areas along streams throughout Georgia and Alabama, growing where soil has recently eroded and other plants have been excluded by unfavorable soil conditions. It can often be found growing in the shadows of red cedar, black oak, sugar maple, chestnut oak, and oak leaf hydrangea. This species has not been identified on Maxwell AFB through previous surveys; therefore, no specific management plan is required at this time. Periodic surveys, both formal and informal, should continue to monitor for favorable habitat and the potential presence of this species.

Georgia Rockcress
Source: University of Georgia

Mollusks: Many indigenous freshwater mussel species occur or are believed to occur in Alabama and are classified as federally endangered (n=39), threatened (n=6), or imperiled (n=40) throughout their region (USFWS, Southeast Region 2011). Stressors for these special status species include anthropogenic stress from dredging, damming, pollution, invasive species, manufacturing, sedimentation, and pearl production. No protected mussel species are known to occur on MAFB property, and any activity in or near a stream, river, or other water body must be reviewed for possible impacts to listed mussel species. This includes land disturbance, chemicals, effluent discharge, water crossings, dredging, construction, and any other activity or environmental disturbance with the potential to affect water quality or mussel movement.

7.4.2 State Special Status Species

There are 3 state-listed priority species that occur in either Montgomery, Elmore, or Tallapoosa Counties; in addition to those species already discussed above under the federally-listed species sub-section. None of these species have been documented on MAFB, Gunter Annex, Vigilant Warrior Training Site, or Lake Martin Recreation Area.

Osprey: Is a large raptor that inhabits lakes, rivers, fresh and saltwater marshes and feeds primarily on fish. For nesting and perching, it requires forested areas with snags but will also use man-made structures. The species decline coincides with increased use of DDT since the chemical is ingested by ospreys when they eat fish who have been exposed to DDT. The osprey is currently on the rise. Maxwell AFB natural resource personnel and USDA personnel should continue to survey for the potential presence of ospreys on the installation.

Osprey
Source: Bob Howdeshell

Alabama map turtle: Is a shy, medium-sized turtle whose range is mostly confined to Alabama but also includes surrounding states. They are carnivorous and prefer rivers and streams with sandy or muddy bottoms. Basking sites are essential to their comfort and they are an integral part of the habitats they live in because they control populations of their prey while acting as a food source themselves. The following management strategies are recommended:

- Update Maxwell's surveys for reptiles and amphibians
- Prevent the loss of wetland and adjacent upland habitat through land-use planning
- Consider options for river and stream mitigation strategies that give high priority to avoidance and restoration

Alabama map turtle
Source: Jim Godwin

Black-knobbed sawback turtle: Is a smaller turtle whose carapace has broad, rounded, black, knoblike vertebral projections. It can be found throughout Alabama and Mississippi where there is sand and clay-bottomed streams with moderate currents and plenty of basking sites. They feed on insects, mollusks and fish. The following management strategies are recommended:

- Update Maxwell's surveys for reptiles and amphibians
- Avoid removing dead logs from shorelines that can be used for basking
- Consider options for river and stream mitigation strategies that give high priority to avoidance and restoration

Black-knobbed sawback turtle
Source: Michael Bloxom

7.4.3 Pollinator Conservation

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

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

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

7.5 Water Resource Conservation

For a complete summary of water resources on MAFB property see Section 2.2.4. Water resource management needs to consider land and water management actions at MAFB in terms of impact on the quality and quantity of groundwater and surface water within the watershed. The watershed (or drainage basin) is a topographically defined area that drains to a particular point on the landscape – usually a waterbody, wetland, or point along a stream or ditch.

Management practices focus on an installation's effect on regional watersheds. The effects on the watershed are primarily from the stormwater from the MAFB. The storm water can be affected by both direct impacts from discharges from operations run-off, and from non-point source pollutions such as run-off from yards and other surfaces. Management practices for water resource protection include maintaining monitoring

activities for both groundwater and surface water. When possible, monitoring programs and management activities will be part of available cooperative programs with regional government or private organizations.

Any material which enters waterways and groundwater affects the quality of the waters on and leaving MAFB. Materials carried in storm water runoff from developed areas could include fuel, oil, grease, coolant and metals which accumulate on pavement from vehicles and aircraft; deicing chemicals applied to roadways, runways, and aircraft; and fertilizers and pesticides applied to yards and other treated surfaces. Other potentially included materials are uncontained hazardous materials, such as solvents, from normal use and contaminants migrating from ERP sites. Industrial and sanitary wastewater discharges are managed by collection and treatment prior to discharge into surface waters.

Maxwell's Environmental Office maintains "Site Disturbance During Construction Activities and Stormwater Pollution Prevention" directives. These requirements contain Best Management Practices (BMPs) that must be implemented with all ground-disturbing activities to prevent soil erosion and to protect surface waters on MAFB property. These instructions are provided to Maxwell Civil Engineering personnel and contractors for proposed site-disturbing activities. Compliance is monitored by quality assurance and environmental personnel.

The responsibility of watershed management does not fall entirely on operational personnel. Grounds contractors, privatized family housing residents, facility managers maintaining landscaped areas, and general construction contractors, in addition to the operational personnel, must all take responsibility to prevent soil erosion, to maintain or enhance soil fertility on improved grounds, and to protect surface waters from non-point pollutants including sediments, pesticides and excess nutrients, and other surface contaminants.

MAFB maintains and remains in compliance with NPDES Stormwater and Wastewater Discharge Permits.

7.6 Wetland Protection

Wetlands play an important role in the ecosystem as well as improving water quality and flood control. EO 11990 requires all federal agencies to provide leadership in the protection of wetlands in managing federal lands and conducting federal activities and programs affecting land use.

The wetlands on MAFB, Gunter Annex, and Lake Martin Recreation Area were surveyed in 1994 and updated by Maxwell AFB Environmental Office in 2009. The results of the survey provided acreage size, hydrologic modifiers indicating length of time they are expected to be saturated, as well as a description of vegetation habitat type found in each wetland area. These results assisted in the management of information to improve and protect wetlands. As a part of the management system, the wetlands will be routinely monitored for changes in vegetation, hydrology, and size. Management practices to improve the quality of or expand wetlands focus on those wetlands connected to wetlands or watersheds extending beyond the base boundary.

7.6.1 Management Strategies

In general, water resources will be managed through conservation and impact avoidance. The following guidelines will be implemented to ensure compliance and to protect and enhance water resources on MAFB.

- Consult with the U.S. Army Corps of Engineers (USACE) prior to initiating projects with the potential to disturb water resources
- Apply for an appropriate permit when regulated waters, including wetlands and associated buffers, will be impacted

- Do not allow vehicles within known wetland areas
- Restrict vehicles from within 30 feet of water resources except where established crossings and roads exist
- Maintain riparian management zones (RMZ) around water resources, including at least 100 foot vegetated buffer along streams where practicable
- Implement management controls to limit unavoidable erosion with the RMZs
- Avoid disturbance of wetlands and aquatic habitats where practicable
- Manage invasive species to promote desirable native species
- Plan development to avoid wetland and floodplain impacts to the maximum extent possible and mitigate unavoidable impacts on wetland and floodplain functions
- Review operations and maintenance programs that potentially affect water resources and develop procedures and guidelines to avoid the loss of function
- Do not enhance wetlands or other water resources in the Air Operations Areas (AOA) and ensure any mitigation occurs outside the AOA

7.7 Grounds Maintenance

Given that large parts of MAFB and Gunter Annex are landscaped, the management and design of those areas has significant implications for water quality, BASH risk and native species. The following recommended landscaping practices should benefit the environment and generate long-term cost and maintenance time savings. The use of native plants not only protects biodiversity and provides wildlife habitat, but it can also reduce demands for fertilizer, pesticides, and irrigation and their associated costs.

General recommendations to promote environmentally beneficial landscaping include:

- Maintain and protect the health, environmental quality, aesthetic value, and ecological balance of the military community
- Design landscaping to be suitable to the specific site and appropriate for the use and operation of the facility
- Maintain the grounds on MAFB properties in a prioritized manner according to the location's visibility and amount of traffic. Provide greater maintenance on grounds with high visibility and/or traffic
- Improve the appearance of the installations and its facilities through the preservation of the natural terrain and vegetation, and by appropriate new plantings
- Follow principals that encourage conservation, plant healthy, and low maintenance species that support existing military uses
- Plant willow thickets, buttonbush, or other vegetative erosion control plants along bank areas prone to erosion
- Minimize use of water by planting drought-tolerant and low water use native plants for landscaping.
- Implement water-efficient practices, use efficient irrigation systems and recycled water, and use landscaping to conserve energy
- Limit turf areas where practical to reduce water use and maintenance requirements.
- Use wood mulch instead of rock mulch, when practical
- Prevent expansion of nonnative plants into native plant areas by using regionally native plants for landscaping, where practicable
- Reuse landscape trimmings on site, as appropriate
- Use porous pavement when possible to support water infiltration
- Do not use seed-bearing or fruiting plants that provide food for wildlife and wildlife habitat in areas near airfield
- Prevent non-point pollution from the application of fertilizers

- Ensure new landscaping is in compliance with Anti-Terrorism/Force Protection standards

MAFB lands are classified and subsequently managed using three land use categories: improved land, semi-improved land, and unimproved land. Of the total areas managed by MAFB, the main installation and Gunter Annex is primarily composed of improved land (**Map C-29 and C-30)**, Lake Martin Recreation Area is primarily semi-unimproved with sections of semi-improved **(Map C-31)**, and Vigilant Warrior Training Site is classified as mostly unimproved (**Map C-32)**. The following characterizations can be made regarding land types.

Improved lands: This classification includes areas that have been developed for administration, housing, other building projects, and organized recreation (golf courses, ball fields, etc.). Vegetation on improved lands requires constant maintenance to ensure survival in the local arid climate. On MAFB and Gunter Annex, the major turf grass is a combination of Common Bermuda, St. Augustine, and Bahia. Improved lands are regularly mowed and irrigated throughout the year and aerated as needed. Weeds and brush are controlled with herbicides, as required. Trees and shrubs are pruned at least annually.

Semi-improved lands: Semi-improved lands on MAFB, Vigilant Warrior Training Site, and Lake Martin Recreation Area usually include areas that are located in proximity to runways, airfields, fence lines, parking ramps, and minimally developed spaces such as open storage areas. Most semi-improved lands are not grass seeded; those areas with grass are irrigated and mowed during the growing season. Mowing also controls weeds and brush, which is important for reducing fire hazard fuels. Trees and shrubs are pruned when needed.

Unimproved lands: Grounds are not classified as improved or semi-improved and usually not mowed more than once a year. These include areas such as timber and forest lands, lakes, ponds and swamps, areas in airfields beyond the safety zone, and similar areas requiring limited or no maintenance.

Additionally, all improved and semi-improved areas of the base should be continually evaluated for possible conversion to lower levels of grounds maintenance. Semi-improved areas should be evaluated for reduced mowing, or elimination of maintenance to allow for conversion to the native habitat. This will reduce the overall grounds maintenance expenses by converting additional improved grounds to semi-improved grounds, or converting semi-improved grounds to unimproved grounds.

In addition to these more general landscaping practices, seek alternative processes such as natural landscaping, rain gardens, drainage swales, cisterns, permeable paving, or shallow depressions that would be beneficial for managing stormwater on site and for improving water quality in adjacent water bodies. Rain gardens or depressions are generally placed strategically to capture stormwater from impervious services (e.g., parking lots) and typically are bowl shaped depressions filled with organic matter and native plants. These depressions then allow for improving the water quality of the stormwater runoff, while allowing for slow infiltration into the ground water.

7.7.1 General Maintenance

Grounds maintenance that occurs on MAFB and Gunter Annex is provided primarily by the Federal Prison Camp. Federal Prison Camp inmate support includes grass cutting, bush-hogging or other mechanical vegetation control, tree pruning, shrub trimming, fertilization, tree/shrub planting, and other related activities. In addition, the MAFB and Gunter Annex Federal Prison Camp scope of work specifies other related activities performed. No chemical pest control is performed by the Federal Prison Camp inmates. Grounds maintenance is performed on approximately 1,947 acres of improved and semi-improved grounds on MAFB and Gunter Annex. Improved ground areas covered by this contract include lawns in the main cantonment, parade grounds, athletic fields, and road shoulders along major thoroughfares. Semi-improved

grounds such as the airfield, rifle range, antenna farms, ammunition storage areas, secondary road shoulders, and drainage ditch banks are maintained at a somewhat lower level. For roadside maintenance throughout the installation, where feasible, it is recommended that grass height is maintained along roadways of at least 25 centimeters (cm; 10 inches).

All of the turf in common or community areas of the installations is also maintained by Federal Prison Camp inmates. Privatized Family Housing (PFH) personnel utilize a local contractor to maintain their own lawn areas. Civil Engineering pest management personnel are responsible for weed, insect, and disease control in all turf areas maintained under the grounds contract. Herbicides are primarily used to control weeds associated with paved areas such as sidewalks, roadways, and airfield pavements.
Mowing is performed as needed to maintain the grass between heights of 2.5-4 inches in improved areas. In semi-improved areas, except the airfield, the grass is maintained at heights between 6-18 inches. On the airfield, the height is maintained between 7-14 inches, in accordance with the Bird/Wildlife Aircraft Strike Hazard (BASH) Plan, to discourage birds from using the airfield. Turf establishment or re-establishment is primarily through the use of hydromulching or sodding. The limited amount of turf areas on unimproved ground, such as right-of-ways, is mowed to maintain the grass heights between 8-24 inches.

Air Force and Federal Prison Camp employees administering grounds maintenance should ensure that maintenance personnel are qualified to do the work and are familiar with the regulations and policies outlined in various plans, including this INRMP.

7.8 Forest Management

MAFB and Gunter Annex consists of developed areas, with little or no forest program land, and few undisturbed ecosystems remaining. Much of the base is comprised of fragmented urban forests. Healthy urban forests benefit the installations and their missions by increasing the aesthetic value of the installations, screening unwanted views, creating a microclimate regulator by providing shade, acting as a windbreak, stabilizing soil, and filtering pollution from the water shed. Urban forests on MAFB will continue to be maintained for their functional and aesthetic values, as well as to provide wildlife habitat in otherwise urban environments. Forested areas will be surveyed on a regular basis and dead and diseased trees will be removed and pruning will be performed to remove sick, weak, or hazardous tree components. Tree species that are planted in forested areas will be selected to assure diversity, functionality, and suitability for existing in an urban environment with minimal maintenance required. Tree planting sites will be selected to avoid conflicts with buildings and other structures. Details for tree selection, placement, and maintenance can be found at the Alabama Urban Forestry Association (http://www.aufa.com/).

Fragmentation reduces forest health and degrades habitat. Floral and faunal movement is inhibited in isolated forests, restricting breeding and gene flow which result in long-term population decline (**Figure 16**). The installation should avoid the loss or disturbance of even small forest tracts, especially those adjacent to existing wetlands and riparian zones. Habitat improvements are not expected to conflict with flying missions. The smaller forested tracts in more naturalized areas along the Alabama River will be managed to protect native species of flora and fauna, and control the spread of invasive species.

Urban forest alterations (e.g., cutting, burning) or disturbances (e.g., mowing) during avian nesting season can destroy active nests and eggs, kill nestlings, and/or cause the birds to abandon the nests. To prevent this from occurring, cutting down or trimming trees should be avoided from 15 April to 15 August.

The goals and objectives section will depict many of the initiatives the base plans to implement over the next 5 years, to include an Urban Forestry Management Plan as a component to the INRMP. Objectives of forest management are to maintain ecological integrity, maintain a biological balance in the forest community, protect watersheds and wildlife habitat, Commercial forestry does not occur on MAFB properties.

7.9 Wildland Fire Management

This section is not applicable to MAFB properties.

7.10 Agriculture Outleasing

This section is not applicable to MAFB properties.

7.11 Integrated Pest Management Program

MAFB has an Integrated Pest Management Program implemented by the CE Operations Flight (MAFB 2017). Integrated Pest Management (IPM) is the use of multiple techniques in a compatible manner to avoid damage and minimize adverse environmental affects while obtaining control of target pests. The goal of IPM is to utilize non-chemical procedures to control pests, including invasive, exotic plant and animal species. Management goals associated with pest management assess how pest species interrelate with the NRM of the installation and controlling invasive species. An IPM was designed for the installation and is provided in **Section 15**, **Tab 5**. Pest management records will be maintained in the Enterprise Environment, Safety, and Occupational Health Management System (EESOHMIS). The IPMP is reviewed annually by the Installation Pest Management Coordinator, Installation Environmental Coordinator, Senior Installation Engineer, Installation Medical Officer, Installation Commander, and AFCEC/COSC Pest Management Consultant .

Figure 16. Urban Forest Ecosystem providing bat and avian habitat.

MAFB only uses pesticides that are approved by the EPA and AFCEC/COSC. Low-toxicity pesticides are applied to infested areas, when necessary. Herbicides are used to control weed growth, especially around the runways and taxiways. Vertebrates such as opossums and birds are controlled through the use of

trapping devices while rats may also be controlled by poisons, as necessary. Exotic nuisance plant species are treated with herbicide.

7.11.1 Invasive Species

A Natural Community and Rare Plant and Animal Survey for Maxwell Air Force Base, Gunter Annex, and Lake Martin Recreation Area took place in 2002 (Alabama Natural Heritage Program). The priority species targeted are listed in **Table** 7 in **Section 2.3.2.2.4**. The 2002 survey focused on the improvement of existing natural communities, and the impact from flooding, fire, tornadoes, and ecological forces allowing invasive species to quickly proliferate. Disturbed land along linear features such as roads, ditches, and mowed right-of-way (ROW) has allowed invasive plant species such as *Ligustrum* to become established in many states throughout North America. Several forested areas along the Alabama River and golf course have been identified as overgrown with Chinese tallow trees, and recent eradication efforts proved futile due to widespread occurrence and limited funding (MAFB 2015). If Chinese tallow trees are identified in new locations, the installation should program for immediate removal to mitigate movement of this species. MAFB is also experiencing other terrestrial invasive species such as Chinese privet, Japanese privet, Johnson grass, Chinaberry, kudzu, and bamboo along with numerous aquatic invasive species creating unfavorable conditions in installation lakes.

The State of Alabama lists numerous plants and animals as noxious or invasive. The following link http://www.se-eppc.org/alabama/2007plantlist.pdf can be used to view the list of plants. Alabama lists no animals as invasive, but does list several birds, with the pigeon being the most prevalent pest to the area.

Insects such as fire ants, mosquitoes, cockroaches, fleas, ticks, bees, wasps, hornets, and termites are monitored and managed on MAFB properties. Current fire ant eradication programs, such as Auburn University Entomology Integrated Pest Management Pest Press 'Give Fire Ants the Boot,' provide recommendations to manage red imported fire ants on MAFB properties (https://enpp.auburn.edu/pestpress/2013/09/26/239/). The goal of the program is to keep fire ant abundance below the level that causes damage for a particular area or circumstance. IPM options mentioned in the management plan include (1) regulatory control, (2) cultural control, (3) biological control, and (4) chemical control.

7.11.2 Management Strategies for Invasive Species

Invasive, non-native species and noxious weeds have the capability to significantly impact native vegetation and wildlife. A key element of INRMP implementation is to ensure no net loss of military training capability. Management of undesirable species is necessary to maintain military lands and facilities in usable condition. In addition, uncontrolled insects and other animal pests can become health hazards, which could threaten the military mission. The task of controlling invasive and exotic species and noxious weeds is often expensive, lengthy, and risky because total eradication is required to prevent reestablishment. Prevention is the best approach. However, in accordance with laws and regulations pertaining to the management of these species, the NRM group will work to prevent the introduction of these species and take measures to control them in an economically and environmentally sound manner.

General management strategies are as follows:

- Implement Best Management Practices (BMPs) to minimize land disturbances that favor invasion of non-native species and re-vegetate disturbed areas with native species
- Native rock material should be used instead of non-indigenous rock when practical for maintenance or construction projects

- Utilize mulches from MAFB or certified-weed free sources to facilitate the establishment of native ground cover on impoverished soils
- Maintain biodiversity and undisturbed habitat to maximize resilience to and competition with invasive species
- Control invasive and exotic species and noxious weeds through early detection, isolation of infested areas, and control of individual plants with physical, chemical, or mechanical means, depending on the species
- Favor basal application and spot treatment and avoid aerial or broadcast application of pesticides to prevent adverse impacts to native plants and wildlife
- Do not use invasive, non-native species in landscaping
- Continue to reseed exposed soils using a certified weed-free native grass mix
- Education of users, maintenance staff and others, as relevant

The use of chemicals to control invasive and exotic species can hinder an installation's efforts to reduce usage of pesticides. Therefore, it is important to prevent the initial spread of invasive and exotic species and address the spread of such species as early as possible to reduce the amount of required herbicide and pesticide applications, and reduce costs associated with treatment. The MAFB NRM should evaluate the threat of invasive species as well as the environmental impacts and permitting requirements of herbicide usage, if applicable, prior to implementing any eradication and/or control program.

7.12 Bird/Wildlife Aircraft Strike Hazard (BASH)

MAFB wing staff and operations group implement a BASH Plan (MAFB 2018a) which has established specific procedures intended to reduce known and future hazards from birds, including the development of a Bird Hazard Working Group (BHWG). The BHWG is chaired by the Vice Wing Commander and is responsible for developing, implementing, and updating the BASH Plan and reviewing BASH incidents. The natural resources manager (NRM) also participates in the BHWG.

Birds can be encountered up to altitudes of 30,000 feet and higher. However, most birds fly close to the ground level, and more than 95% of all reported incidents in which an USAF aircraft has struck a bird have been below 3,000 feet above ground level. Approximately half of these bird strikes occur in an airfield environment, and approximately one quarter occur during low-altitude training. Strike rates rise significantly as altitude decreases, partly due to the greater number of low-altitude missions, but mostly because birds are commonly active close to the ground. Any gain in altitude represents a substantially reduced threat of a bird-aircraft strike. The potential exists for future bird strikes if current procedures to minimize risk are not continued.

At MAFB, there are several common birds that might be present and pose a hazard: gulls, hawks, owls, falcons, blackbirds, starlings, rufous-sided towhee, pigeons, doves, ducks, geese, woodpeckers, crows, wild turkey, sparrows/house sparrows, chickadee, meadowlark, killdeer, tufted titmice, and common grackle. Migratory waterfowl (ducks, geese, and swans) pose a threat to low-flying aircraft. Waterfowl vary considerably in size, from 1-2 pounds for ducks, 5-8 pounds for geese, and up to 20 pounds for most swans. There are 2 normal migratory seasons, spring and fall. Waterfowl present an increased hazard during the migratory season; however, Canada geese have become year-round residents in Alabama's favorable climate, and congregate near ponds found on and near Maxwell. Waterfowl typically migrate at night and generally fly between 1,500-3,000 feet above ground level during the fall migration and 1,000-3,000 feet above ground level during spring migration. Other large avian species, such as turkey vultures and gulls,

pose a threat to military aircraft. In addition, bats contribute to air strikes at MAFB and man-made bat boxes are prohibited.

To minimize the BASH-related risk, wildlife management on MAFB, 42 AFB/SEF will attempt to deter animals from foraging or roosting in areas near or adjacent to the low-level flying routes and attract wildlife to areas away from those routes. This approach has been chosen due to the relative abundance and diversity of wildlife species present on MAFB, and the low likelihood of excluding all wildlife species that pose a significant threat to the safety of the flying mission.

The potential for BASH has been reduced by an effective BASH Plan developed and maintained by the MAFB Flight Safety office, 42 ABW/SE, in coordination with the installation NRM. The Plan includes close management of the grass height in and around the airfield to reduce flocking of birds, monitoring, and reporting of flocks by all airfield users, and the MAFB Bird Hazard Warning System along with Bird Watch Condition (BWC) codes for air crews. Habitat modification, non-lethal hazing, use of pyrotechnics are all employed IAW the BASH Plan. If those means are not effective in controlling nuisance wildlife presenting a BASH risk, MAFB maintains a USFWS Airport Depredation Permit and an Alabama State Wildlife Control Permit to manage nuisance wildlife.

BWC codes are used for rapid dissemination of wildlife activity in the airspace and provides recommendation procedures to reduce the hazard. BWC is reported to aircrew including specific information such as wildlife life species, location, and number. Except for BWC Low airfield status, BWC Severe, and BWC Moderate will be reported on the Automated Terminal Information Service (ATIS) by Airfield Management or Wing Safety to reduce BWC to Low. Monitoring of flocks throughout the normal flight zones is also performed with particular areas of high risk avoided by de-conflicting flight patterns (i.e., avoiding direct overflight), whenever feasible. It also mandates the use of the Bird Strike Threat (BST) calculator in mission planning developed to be used in conjunction with Avian Hazard Advisory System/Bird Avoidance Model (AHAS/BAM) to predict bird strike threat risk.

Due to the proximity to 2 major avian migratory routes, the Mississippi Flyway on the east and the Atlantic Flyway to the west of MAFB, waterfowl and blackbirds are the greatest potential aircraft strike hazard at MAFB. A mammal sighting log is maintained and includes the number of species, their location, direction of travel, and record of runway intrusions. Birds and mammals are dispersed from the airfield utilizing pyrotechnics, propane cannons, repellents, trapping, depredation, and/or vehicles whenever they pose a hazard to aircraft operations. Airfield management as well as the USDA representative, are the agencies responsible for the dispersal of wildlife. Sixteen remotely controlled bird scare propane cannons have been placed around the airfield to help in bird dispersal. These cannons are controlled by airfield management or Flight Safety personnel. Under bird watch conditions classified as “Moderate” or “Severe” pyrotechnics may be used. These practices have proven adequate in most situations.

As long as current threat reduction practices continue to be employed on the airfield, waterfowl and blackbird populations currently pose minimal conflict with airfield operations. However, the Bird Avoidance Model (BAM) graphs predict waterfowl migration hazards. Raptors and blackbirds pose year-round hazards. Migratory birds are protected by federal law and managed by the USFWS. The base has a bird depredation permit from the USFWS. A USFWS bird depredation permit, in accordance with 50 CFR part 13 and part 21.41, The MAFB BASH Plan 91-212 is included in **Section 15**, **Tab 2**.

All construction projects will be reviewed by the BHWG or 42 ABW/SE for any BASH related impacts. Projects that disturb the grounds must include a restoration plan as part of the project. Must ensure the site is returned to pre-construction condition and include landscape that deters wildlife.

7.13 Coastal Zone and Marine Resources Management

This section is not applicable to MAFB properties.

7.14 Cultural Resources Protection

Important historical cultural resource items are present at MAFB. Very little information of the cultural resources is made public to prevent any intentional destruction or collection of cultural artifacts. The resources will be managed on a case-by-case basis when development or disturbance of the specific areas of interest are proposed. The installation Cultural Resources Manager (CRM) will review all plans for the possible effects on the cultural resources, and the State Historic Preservation Officer will be consulted in the event that a base project potentially could affect cultural resources.

To protect these resources and to integrate cultural resources management into the planning and implementation of construction, training, and land use, an Integrated Cultural Resource Management Plan (ICRMP) has been prepared and is reviewed annually by CES/CEIEA, with any major revisions required every 5 years.

In support of the mission at MAFB and to assist in compliance with the National Historic Preservation Act (NHPA) and Alabama State Historic Preservation Office, the ICRMP cites the relevant historic preservation laws which the Air Force must comply with, presents various information useful for determining the significance of the installation's cultural resources, summarizes the installation's inventory of known cultural resources, identifies the potential for discovery of additional significant resources, describes present and anticipated near-term land uses, identifies potential threats to cultural resources and activities regulated by or exempted from regulation by the ICRMP, and provides standard operating procedures and prioritized action plans and programs for cultural resources management.

The ICRMP and general protection of cultural resources were considered during preparation of the INRMP. It is the NRM's responsibility to coordinate a natural resource activity/action with the cultural resource manager (CRM).

7.14.1 Archaeological Resources

There is one protected archaeological site that is NHRP (National Historic Register) eligible on MAFB. It is located near the Alabama River and is preserved in accordance with the MAFB ICRMP. This site is managed and monitored to ensure that it is not disturbed. There are no significant natural resources associated with this site, therefore, there are no foreseeable conflicts between natural and cultural resource management plans and/or activities.

7.14.2 MAFB Historic Housing Districts

MAFB has numerous historic buildings and military family housing areas that are registered with the National Register of Historic Places. The mature trees, street signs, sidewalks, and lights are essential components of the district streetscapes. Mature oaks are complementary to the historic neighborhood and shall be preserved as elements of these districts.

In August 2013, the Army Corps of Engineers conducted a Historic Landscape Survey, Maxwell AFB, Alabama to evaluate, inventory, and document the landscape features and make recommendations for the preservation and maintenance establishing the installation's importance to military history and heritage. As part of the evaluation criteria for National Register of Historic Places (NRHP), MAFB used a Multiple Resource Areas (MRA) nomination that emphasized the landscape associated with the Senior Officer's Quarters (SOQ) Historic District and the Non-Commissioned Officer's (NCO) area. SOQ's are similar in style and are described as French Provincial with stucco walls, tile roofs, corner quoins, curved boulevards, and large lawns. MAFB SOQ's are preserved examples of the construction style of the 1927 Army Air Corps Five Year Expansion Program, and the tradition of historic integrity (**Figure 17**).

Figure 17. Historic Senior Officer Quarters housing.

In 2007, MAFB family housing and land was privatized with the owner being responsible for the maintenance, repair, historical integrity, and management of the communities for 50 years. Measures should be established between 42 CES/CEIE, the 42 ABW contracting office, and the housing contractor to ensure that the tree canopy and landscaping is properly maintained and replenished to ensure that the streetscapes will be preserved in character with the historic districts.

Chennault Circle or often referred as "Academic Circle" is named in honor of Lt. Gen Chennault, and is also considered and managed as a historic district on the installation. The circular layout is unique, and the Circle contains many of the major academic facilities of Air University and its schools. Features that are significant include the layout of the campus, concentric rings of sidewalks, landscaped green spaces, and buildings facing the central library. Trees on Chennault Circle contribute to the park-like campus atmosphere and should be managed in accordance with historic and urban tree conservation policy and recommended guidelines.

7.15 Public Outreach

Due to heightened security requirements on MAFB, Gunter Annex, and Vigilant Warrior Training Site, the general public is not typically allowed access to the these locations. However, MAFB recreational areas

and facilities are available to personnel as described in **Section 7.2** of this plan. These individuals can benefit from MAFB fishing programs and watchable wildlife areas.

Conservation of natural resources is a priority for MAFB's mission, as the installation is located in an ecologically important area. Information regarding recycling programs on MAFB properties, as well as water conservation initiatives, is made available to MAFB personnel to better educate them about initiatives to conserve resources. Literature on MAFB natural resources and conservation in general are available at newcomer orientation and in CES/CEIEA. The Installation NRM makes frequent visits with personnel to educate about natural resources conservation and management. Key announcements pertaining to natural resources programs and events are coordinated through the Public Affairs Office for inclusion in the base newspaper, Base Bulletin, and Maxwell's website.
Some programs that could be developed include (but are not limited to):

- Develop watchable wildlife programs (https://www.outdooralabama.com/watchable-wildlife).
- Volunteer programs supporting natural resources conservation including:
    - Restoration work including planting of native vegetation to preserve soil and water (https://alconservationdistricts.gov/about/)
    - Invasive animal and plant species early detection, eradication, and control programs (https://www.se-eppc.org/alabama/)
- Initiation of a citizen scientist program with the National Phenology Network, an organization that brings together citizens, students and teachers, scientists, and managers from government and non-government agencies to monitor the impacts of climate change on plants and animals in the United States. Citizen scientists record annually recurring aspects of species life histories such as leafing, flowering and fruiting, emergence of insects, and migration of birds. (http://www.usanpn.org/)

7.16 Geographic Information Systems (GIS)

GIS is a useful management tool that facilitates creating, storing, analyzing, and managing spatial data and associated attributes. GIS allows managers to examine ecosystem components where each component is represented as a layer in a spatial format. Layers may be viewed individually for continuity or uniqueness, or several layers can be viewed simultaneously to identify relationships.

Data management support through the use of GIS is critical to the success of this INMP. Spatial data collected on endangered species, plants, cultural resources, roads, culverts, and other elements of the natural resource program are used to create maps that help facilitate planning activities that have the potential to impact management programs. GIS is a vital tool for assisting land managers with making decisions and monitoring results of management and mission activities, plays a critical role in planning actions for current and future years, and maps out useful information for everyday work plans. GIS layers can be used to depict important management areas of concern and potential conflict with proposed military actions, and can assist the NRM in conflict resolution and mission enhancement and sustainment.

The 42 CES/CEIEA collect and maintain GIS data specific to their program needs and responsibilities. This information is shared as needed with installation personnel to support the decision process and allow for no net loss of military missions.

MAFB and associated properties natural resources data are developed and maintained by AFCEC Installation Support System (ISS) Environmental GIS Support Analyst and stored both locally and on the Base network. All data are maintained and displayed using ArcGIS. This software package gives MAFB NRM the ability to create theme related shape files, digitize maps, store data, and compile reports or analyses for natural resources management. Several existing key natural resources layers include:

- Delineated Floodplain and Wetland Areas
- Waterbodies
- Land Cover
- Invasive Species
- T & E Habitat Locations
- T & E Sightings
- Recreation Areas

In addition, MAFB should not only maintain a natural resources management database in GIS, but also track progress toward goals. To accomplish this, MAFB should continue to consult with AFCEC for information on the appropriate format and software to be used. Maps should be prepared on a scale that is practical for the size of the installation and should be reviewed regularly. GIS maps should be compatible with base comprehensive planning maps. GIS and other relevant information on species and habitat should be shared with the State Natural Heritage database, the local Nature Conservancy, and the USFWS. Finally, MAFB should ensure that at least 3 or 4 people are trained in the use of GIS receivers and field computers.

The following **Table 11** provides a summary of natural resource GIS data currently available for MAFB properties.

Table 11. Summary of Natural Resource GIS Data Available for MAFB

GIS Data	Source	Year Updated
Riparian Areas	MAFB	2005
Watersheds	USACE	2016
Land Cover	CSU-CEMML	2017
Soils	NRCS	2002*
Nature Trails	CSU-CEMML	2016
Fire Area (natural)	MAFB & CSU-CEMML	2016
Wildland/Urban Interface	Southern Group of State Foresters	2017
Bird & Bat Survey Stations	MAFB and CSU-CEMML	2017
Fishing	MAFB & CSU-CEMML	2016
Forest Stand	MAFB & CSU-CEMML	2005
Noxious & Invasive Species	MAFB & CSU-CEMML	2011
Wood stork Locations	USFWS	2017
Aerial Imagery	Multiple Sources	--

Notes:
MAFB NR=Maxwell Air Force Base Natural Resources
CSU CEMML=Colorado State University Center for Environmental Management
NRCS=Natural Resources Conservation Services
*USDA surveyed Maxwell soils in 2019. Information is being updated by USDA NRCS.

8.0 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 IRNMP implementation. Objectives indicate a management initiative for 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.

Goals and objectives provide the framework for the natural resources management programs. Goals provide a general guiding direction for each technical area, and logical objectives that facilitate achieving those goals are described for any priority issues within each technical area. The objectives then drive the development of activities and projects to achieve those objectives. Activities and projects, and the objectives they support, are described in **Tables 12 & 13** in **Section 10.0**. Below are the goals identified in the Executive Summary.

GOAL 1: Provide a natural resource management program within 42 CES/CEIEA that supports the 42 ABW mission while protecting ecosystem diversity to the maximum extent possible while complying with applicable federal and state laws and USAF regulations and policies.

- OBJECTIVE 1.1: Prepare budget necessary to implement natural resources management plans.
- OBJECTIVE 1.2: Prepare INRMP in cooperation with U.S. Fish and Wildlife Service (USFWS) and the Alabama Department of Conservation and Natural Resources (ADCNR).
    - PROJECT 1.2.1: Conduct required INRMP annual reviews with cooperative agencies.
- OBJECTIVE 1.3 Coordinate with the USDA for removal of Canada geese when necessary.
- OBJECTIVE 1.4: Continue to maintain and abide by authorizations.
- OBJECTIVE 1.5: Continue internal environmental awareness activities to minimize impacts to natural resources by MAFB personnel and visitors.
- OBJECTIVE 1.6: Continue outdoor recreation program in conjunction with 42 ABW/FSS.
- OBJECTIVE 1.7: Continue public outreach in coordination with other regional entities as appropriate.
- OBJECTIVE 1.8: Continue to cooperate with other agencies and local landowners on regional land and natural resources management efforts.
- OBJECTIVE 1.9: Maintain and improve Geographic Information System (GIS) data and access to that data by MAFB personnel.
- OBJECTIVE 1.10: Initiate and/or continue programs and projects that enhance the training land and training opportunities, and result in no net loss of training land availability.
- OBJECTIVE 1.11: Use adaptive, ecosystem management as the primary natural resources management paradigm.
- OBJECTIVE 1.12: Support 42 ABW/SE BASH plan.
    - PROJECT 1.12.1: Implement BASH risk reduction measures by maintaining landscapes, eliminating wildlife attractants, implement strategies to mitigate wildlife, and review proposed base activities and requests for BASH concerns.

GOAL 2: Remain in compliance with federal, state, and local laws and regulations governing natural resources.

- OBJECTIVE 2.1: Cooperatively support USFWS and State of Alabama protection goals.
- OBJECTIVE 2.2: Maintain correspondence with USFWS and State of Alabama regarding updates to federal and state threatened, endangered, and species of concern lists.
- OBJECTIVE 2.3: Maintain appropriate state and federal permits to enable necessary wildlife control.
    - PROJECT 2.3.1: Maintain Federal Migratory Bird Depredation Permit under Migratory Bird Treaty Act.
    - PROJECT 2.3.2: Utilize information from USDA assessments of BASH-related populations to support Flight Safety, as needed, in applying for depredation permit renewal for appropriate species.

GOAL 3: Manage soil to minimize sediment loss and erosion, while protecting water quality.

- OBJECTIVE 3.1: Manage shorelines on installation lakes to minimize erosion and sediment loss.
- OBJECTIVE 3.2: Manage stormwater runoff in order to reduce erosion, encourage infiltration upstream of major water bodies, and reduce nutrients before runoff enters major water bodies.
- OBJECTIVE 3.3: Minimize nonpoint source pollution through implementation of BMPs, following existing spill prevention and hazardous materials management protocols, and education.
- OBJECTIVE 3.4: Monitor at-risk sites to ensure erosion and sediment control measures are effective.
    - PROJECT 3.4.1: Develop comprehensive operation and management plan for maintaining and improving highly-erodible and degraded roads and trails at Vigilant Warrior Training Site.
    - PROJECT 3.4.2: Perform annual work needed to repair, stabilize, or modify Vigilant Warrior trails.
- OBJECTIVE 3.5: Maintain riparian management zones around water resources.

GOAL 4: Manage water resources so they remain resilient and with no net loss of acreage, or functions and values.

- OBJECTIVE 4.1: Minimize impacts to water resources and comply with all laws and regulations pertaining to wetlands, streams, floodplains and regulated water bodies.
    - PROJECT 4.1.1: Continue to review proposed activities for potential impacts to water resources.
    - PROJECT 4.1.2: Coordinate with USACE and ADEM regarding activities likely to impact wetland or other water resource and identify mitigation options.
- OBJECTIVE 4.2: Maintain or enhance riparian management zones around water resources.
    - PROJECT 4.2.1: Update wetland and other water resources mapping and delineations.
- OBJECTIVE 4.3: Implement management measures to reduce impacts to water quality in major water bodies.
- OBJECTIVE 4.4: Mitigate/enhance stream and riparian area IAW permits issued under Section 404 of Clean Water Act.

GOAL 5: Manage vegetation to promote a diversity of native species using cost-effective and sustainable methods.

- OBJECTIVE 5.1: Develop comprehensive vegetation community data based on the National Vegetation Classification System (NVCS).
    - PROJECT 5.1.1: Conduct vegetation survey using remote sensing and ground trothing.

- OBJECTIVE 5.2: Maintain intact, healthy habitat and enhance or restore degraded habitat without increasing BASH risk.
- OBJECTIVE 5.3: Promote ecosystem diversity through mechanical and approved herbicidal treatments to remove or reduce invasive plant species, utilizing an integrated pest management approach in accordance with IPMP.
    - PROJECT 5.3.1: Monitor regularly for new invasive species or sudden increases in densities of existing invasive species.
    - PROJECT 5.3.2: Survey and map invasive plant species.
    - PROJECT 5.3.3: Conduct ecosystem surveys in invasive species areas considered for potential management in order to assess ecosystem benefits and risks of invasive species removal.
    - PROJECT 5.3.4: Implement annual invasive species removal projects, as needed.
- OBJECTIVE 5.4: Maintain forested areas and ensure management does not cause impacts to nesting migratory birds.
- OBJECTIVE 5.5: Coordinate with nearby installation foresters, US Forest Service, Alabama Forestry Commission, or other resource personnel to assess forest health and determine management recommendations.
- OBJECTIVE 5.6: Manage airfield environments so that trees and other vegetation do not violate airfield clearance specified in Uniform Facilities Criteria (UFC 3-260-01).
    - PROJECT 5.6.1: Remove any trees penetrating the Airspace Imaginary Surfaces at MAFB and base defense zone (BDZ).
- OBJECTIVE 5.7: Maintain and improve the installation's Urban Forest through preservation of the natural terrain and woody vegetation, and appropriate new and replacement trees.
    - PROJECT 5.7.1: Develop Urban Forestry Management Plan.
    - PROJECT 5.7.2: Plan, program, and budget for annual tree maintenance, removal, and replacement needs.
- OBJECTIVE 5.8: Perform Timber Stand Improvement operations for enhanced forest health.
    - PROJECT 5.8.1: Conduct updated forest inventory as directed by AFI 32-7064.

GOAL 6: Manage fish and wildlife to maintain populations of game and non-game species consistent with 42d ABW mission and ecosystem management.

- OBJECTIVE 6.1: Minimize BASH risk by deterring hazardous birds and other wildlife from the airfield and its critical zone.
- OBJECTIVE 6.2: Maintain populations of wildlife away from the airfield on MAFB by minimizing negative impacts and by providing healthy, diverse habitat types and corridors for wildlife movement between those habitats.
- OBJECTIVE 6.3: Install and maintain habitats that encourage pollination activities in appropriate areas on base.
- OBJECTIVE 6.4: Improve game management practices on MAFB.
    - PROJECT 6.4.1: Conduct annual deer population survey to determine on-base deer population, and establish and implement effective population control strategies.
    - PROJECT 6.4.2: Improve avian habitat by creating small forest openings that promote growth of shrubs, small trees, and vine tangles interspersed in patches of herbaceous vegetation to provide cover, nesting sites, and a variety of food sources for birds.
- OBJECTIVE 6.5: Improve recreational fisheries at MAFB.
    - PROJECT 6.5.1: Manage vegetation to maintain properly balanced aquatic ecosystems.
    - PROJECT 6.5.2: Use herbicidal, biological and/or mechanical treatments to control the spread of aquatic weeds in the base lakes.
    - PROJECT 6.5.3: Install artificial structures to attract fish and provide cover for forage species.

    - PROJECT 6.5.4: Implement yearly fertilization program, as advised by ADCNR, to increase lake productivity.
- OBJECTIVE 6.6: Continue to allow fishing opportunities in installation waters, as fishing remains compatible with the military mission and outdoor recreation opportunities.
    - PROJECT 6.6.1: Improve fish habitat and spawning areas in installation lakes #1 and #2, and investigate options of adding sunken trees or other obstacles that provide fish cover.
    - PROJECT 6.6.2: Educate installation personnel of fishing opportunities, 42 ABW/FSS equipment checkout, and interpretive signs.
- OBJECTIVE 6.7: Continue to develop and maintain the wildlife habitat on MAFB to support existing and recovering wildlife species.
    - PROJECT 6.7.1: Create and maintain wildlife openings throughout forested areas.
    - PROJECT 6.7.2: Conduct current fisheries/wildlife surveys with an emphasis on rare species.
- OBJECTIVE 6.8: Conduct avian surveys to supplement previous inventories and establish distribution, abundance, and long range trends of seasonal bird communities found on the installation for bird habitat management decisions, BASH management decisions, environmental assessments, and construction siting decisions.
    - PROJECT 6.8.1 Create and maintain wildlife openings throughout forested areas.

GOAL 7: Manage endangered, threatened, and rare species habitat using an ecosystem approach, while maintaining the military mission at MAFB.

- OBJECTIVE 7.1: Manage rare water-dependent species (e.g., wood stork, waterfowl, etc.) by protecting the shorelines of, and water quality in, installation lakes.
- OBJECTIVE 7.2: Continue informal surveys of wood stork potential presence and foraging areas. If occurrences become more frequent, consult with USFWS and ALDCNR for any needed management plans.
- OBJECIVE 7.3: Continue to protect foraging habitat, and evaluate installation activities for potential impact.
- OBJECTIVE 7.4: Manage rare forest-dependent species by using sustainable forestry practices and avoiding tree removal during nesting periods.
- OBJECTIVE 7.5: Manage rare prairie-dependent species by protecting existing prairie habitat, initiating regular disturbance mechanisms to maintain early successional habitat, and reduce any other action that would degrade prairie quality.
    - PROJECT 7.5.1: Conduct updated floral surveys, including surveys for Canebrake pitcher plants and other state protected and candidate species, and provide an overall ecosystem management strategy for the protection and recovery of species.
- OBJECTIVE 7.6: Monitor for potential listed species during any natural resources activities.
    - PROJECT 7.6.1: Conduct survey to document status and likelihood of potential federally-listed species.
- OBJECTIVE 7.7: Review all demolition/construction projects and military activities for potential impacts to rare, threatened, and endangered species by following guidelines and obtaining appropriate permits, as required.

GOAL 8: Minimize impacts of invasive plant and pest species with mechanical treatment and minimal chemical applications, utilizing an integrated pest management approach.

- OBJECTIVE 8.1: Explore possibilities of partnering with other agencies or institutions for research and projects pertaining to control of invasive species.
- OBJECTIVE 8.2: Develop comprehensive Invasive Species Management Plan.

GOAL 9: Enhance Natural Resources Programs with continual training opportunities.

- OBJECTIVE 9.1: Provide training opportunities that will provide Natural Resources staff with the current skills needed to keep program in compliance with applicable law.

GOAL 10: Protect and conserve watershed habitats where it is compatible with the military mission.

- OBJECTIVE 10.1: To the extent possible, avoid activities that lead to further development in MAFB semi-improved areas within the floodplains and near the Alabama River.
- OBJECTIVE 10.2: Prevent destruction or degradation of wetlands and other potential habitat areas near the Alabama River.
- OBECTIVE 10.3: Evaluate proposed projects and work requests for impact to potential wildlife habitat areas.
- OBJECTIVE 10.4: Explore opportunities to convert some improved or semi-improved areas to naturalized areas.
- OBJECTIVE 10.5: Properly delineate any impacted wetlands and apply appropriate mitigation.

GOAL 11: Prevent MAFB properties from contributing to pollution through release of harmful substances or erosion debris into watersheds.

- OBJECTIVE 11.1: Manage the installation storm water protection program and activities in accordance with the MAFB Spill Prevention, Control, and Countermeasures Plan (SPCC) in order to prevent release of harmful substances into waterways.
- OBJECTIVE 11.2: Review all work requests, projects, and proposed contracts for potential impacts to water resources.
- OBECTIVE 11.3: Ensure applicable future construction projects will comply with the Energy Independence & Security Act (EISA) Section 438 guidelines for low-impact development and green infrastructure.
- OBJECTIVE 11.4: Ensure installation activities implement and maintain proper pollution prevention and water protection measures.
- OBJECTIVE 11.5: Projects are being planned and programmed to improve drainage and protect nearby watersheds.

GOAL 12: Reduce the risk of floodplain loss.

- OBJECTIVE 12.1: 42 CES/CEIEA will review all work requests and projects for potential impacts to floodplains.
- OBJECTIVE 12.2: Consider alternatives to floodplain development in order to avoid adverse effects and incompatible development.
- OBECTIVE 12.3: Ensure EIAP process and NEPA requirements are followed to evaluate potential impacts to floodplains.
- OBJECTIVE 12.4: Construction in a floodplain should be consistent with standards outlined by the National Flood Insurance Program.
- OBJECTIVE 12.5: Continue appropriate use of floodplains for recreational opportunities.

GOAL 13: Avoid to the maximum extent possible, destruction, loss, or degradation of wetlands.

- OBJECTIVE 13.1: 42 CES/CEIEA will review all work requests and projects for potential impacts to wetlands.
- OBJECTIVE 13.2: To the maximum extent possible and after NEPA evaluation, prohibit dredging, filling, and development in wetlands.
- OBJECTIVE 13.3: Properly delineate any impacted wetlands and apply appropriate mitigation.
- OBJECTIVE 13.4: Replant native vegetation in disturbed areas to reduce runoff and siltation.

- OBJECTIVE 13.5: Control erosion and sediment production from riparian wetland areas. Increase vegetation cover, stabilize stream banks, control gully erosion, and minimize surface disturbance activities.

9.0 INRMP IMPLEMENTATION, UPDATE, AND REVISION PROCESS

9.1 Natural Resources Management Staffing and Implementation

The Natural Resources Program at MAFB properties is administered by the Natural Resource Management (NRM) team. Responsibilities of the NRM team in regard to implementation of this INRMP include:

- Providing oversight and coordination with other agencies
- Using professionally-trained natural resources management personnel with a degree in the natural sciences to develop and implement the installation INRMP
- Developing and implementing programs to ensure the inventory, delineation, classification, and management of all applicable natural resources to include: forests, wetlands, listed species, sensitive or unique habitats, and other natural resource areas of special interest
- Providing for the training of natural resources personnel, including CECOS DoD Natural Resources Compliance course. (www.netc.navy.mil/centers/csfe/cecos/CourseDetail2.htm#tab25)
- Maintaining natural resources management records
- Reviewing environmental documents (e.g. environmental impact assessments and remedial action plans) and construction designs and proposals to ensure adequate consideration of natural resources, while ensuring that technical guidance as presented in this INRMP is adequately considered
- Evaluating impacts of military missions and providing guidance to military personnel regarding natural resources
- Coordinating with the cultural resources program and Section 106 compliance
- Coordinating with local, state, and federal governmental and civilian conservation organizations relative to the MAFB natural resources management program
- Implementing and executing AFI 32-7064

Natural Resources Management responsibilities among MAFB organizations are outlined in **Section 4.0**. Implementation of this INRMP also involves the combined efforts of agencies outside of the 42 ABW. Other Federal agencies involved in implementing the INRMP are the U.S. Forest Service (USFS; forest inventory and management recommendations); the U.S. Army Corps of Engineers (USACE; wetland delineation); and the U.S. Fish and Wildlife Service (USFWS; cooperating agency, INRMP signatory agency). At the State level, the Alabama Department of Conservation and Natural Resources (ADCNR) assists in development and implementation of the INRMP and is also a signatory agency for the INRMP. The Alabama Natural Heritage Program and Nature Conservancy has conducted surveys and assessments of natural resources on MAFB.

MAFB has a Natural Resources Manager that has been appropriately trained through the CECOS DoD Natural Resources Compliance course. Additional sources of temporary labor, hired with term limitations, could be utilized to augment current staff, such as temporary employees (i.e., AFCEC environmental support or interns). Outside agency reimbursable hires and Guardsman, Reservists, or Active Duty USAF personnel assigned to MAFB on temporary duty are another source of supplemental labor. Implementation of a number of projects discussed in this INRMP will require active outside assistance. The outside assistance should comply with the Sikes Act, and could come from state and federal agencies, private consortiums and organizations, universities, and contractors. Using these resources is the most efficient and cost-effective method for acquiring expertise on a temporary basis. Some parties will be reimbursed for

their assistance, as agreed based on an MOU and contractual agreements, whereas others will supply their assistance in accordance with cooperative agreements. The INRMP Working Group should assess the level of additional resources necessary to fully implement this INRMP during the annual review process (see **Section 9.3**) and determine the extent to which outside assistance will be required.

9.2 Monitoring INRMP

Monitoring of INRMP implementation is necessary to facilitate the legal requirements of the SAIA for review for operation and effect. These SAIA implementation criteria do not necessarily measure the effectiveness of an INRMP in facilitating mission accomplishment while conserving natural resources. The MAFB INRMP implementation will be monitored for meeting the legal requirements of the SAIA as well as for other mission and biological measures of effectiveness.

The ultimate successful implementation of this INRMP is realized in no net loss in the capability of the MAFB training lands to support the military mission while at the same time providing effective natural resources management. Initiation of projects is one measure that is used to monitor INRMP implementation, but it does not give the total picture of the effectiveness of the natural resources management program. Natural resources management is not the sum total of projects, interagency coordination, or program funding and staffing. Natural resources management at the MAFB is a program and a philosophy that guides the Air Force's approach to land use. A significant portion of INRMP implementation is done through internal coordination in regard to training site operations and land use decision making. This type of implementation cannot be measured by project implementation or funding levels. It is evidenced by such things as the ability to continually train, sustainable land use, ongoing regulatory compliance, retention of species diversity, retention of surface water quality, and the acknowledgement of sustainable natural resources management by partnering conservation agencies and other interested organizations and individuals.

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

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

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

9.2.1 USAF and DoD INRMP Implementation and Monitoring

The USAF uses the Defense Environmental Programs Annual Report to Congress (DEPARC) to monitor SAIA compliance. DEPARC is the automated system used to collect installation environmental information for reporting to DoD and Congress. Established to fulfill an annual requirement to report the status of DoD's Environmental Quality program to Congress, DEPARC collects information on enforcement actions,

inspections, and other performance measures for high-level reports and quarterly reviews. DEPARC also helps the USAF track fulfillment of DoD Measures of Merit requirements.

The Deputy under Secretary of Defense (DUSD) *Updated Guidance for Implementation of the SAIA* updated Conservation Metrics for Preparing and Implementing INRMPs. Progress toward meeting these measures of merit is reported in the annual report to Congress. DEPARC reporting requirements currently include answers to these questions:

- Are the installation plans, programs, and budgets for actions that support INRMP goals and objectives?
- Was the INRMP "fully-implemented" during previous execution year?
- Were all funds allocated for INRMP implementation (Environmental Quality [EQ], Reimbursable, and other) executed for the intended purpose?
- Is there adequate participation/collaboration from USFWS during Annual INRMP review and major revisions?
- Is there adequate participation/collaboration from the state Fish and Wildlife (F&W) Agency during Annual INRMP Review and major revisions?
- Is the INRMP consistent with the goals of the State Wildlife Action Plan (SWAP), Candidate Conservation Agreements, and other regional ecosystem management agreements for which DoD/USAF is signatory?
- Are communications with USFWS and State F&W Agency documented?
- Does the installation have on-site USAF natural resources management staff employed in the GS-0400 Biological Sciences Job Series?
- Is there a sufficient number of natural resources staff to adequately implement INRMP goals and objectives?
- Are the capabilities of the USAF natural resources team enhanced through use of volunteers, cooperative agreements with non-governmental organizations, on-site contractor support, or Interagency Agreements with other federal or state agencies?
- Does the installation have adequate conservation law enforcement capability through employment of a credentialed conservation law enforcement officer, or through interagency agreement with another agency?
- Is there adequate participation/collaboration from the Operations Group, Range and Airspace managers, Community Planners, Tenant Organizations, and other organizations in INRMP update and revision to ensure mission needs are addressed?
- Does the INRMP support unrestricted use of the installation?
- Has there been a net loss of operations area, airspace, or training lands? Is there a deficiency in capacity, size, or arrangement of the installation natural infrastructure to support the current mission and foreseeable future needs?
- Name the federally-listed species present on the installation.
- List the state-protected species present on the installation.
- Have surveys for the presence of potentially-occurring, federally-listed species, or suitable habitat within the historic range of a listed species, been conducted on the installation?
- Does the INRMP adequately address potentially-occurring listed species and/or potentially-suitable habitat within the historic range of a listed species?
- Have listed species locations, or potentially-suitable habitats within the historic range of a listed species, been mapped and included as part of the Environmental Functional Data Set and Geodatabase?
- Does the INRMP provide adequate conservation measures for identified listed species and their habitat, as mutually-agreed by USFWS and state fish and wildlife agency during the INRMP Annual Review or major revision coordination?

- Has Critical Habitat for listed species been designated on the installation?
- Have all major ecosystems (i.e., vegetative communities/habitats) been surveyed and mapped for the installation?
- Does the INRMP address the desired future condition for ecosystems, habitats, and communities to sustain current and future mission activities and achieve natural resources management goals and objectives?
- Are native habitat restoration projects to support INRMP goals and objectives being planned, programmed, budgeted, and executed?
- Does the INRMP provide for adequate control of invasive and exotic species?
- Does the INRMP address the availability of outdoor recreational opportunities (e.g. hunting, fishing, and other dispersed outdoor recreation) on the installation?
- Does the INRMP address the availability of outdoor recreation opportunities for the public, and establish access and usage categories for installation areas in accordance with mission and security requirements (i.e. Open, Restricted, Off-Limits)?
- For each outdoor recreation access category (Open, Restricted, Off- Limits), does the INRMP address and justify allowable access to those areas by category of participant (e.g. Active Duty Military, Military Dependents, DoD Civilians, Military Retirees, Defense Contractors, General Public)?
- Does the INRMP address program management for hunting, fishing and other outdoor recreation, and the role of the installation natural resources manager?

9.2.2 Priorities and Scheduling

The Office of Management and Budget (OMB) considers funding for the preparation and implementation of this INRMP, as required by the Sikes Act, to be a high priority. However, the reality is that not all of the projects and programs identified in this INRMP will receive immediate funding. Therefore, projects need to be funded consistent with timely execution to meet future deadlines. Projects are generally prioritized with respect to compliance. Highest priority projects are projects related to recurring or current compliance, and these are generally scheduled earliest. As such, these projects have been placed into 3 priority-based categories: (Level 0) is a natural resource requirement for maintaining compliance (Operations and Services) or for successful natural resources management; (Level 1) natural resource requirement is a non-recurring action needed to correct a non-conformance or out-of-compliance condition with a supported driver in the programmed year; (Level 2) natural resource requirement is a non-recurring natural resources requirement for activities and projects programmed in a fiscal year which is in advance of the year in which compliance is mandatory and necessary to prevent non-compliance beyond the program year; and (Level 3) natural resources requirement are activities and projects that are not explicitly required by an applicable legal driver but needed to enhance the environment beyond statutory compliance to achieve overall INRMP goals and objectives. The prioritization of the projects is based on need, legal drivers, and ability to further implementation of the INRMP.

Recurring requirements include projects and activities needed to cover the recurring administrative, personnel, and other costs that are necessary to meet applicable compliance requirements (federal and state laws, regulations, Presidential EOs, and DoD policies) or which are in direct support of the military mission. Recurring costs include manpower, training, supplies; hazardous waste disposal; operating recycling activities; permits and fees; testing, monitoring and/or sampling and analysis; reporting and record keeping; maintenance of environmental conservation equipment; and compliance self-assessments.

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

- Environmental analyses, monitoring, and studies required to assess and mitigate potential effects of the military mission on conservation resources
- Planning documents
- Baseline inventories and surveys of natural and cultural resources (historical and archaeological sites)
- Biological Assessments (BAs), surveys, or habitat protection for a specific listed species
- Mitigation to meet existing regulatory permit conditions or written agreements
- Wetland delineations in support of subsequent jurisdictional determinations and consequent permitting
- Efforts to achieve compliance with requirements that have deadlines that have already passed
- Initial documenting and cataloging of archaeological materials

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

- Compliance with future requirements that have deadlines
- Conservation and GIS mapping to be in compliance
- Efforts undertaken in accordance with non-deadline specific compliance requirements of leadership initiatives
- Wetlands enhancement, in order to achieve the executive order for no net loss or to achieve enhancement of existing degraded wetlands
- Public education programs that educate the public on the importance of protecting natural resources

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

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

9.2.3 Funding

Implementation of this INRMP is subject to the availability of annual funding. Funding sources for specific projects can be grouped into 3 main categories by source: federal USAF funds, other federal funds, and non-federal funds. When projects identified in the Plan are not implemented due to lack of funding, or other compelling circumstances, the installation will review the goals and objectives of this INRMP to determine whether adjustments are necessary. The following discussion of funding options is not all-inclusive of funding sources. Many funding sources rely on a variety of grant programs so award criteria and amounts can change considerably from one year to another. Funding through grant programs can occur on a one-time award, annually, or in multiples of years.

The AFCEC/CR Environmental Quality (EQ) is the primary source of funding to support the management of natural resources at MAFB. This budget is managed by AFCEC/TDNC and AFCEC/CZOW. AFCEC/CR EQ provides funding for natural resource surveys, environmental monitoring projects, and compliance-related projects.

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

There are also grant and assistance programs administered by other federal agencies that could be accessed for natural resources management at MAFB. Examples include funds associated with the CWA and endangered species.

Other non-federal funding sources that could be considered include The Public Lands Day Program which coordinates volunteers to improve the public lands they use for recreation, education, and enjoyment, and the National Environmental Education & Training Foundation which manages, coordinates, and generates financial support for the program (https://www.neefusa.org/npld).

State and local agencies are also a great source of additional resources. For example, the MAFB NRM may consider entering into cooperative or mutual aid agreements with states, local governments, non-governmental organizations, and other individuals.

9.3 Annual INRMP Review and Update Requirements

The INRMP requires annual review, IAW DoDI 4715.03 and AFI 32-7064, to ensure the achievement of mission goals, verity the implementation of projects, and establish any necessary new management requirements. This process involves installation natural resources personnel and external agencies working in coordination to review the INRMP. If the installation mission or any of its natural resources management issues change significantly after the creation of the original INRMP, a major revision to the INRMP is required. The need to accomplish a major revision is normally determined during the annual review with USFWS, ADCNR, and NOAA (if required). The NRM/POC documents the findings of the annual review in an Annual INRMP Review Summary and obtains signatures from the coordinating agencies on review findings. By signing the Annual INRMP Review Summary, the collaborating agency representatives assert concurrence with the findings. If any agency declines to participate in an on-site annual review, the NRM submits the INRMP for review along with the Annual INRMP Review Summary document to the agency via official correspondence and request return correspondence with comments/concurrence.

The USFWS, ADCNR, and the NRM/Section conduct an Annual INRMP Review Meeting. This meeting takes place in-person with respective representatives for each agency. Individuals may telephone or video call if they cannot attend in-person. During this meeting the NRM/Section updates the external stakeholders/parties with the end of the year execution report and coordinates future work plans and any necessary changes to management methods, etc. All parties review the INRMP and begin preliminary collaborative work on updating the INRMP (new policies, procedures, impacts, mitigations, etc.) as applicable.

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

If not already determined in previous annual meetings, by the fourth year annual review a determination will be made jointly to continue implementation of the existing INRMP with updates or to proceed with a

revision. If the parties feel that the annual reviews have not been sufficient to evaluate operation and effect and they cannot determine if the INRMP implementation should continue or be revised, a formal review for operation and effect will be initiated. The determination on how to proceed with INRMP implementation or revision will be made after the parties have had time to complete this review.

As part of the annual review, the MAFB NRM will specifically:

- Invite feedback from USFWS and ADCNR on the effectiveness of the INRMP
- Inform USFWS and ADCNR which INRMP projects and activities are required to meet current natural resources compliance needs
- Document specific INRMP action accomplishments from the previous year.

Information for the annual reviews comes from the MAFB environmental staff, the NRM, cooperating agencies, and project files as applicable. Natural resources data, and program and project information are available to cooperating agencies.

9.3.1 Review for Operation and Effect

Not less than every 5 years, the INRMP will be reviewed for operation and effect to determine if the INRMP is being implemented as required by the SAIA and contributing to the management of natural resources at MAFB. Unless delegated, the review will be conducted by the 3 cooperating parties to include the Commander responsible for the INRMP, the Regional Director of the USFWS, and Director of the ADCNR. While these are the responsible parties, technical representatives generally are the personnel who actually conduct the review.

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

If only updates are needed, they will be done in a manner agreed to by all parties. The updated INRMP will be reviewed by the local USFWS field office in Alabama and ADCNR representative. Once concurrence letters or signatures are received from USFWS Regional Director and the ADCNR Director, the update of the INRMP will be complete and implementation will continue. Generally, the environmental impact analysis will continue to be applicable to updated INRMPs and a new analysis will not be required.

If a review of operation and effect concludes that an INRMP must be revised, there is no set time to complete the revision. The existing INRMP remains in effect until the revision is complete and USFWS and ADCNR concurrence on the revised INRMP is received. The NRM will endeavor to complete such revisions within 18 months depending upon funding availability. Revisions to the INRMP will go through a more detailed review process similar to development of the initial INRMP to ensure MAFB military mission, USFWS, and ADCNR concerns are adequately addressed, and the INRMP meets the intent of the SAIA.

9.3.2 National Environmental Policy Act

The initial step in compliance with NEPA for any activity that might impact the environment by the NRM is to complete USAF Form 813: Request for Environmental Impact Analysis. The form is prepared to aid in the development of the assessment, providing information on the proposed action and its alternatives, purpose, and potential environmental effects. This allows the proponent to identify potential environmental impacts early and facilitates making a determination about whether an Environmental Assessment (EA) or Environmental Impact Statement (EIS) might be required for a specific action.

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

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

CEQ regulations require intergovernmental notifications prior to making any detailed statement of environmental impacts. Through the Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) process, MAFB notifies relevant federal, state, and local agencies and allows them sufficient time to make known their environmental concerns specific to a Proposed Action. Comments and concerns submitted by these agencies during the IICEP process are subsequently incorporated into the analysis of potential environmental impacts. This coordination fulfills requirements under Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, and AFI 32-7060, IICEP. Furthermore, public participation in decision making on new proposals is also required. Consideration of the views and information of all interested persons promotes open communication and enables better decision-making. Agencies, organizations, and members of the public with a potential interest in the Proposed Action, including minority, low-income, disadvantaged, and Native American groups, are urged to participate.

The EIAP for the implementation of MAFB first INRMP (2018) was conducted in accordance with NEPA, CEQ *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 Code of Federal Regulations [CFR] § 1500-1508), and 32 CFR Part 989. The EIAP and decision-making process for the Proposed Action (implementation of the 2018 MAFB INRMP) involved an examination of all environmental issues pertinent to the action proposed. Impact evaluations of the 2018 MAFB INRMP determined that no significant environmental impacts would result from implementation of the Proposed Action or any identified alternative. This determination was based on thorough review and analysis of existing resource information, and coordination with knowledgeable, responsible personnel from the MAFB and other relevant local, state, and federal agencies. The EIAP for the implementation of the 2019 MAFB INRMP does not include an analysis of effects for individual actions or projects. Individual actions or projects that have the potential to impact the environment will be analyzed separately in accordance with the NEPA process. A new EIAP is not required for this INRMP update.

If a future action or project has the potential to impact the environment, the initial step in compliance with NEPA is to complete USAF Form 813 "Request for Environmental Impact Analysis". The form is prepared to aid in the development of the assessment, providing information on the proposed action and its alternatives, purpose, and potential environmental effects. This allows the proponent to identify potential environmental impacts early and facilitates making a determination about whether an EA or an Environmental Impact Statement (EIS) might be required for a specific action. Some sections are prepared by the proponent and other sections are prepared by the Environmental Management Office 42 CES/CEIEA. If the action is not covered by a categorical exclusion, then an EA is prepared to determine if there are potential significant impacts. If potential significant impacts are identified, either while completing USAF Form 813 or during the EA, then an EIS is prepared. The majority of natural resources management actions in this INRMP are covered by categorical exclusions.

If the action is not covered by a categorical exclusion, then an EA is prepared to determine if there are potential significant impacts. If potential significant impacts are identified, either while completing AF Form 813 or during the EA, then an EIS is prepared. The majority of natural resources management actions are covered by categorical exclusions.

10.0 ANNUAL WORK PLANS

The INRMP Annual Work Plans are included in this section. These projects and activities that are recurring (**Table 12**) and planned projects (**Table 13**). 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 AF 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 Air Force is non-compliant with the Sikes Act; or that it is specifically tied to an INRMP goal and objective and is part of a "Benefit of the Species" determination necessary for ESA Sec 4(a)(3)(B)(i) critical habitat exemption.
- Medium: Project supports a specific INRMP goal and objective, and is deemed by INRMP signatories to be important for preventing non-compliance with a specific requirement within a natural resources law or by EO 13112 on Invasive Species. However, the INRMP signatories would not contend that the INRMP is not be implemented if not accomplished within programmed year due to other priorities.
- Low: Project supports a specific INRMP goal and objective, enhances conservation resources or the integrity of the installation mission, and/or support long-term compliance with specific requirements within natural resources law; but is not directly tied to specific compliance within the proposed year of execution.

Detailed INRMP Implementation tables are located in **Appendix B**.

Table 12. Recurring Natural Resource Management Activities (Subject to Funding Availability)				
Activity		Priority	Objective(s) in Section 8.0	Timing
1	Prepare budget to implement the natural resources management program	1	1.1	Annual
2	Purchase equipment and supplies necessary for program management	1	1.1	As Needed
3	Purchase parts and supplies necessary to maintain equipment related to program management		1.1	As Needed
4	Complete review for operation and effect at least every 5 years with INRMP Task Force; initiate update or revision as appropriate	1	1.2	2024
5	Complete annual review of INRMP	1	1.2	Annual
6	Continue implementing BASH risk reduction measures	1	1.12	As Needed
7	Assess BASH related-populations and apply for depredation-permit renewal for appropriate species	1	2.3	Annual
8	Maintain Federal Migratory Bird Airport Depredation Permit under Migratory Bird Treaty Act and Alabama Wildlife Permit(s)	1	2.3	Annual
9	Evaluate effectiveness of erosion and sediment control measures IAW Stormwater Management Plan	1	3.1	As Needed
10	Manage stormwater runoff in order to reduce erosion, encourage infiltration upstream of major water bodies, and reduce nutrients before runoff enters major water bodies IAW Stormwater Management Plan	1	3.2	As Needed
11	Minimize non-point source pollution through implementation of BMPs, following existing spill prevention and hazardous materials management protocols, and education IAW Stormwater Management Plan	1	3.3	As Needed
12	Monitor at-risk construction sites to ensure erosion and sediment control measures are effective IAW Stormwater Management Plan	1	3.4	As Needed
13	NRM personnel will review proposed activities for potential to impact water resources	1	4.1	As Needed
14	If an activity will impact a wetland or other water resource, coordination with USACE and ADEM will be completed and mitigation options identified	1	4.1	As Needed
15	Maintain riparian management zones around water resources as compatible with airfield management	1	4.2	As Needed
16	Implement IPMP, including methods for control and reporting requirements	1	5.3	As Needed
17	Monitor regularly for new invasive species or sudden increases in density of existing invasive species	1	5.3	As Needed
18	Conduct any tree management to minimize impacts to migratory birds and roosting bats	1	5.4	As Needed
19	Assist CE and BASH team in managing airfield environments so that trees and other vegetation do not violate airfield clearance specified in Uniform Facilities Criteria (UFC 3-260-01)	1	5.6	As Needed
20	Perform timber stand improvement operations to improve forest health	1	5.7	As Needed
21	Provide consultation on projects that impact trees on base. As a general policy, plantings should occur at the same or greater frequency than removals	1	5.7	As Needed

Table 12. Recurring Natural Resource Management Activities (Subject to Funding Availability)				
	Activity	**Priority**	**Objective(s) in Section 8.0**	**Timing**
22	Use native plant species and materials for landscaping activities where possible	1	5.7	As Needed
23	Maintain and promote Urban Forestry Program	2	5.8	Annual
24	Minimize BASH risk by deterring birds and other wildlife from the airfield	1	6.1	As Needed
25	Conduct formal or USDA partner deer population surveys	1	6.4	As Needed
26	Manage aquatic vegetation to maintain properly balanced aquatic ecosystem	1	6.5	As Needed
27	Implement wood stork protocol during season	1	7.2	Annual
29	Monitor for potential listed species during natural resources activities	1	7.5	As Needed
30	When new activities are undertaken at MAFB, a review for impacts to listed species and their habitat should be conducted and reviewed by USFWS	1	7.6	As Needed
31	Provide environmental and natural resources training to MAFB personnel	1	9.0	As Needed

This table is also presented in **Appendix B** with details of labor hours and estimated costs.
Priority Codes: 1=High, 2=Medium, 3=Low.
Priority codes are roughly equivalent to funding priorities as described in DoDI 4715.03 and AFI 32-7064.

Table 13. Projects Identified to Implement the INRMP (Subject to Funding Availability)				
	Project	**Priority**	**Objective(s) in Section 8.0**	**Projected Date**
1	Update/revise INRMP as determined by INRMP Task Force meeting during review for operation and effect	1	1.2	2024
2	Maintain and improve Geographic Information System (GIS) data and access to that data by MAFB personnel	1	1.9	As Needed
3	Implement BASH risk reduction measures	1	1.12	As Needed
4	Maintain current USFWS Depredation permits to allow taking of birds posing a hazard to human life and equipment, on and around the flightline	1	2.3	Annually
5	Maintain current AL DCNR Depredation Permit to allow the taking of deer, coyote, and other large mammals posing a hazard to human life and equipment, on and around the flightline	1	2.3	Annually
6	Develop erosion and sediment control manual with site-specific BMPs (especially for Vigilant Warrior Training Site and Lake Martin Recreation Areas)	2	3.1	2020
7	Maintain riparian management zones around water resources, as compatible with airfield management	1	3.5	As Needed
8	Review proposed activities for potential impacts to water resources	1	4.1	As Needed
9	Coordinate with USACE and ADEM regarding activities likely to impact wetland or other water resources and identify mitigation options	1	4.1	As Needed
10	Update wetland and other water resources mapping and delineations	2	4.2	2020
11	Mitigate/enhance stream and riparian area IAW permits issued under Section 404 of Clean Water Act	1	4.4	As Needed
12	Conduct vegetation survey using remote sensing and ground truthing	2	5.1	2020
13	Updated Golf Course Environmental Management Plan	3	5.1	2022
14	Monitor for new invasive species or sudden increases in densities of existing invasive species	1	5.3	2021
15	Monitor priority invasive species and once identified, implement control projects as needed	1	5.3	As Needed
16	Provide consultation to CE to remove any trees that are penetrating the Airspace Imaginary Surfaces at MAFB and BDZ	1	5.6	As Needed
17	Conduct updated forest inventory as directed by AFI 32-7064	1	5.7	2020
18	Perform Timber Stand Improvement operations for enhanced forest health.	1	5.7	As Needed
19	Provide consultation on projects that will impact base trees (planting should occur at a greater frequency than removals)	1	5.7	As Needed
20	Updated Golf Course Environmental Management Plan	3	5.7	2022
21	Conduct formal or USDA supported on-base deer population surveys	1	6.4	As Needed

Table 13. Projects Identified to Implement the INRMP (Subject to Funding Availability)				
	Project	**Priority**	**Objective(s) in Section 8.0**	**Projected Date**
22	Establish and implement effective deer population control strategies in order to reduce BASH risk	1	6.4	As Needed
23	Improve wild turkey and quail habitat at Vigilant Warrior Training Site and Lake Martin Recreation Area	2	6.4	As Needed
24	Create and maintain small wildlife openings throughout forest	2	6.4	As Needed
25	Manage vegetation to maintain properly balanced aquatic ecosystem	1	6.5	As Needed
26	Use aquatic herbicide to control alligator weed in base lakes and other invasive species	1	6.5	As Needed
27	Install artificial structures to attract fish and provide cover for forage species	2	6.5	As Needed
28	Implement yearly fertilization program to increase lake productivity	1	6.5	Annually
29	Update wildlife surveys with an emphasis on rare species, mussels, reptiles, and amphibians	1	6.6	2021
30	Conduct avian surveys to supplement previous inventories and establish distribution, abundance, and long range trends of seasonal bird communities found on the installation	2	6.7	2020
31	Develop conservation management plan for wood storks	1	7.2	2020
32	Transplant existing indigenous plants and seeds to encourage desirable plant establishment away from airfield to reduce BASH risk	2	7.5	As Needed
33	Conduct a survey to document status and likelihood of potential federally-listed species	1	7.6	2020
34	Develop comprehensive Invasive Species Management Plan	1	8.2	2020
35	Provide environmental and natural resources training to MAFB personnel	1	9.1	As Needed

This table is also presented in **Appendix B** with details of labor hours and estimated costs.
Priority Codes: 1=High, 2=Medium, 3=Low.
Priority codes are roughly equivalent to funding priorities as described in DoDI 4715.03 and AFI 32-7064.

11.0 REFERENCES

11.1 Standard References (Applicable to all AF Installations)

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- Sikes Act – available at: https://www.fws.gov/endangered/esa-library/pdf/2004SikesAct%20NMFWA.pdf
- eDASH Natural Resources Program Page – available at: https://cs2.eis.af.mil/sites/10040/wpp/homepage/home.aspx
- Natural Resources Playbook – available at: https://cs1.eis.af.mil/sites/ceportal/CEPlaybooks/NRM2/Pages/

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12.0 ACRONYMS

12.1 Standard Acronyms

- eDash Acronym Library
- Natural Resources Playbook – Acronym Section
- U.S. EPA Terms and Acronyms

12.2 Installation Acronyms

AAC Alabama Administrative Code
AAF Army Air Forces
42 ABW 42nd Air Base Wing
ADAI Alabama Department of Agriculture and Industries
ADECA Alabama Department of Economic and Community Affairs
ADEM Alabama Department of Environmental Management
AETC Air Education and Training Command
AF Air Force
AFB Air Force Base
AFCEC Air Force Civil Engineer Center
AFI Air Force Instruction
AGL Above Ground Level
AHAS/BAM Avian Hazard Advisory System/Bird Avoidance Model
AICUZ Air Installation Compatible Use Zone
AFPD Air Force Policy Directive
AHAS Avian Hazard Advisory System
AIPC Alabama Invasive Plant Council
AL Alabama
ANHP Alabama Natural Heritage Program
AOA Air Operations Area
APZ Accident Potential Zone
ATIS Automated Terminal Information Service
BAM Bird Avoidance Model
BASH Bird/Wildlife Aircraft Strike Hazard
BCI Bat Conservation International
BDZ Base Defense Zone
BES Business and Enterprise Systems
BHWG Bird Hazard Working Group
BMP Best Management Practice
BST Bird Strike Threat
BWC Bird Watch Condition
CAA Clean Air Act
CEQ Council on Environmental Quality (CEQ)
CFR Code of Federal Regulations
CFT Cross Functional Team
CRM Cultural Resources Manager
CWA Clean Water Act
DEPARC Defense Environmental Programs Annual Report to Congress
DoD Department of Defense
DoDI Department of Defense Instruction
DoI Department of Interior
DRMP Defense Reutilization and Marketing Office

DUSD	Deputy under Secretary of Defense
EA	Environmental Assessment
ECOS	Environmental Conservation Online System
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EISA	Energy Independence & Security Act
EM	Environmental Manager
EMS	Environmental Management System
EOD	Explosive Ordnance Disposal
EQ	Environmental Quality
EO	Executive Order
EPA	Environmental Protection Agency
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ESOHC	Environment, Safety, and Occupational Health Council
°F	degrees Fahrenheit
FEMA	Federal Emergency Management Agency
FGS	Final Governing Standards
FNW	Federal Noxious Weed
FONSI	Finding of No Significant Impact
ft	feet
FSC	Federal Species of Concern
FY	Fiscal Year
gpm	gallons per minute
GIS	Geographic Information System
HAP	High Accident Potential
IAW	In Accordance With
ICRMP	Integrated Cultural Resources Management Plan
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
IDP	Installation Development Plan
INRMP	Integrated Natural Resources Management Plan
IPM	Integrated Pest Management
IPMP	Integrated Pest Management Plan
ISO	International Standards Organization
ISS	Installation Support Section
LMRA	Lake Martin Recreation Area
MAFB	Maxwell Air Force Base
MBTA	Migratory Bird Treaty Act
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MRA	Multiple Resource Areas
MSL	Mean Sea Level
MS4	Municipal Separate Storm Sewer System
MWWSSB	Montgomery Water Works & Sanitary Sewer Board
NAAQS	National Ambient Air Quality Standards
NCO	Non-Commissioned Officer
NDAA	National Defense Authorization Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NHRP	National Historic Register
NLCD	National Land Cover Database
NOA	National Oceanic and Atmospheric Administration

NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
PFH	Privatized Family Housing
PIF	Partners in Flight
RMZ	Riparian Management Zone
ROW	Right of Way
SA	Sikes Act
SAIA	Sikes Act Improvement Act
SGCN	Species of Greatest Conservation Need
SNW	State Noxious Weed
SOQ	Senior Officer Quarters
SWCD	Soil and Water Conservation District
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
U.S.	United States
USC	U.S. Code
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USDA	United States Department of Agriculture
USDA-APHIS	United States Department of Agriculture Animal and Plant Health Inspection Services
US EPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

13.0 DEFINITIONS

- Natural Resources Playbook – Definitions Section

13.1 Installation Definitions

Agricultural Outleasing is the use of DOD lands under a lease to an agency, organization, or person for the purpose of growing crops or grazing animals.

Biological Diversity is the variety of life forms, the ecological roles they perform, and the genetic variability they contain within any defined time and space.

Commercial Forest Land is land under management capable of producing at least 20 cubic feet of merchantable timber per acre a year. It must be accessible and programmed for silvicultural prescriptions. The smallest area for this classification is 5 acres. Roadside, streamside, and shelterbelt strips of timber must have or be capable of producing a crown width of at least 120 feet to be classified as a commercial forest.

Cooperative Agreement is a written agreement between an Air Force installation and one or more outside agencies (Federal, State, or Local) which coordinates planning strategies. It is a vehicle for obtaining assistance in developing natural resources programs.

Critical Habitat is any air, land, or water area (exclusive of those existing man-made structures or settlements that are not necessary to the survival and recovery of a listed species) and constituents thereof, the loss of which would appreciably decrease the likelihood of the survival and recovery of an endangered or threatened species or a distinct segment of its population and so designated by the Fish and Wildlife Service.

Cropland is land primarily suited for producing farm crops, including grain, hay, and truck crops.

Defensible Space is an area as defined by the "Authority Having Jurisdiction" (typically a width of 9.14 m (30 ft) or more) between an improved property and a potential wildfire where combustible materials and vegetation have been removed to reduce the potential for fire on improved property spreading to wildland fuels or to provide a safe working area for fire fighters protecting life and improved property.

Ecosystem Management is an approach to natural resources management that recognizes the interrelationships of ecological processes linking soils, plants, animals, minerals, climate, water, and topography as a living system that has importance to and is affected by human activity beyond traditional commodity and amenity uses and acknowledges the importance of ecosystem services such as water conservation, oxygen recharge, and nutrient recycling.

Endangered Species are all plants and animals listed or proposed for listing as threatened or endangered by the Federal government or State governments.

Exotic Species are any plant or animal not native to a region, state, or country.

Fire Hazard. A fuel complex, defined by kind, arrangement, volume, condition, and location, that determines the ease of ignition and/or resistance to fire control.

Fish includes fresh and salt water fin-fish, other aquatic vertebrate organisms, crustaceans, and mollusks.

Floodplains are defined as 100-year floodplains or areas with a 1% chance of inundation in any given year.

Forest Fire. See Wildland Fire.

Forest Land is land on which forest trees of various sizes comprise at least 10% of the area. This category includes open land that is capable of supporting trees, though not currently developed for forest uses, but planned for forest regeneration and management.

Forest Management is developing, conserving, and protecting forest resources to provide sustained yield and multiple use from the forest resources.

Forest Products are all plant materials in wooded areas that have commercial value, such as saw-logs, veneer (peeler) logs, poles, pilings, pine needles, cordwood (for pulp, paper, firewood, etc.), fence posts, mine timber, Christmas trees (from unsheared trees cut during intermediate harvests), and similar wood or chemical products.

Fuel Modification. Any manipulation or removal of fuels to reduce the likelihood of ignition or the resistance to fire control.

Fuels. All combustible materials within the wildland/urban interface or intermix including, but not limited to, vegetation and structures.

Game are any species of fish or wildlife for which seasons and bag or creel limits have been prescribed, and which are taken under State or Federal laws and regulations.

Grass Fire. See Wildland Fire.

Grazing Land is land with vegetative cover that consists of grasses, forbs, and shrubs valuable as forage.

Ground Fuels. All combustible materials such as grass, duff, loose surface litter, tree or shrub roots, rotting wood, leaves, peat, or sawdust that typically support combustion.

Habitat is an area that provides the environmental elements of air, water, food, cover, and space necessary for a given species to survive and reproduce.

Highly Erodible Soils are soils whose physical properties and/or slope are identified by the U.S. Department of Agriculture, Soil Conservation Service as being highly susceptible to wind and/or water erosion.

Improved Property Is a piece of land or real estate upon which a structure has been placed, a marketable crop is growing (including timber), or other property improvement has been made.

Improved Grounds are grounds on which intensive maintenance activities are annually planned and performed. These are developed areas of an installation that have lawns and landscape plantings that require intensive maintenance. These usually include the cantonment, parade grounds, drill fields, athletic areas, golf courses (excluding roughs), cemeteries, housing areas, etc.

Integrated Natural Resources Management Plan is a natural resources management plan based on ecosystem management which shows the interrelationships of all individually addressed component plans such as forestry plans, fish and wildlife plans, and outdoor recreation plans as well as other mission and adjacent land use activities to the basic land management plans as well.

Land Management Unit is the smallest land management division used in developing specific plans to accomplish natural resources management goals. Land management units may correspond to grazing units on agricultural outleased lands, stands, or compartments on commercial forest lands, various types of

improved grounds (for example, athletic fields, parks, yards in family housing, or landscaped areas around administrative buildings), or identifiable semi-improved grounds (for example, airfield areas, utility rights-of-way, roadside areas, etc.).

Land-Use Regulation is a document that prescribes the specific, technical actions, or land use and restrictions with which lessees, permittees, or contractors must comply. It is derived from the grazing or cropland management plan and is included as a part of all outleases, land-use permits, or other contracts.

Livestock are domestic animals kept or raised for food, by-products, work, transportation, or recreation.

Mitigation is any action that moderates the severity of a fire hazard or risk.

Multiple-use is the integrated, coordinated, and compatible use of various natural resources to derive the best benefit while perpetuating and protecting those resources.

Multiple-use and Sustained Yield Management is the care and use of natural resources in the combination best serving the present and future needs of the United States and its people without impairing the productivity of the land and water.

Natural Resources Management Professional is an individual with a degree in the natural sciences who has responsibility for managing natural resources on a regular basis and receives periodic training to maintain proficiency in managing natural resources.

"No Funds" Service Contract involves no exchange of funds for land management service rendered in lieu of other considerations received for performing this service. This contract is necessary when a party agrees to make no charge to establish, control, or remove vegetative cover or growth and is given the growth in payment of service.

Noncommercial Forest Land is land not capable of yielding forest products of at least 20 cubic feet per acre per year because of adverse site conditions. The classification also includes productive forest land on which mission requirements, accessibility, or non-compatible uses preclude forest management activities.

Noncombustible Materials Are any materials that, in the form in which they are used and under the conditions anticipated, will not ignite and burn nor will add appreciable heat to an ambient fire.

Outdoor Interpretation is observing and explaining the history, development, and significance of our natural heritage and natural resources.

Outdoor Recreation is recreation that relates directly to and occurs in natural, outdoor environments.

Outdoor Recreation Resources are land and water areas and associated natural resources that provide, or have the potential to provide, opportunities for outdoor recreation for present and future generations.

Parcourses are physical fitness trails that combine jogging and calisthenics. They are usually located in wooded areas and are about 1.5-2 miles in length. Numerous exercise stations, located along the route, direct the participants through various exercises.

Prescribed Fire is a fire burning within prescription from either planned or unplanned ignitions.

Prevention Activities are activities, including public education, law enforcement, personal contact, and reduction of fuel hazards, directed at reducing the incidence of fires.

Prime Farmland is land that has the best combination of chemical and physical characteristics for producing food, feed, forage, fiber, and oil-seed crops, and is also available or potentially available for these uses. It has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops economically when treated and managed, including water management, according to modern farming methods. Existing pastureland, rangeland, forest land, or other land not in an urban buildup condition is considered eligible for designation as prime farmland, providing it meets the other criteria.

Procurement Contract is an agreement for payment by the government to the contractor for land management service rendered to establish, control, or remove vegetative cover or growth. This contract may not extend beyond the period for which appropriations are provided for the procurement.

Rangeland is land on which the native vegetation is predominantly grasses, grass-like plants, forbs, or shrubs suitable for grazing or browsing use. Includes lands revegetated naturally or artificially to provide a forage cover that is managed like native vegetation and includes natural grasslands, savannas, shrubland, most deserts, tundra, alpine communities, coastal marshes, and wet meadows.

Recreation Carrying Capacity is the level of recreational use for a specific activity that an area can sustain without degrading environmental qualities.

Reforestation is the renewal or regeneration of a forest by natural or artificial means.

Rotation Age is the planned number of years between the regeneration of a forest stand and its final cutting at a specified stage of maturity.

"Sales" Service Contract is an agreement for payment by contractor to the government for crops, crop residue, or grazing privileges incidental to control or removal of vegetative growth for land management purposes. Sales contracts will be for a period of 1-5 years.

Savanna is a grassland region with scattered trees and shrubs, grading into either open plains or woodlands.

Semi-Improved Grounds are grounds where periodic maintenance is performed primarily for operational and aesthetic reasons (such as erosion and dust control, bird control, and visual clear zones). These usually include grounds adjacent to runways, taxiways, and aprons; runway clear zones; lateral safety zones (AFR 86-14); rifle and pistol ranges; picnic areas; ammunition storage areas; antenna facilities; golf course roughs; etc.

Stewardship is the management of a resource base with the goal of maintaining or increasing the resource's value indefinitely into the future.

Threatened Species are those Federal or State-listed species of flora and fauna that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range and which have been designated for special protection and management pursuant to the Endangered Species Act.

Timber Management is applying silvicultural knowledge and prescriptions to forest lands within economic and environmental constraints to produce a sustained yield of forest products.

Timber Stand Improvement is silvicultural treatments applied to existing stands to improve their quality, composition, condition, or rate of growth (such as pruning, thinning, releasing, and prescribed burning).

Unimproved Grounds are all grounds not classified as improved or semi-improved and usually not mowed more than once per year. These include weapons ranges; forest lands; cropland and grazing lands; lakes, ponds, and wetlands; and areas in airfield beyond the safety zones (AFRs 86-5 and 86-14).

Unique Farmland is land, other than prime farmland, used for producing specific high-value food and fiber crops at the time of designation. It has the special combination of soil quality, location, growing season, and moisture supply needed to produce sustained high-quality or high yields of a specific crop when treated and managed according to modern farming methods. Examples include citrus, tree nuts, olives, cranberries, fruit, and vegetables.

Urban Forests are planted or remnant native tree species existing within urbanized areas such as parks, tree-lined residential streets, scattered tracts of undisturbed woodlands, and cantonment areas.

Urban Wildlife are wildlife that habitually live or periodically survive in an urban environment on improved or semi-improved grounds.

Watchable Wildlife Areas are areas identified under the Watchable Wildlife Program as suitable for passive recreational uses such as bird watching, nature study, and other non- consumptive uses of wildlife resources.

Wetlands are areas inundated or saturated by surface or ground water at a frequency and a duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Wildfire. See Wildland Fire.

Wildland Fire is an unplanned and uncontrolled fire spreading through vegetative fuels, at times involving structures.

Wildland/Urban Interface is any area where wildland fuels threaten to ignite combustible homes and structures.

Wildland/Urban Interface Coordinator is the person responsible for the development of the plan(s) for the reduction of the fire risks and hazards associated in the wildland/urban interface.

Wildland/Urban Interface Protection Specialist is the person responsible for the development and/or implementation of a plan to protect people, communities, or individual structures from a wildland fire.

Wildland/Urban Intermix is an area where improved property and wildland fuels meet with no clearly defined boundary.

Wildlife-Carrying Capacity is the maximum density of wildlife which a particular area or habitat is capable of carrying on a sustained basis without deterioration of the habitat.

14.0 APPENDICES

14.1 Standard Appendices

Appendix 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.

Federal Public Laws and Executive Orders	
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, *Exotic and 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 Public Laws and Executive Orders	
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.

Federal Public Laws and Executive Orders	
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.

Federal Public Laws and Executive Orders	
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 32-7062, *Air Force Comprehensive Planning*	Provides guidance and responsibilities related to the USAF comprehensive planning process on all USAF-controlled lands.
AFI 32-7064, *Integrated Natural Resources Management*	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.
AFI 32-7065, *Cultural Resources Management*	This instruction 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.
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

Federal Public Laws and Executive Orders	
	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.

14.2 Installation Appendices

Appendix B. Detailed INRMP Implementation Tables

Table B-1 provides an overview of recurring natural resource management activities. These activities are generally performed by MAFB Environmental Manager or other MAFB personnel. The implementation schedule for planned projects for this updated INRMP are detailed in **Table B-2**. **Table B-2** will be used to develop budget requests and schedule annual project requirements. Funding requests will be submitted in accordance with current AFCEC procedures for conservation projects. Schedules are only estimates and are based on availability of funding.

Abbreviated Tables are presented in **Section 10.0**.

Table B-1. Detailed MAFB INRMP Activities

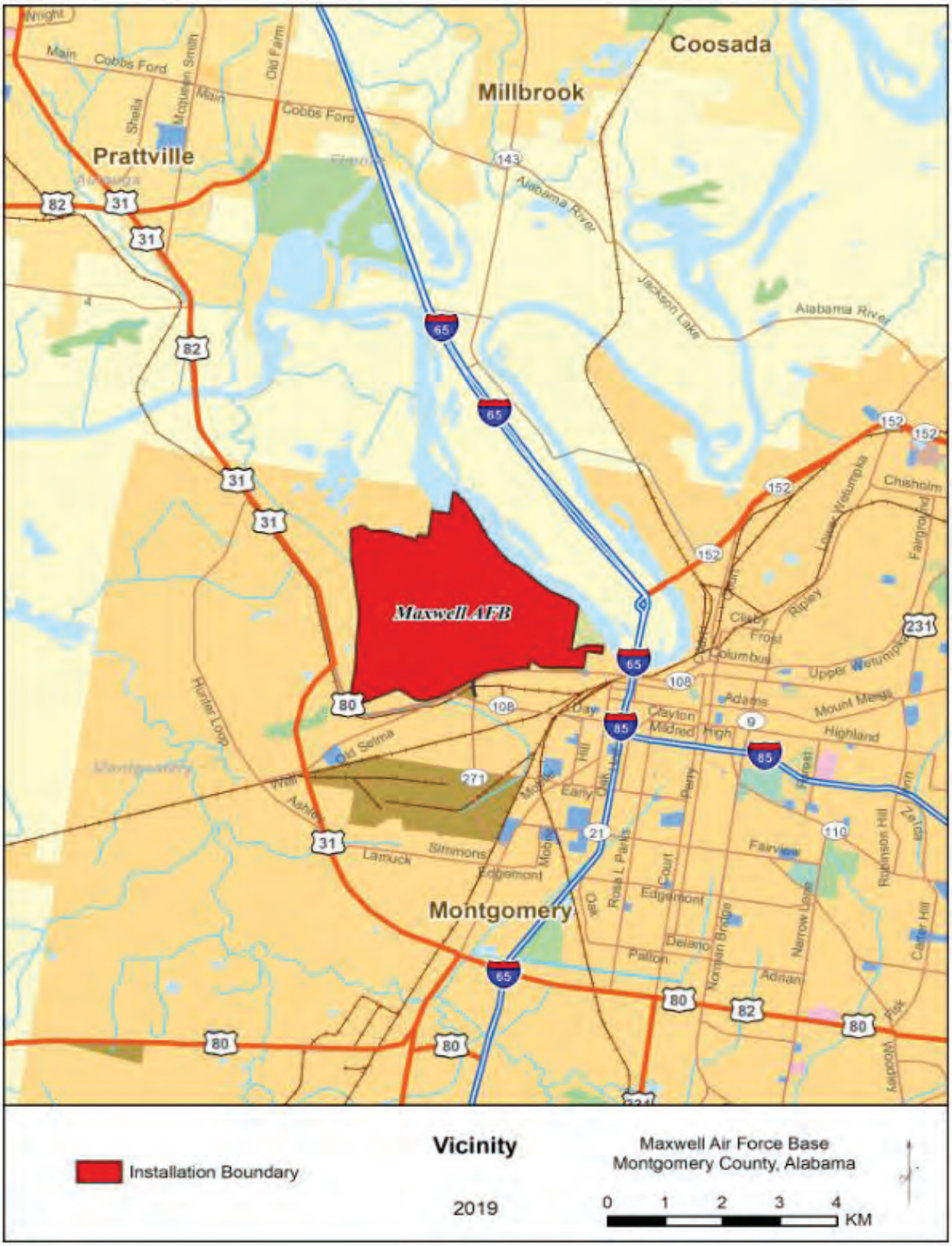
Table B-1. Detailed Maxwell AFB INRMP Recurring NRM Activities																					
Abbreviated Table Presented in Section 10, Table 12					MAFB NRM Personnel Labor Hours										Equipment & Supply Funding					
	Activity	Priority	Objective(s) in Section 8.0	Timing	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY20	FY21	FY22	FY23	FY24	FY25
1	Prepare budget to implement the natural resources management program	1	1.1	Annual	40	40	40	40	40	40	40	40	40	40	N/A	N/A	N/A	N/A	N/A	N/A
2	Purchase equipment and supplies necessary for program management	1	1.1	As Needed	40	40	40	40	40	40	40	40	40	40	7000	7000	7000	7000	7000	7000
3	Purchase parts and supplies necessary to maintain equipment related to program management		1.1	As Needed	40	40	40	40	40	40	40	40	40	40	4000	4000	4000	4000	4000	4000
4	Complete review for operation and effect at least every 5 years with INRMP Task Force; initiate update or revision as appropriate	1	1.2	2024	120	20	20	20	20	120	20	20	20	20	N/A	N/A	N/A	N/A	N/A	1000
5	Complete annual review of INRMP	1	1.2	Annual	40	80	80	80	80	80	80	80	80	80	N/A	N/A	N/A	N/A	N/A	N/A
6	Continue implementing BASH risk reduction measures	1	1.12	As Needed	120	120	120	120	120	120	120	120	120	120	TBD	TBD	TBD	TBD	TBD	TBD
7	Assess BASH related-populations and apply for depredation-permit renewal for appropriate species	1	2.3	Annual	40	40	40	40	40	40	40	40	40	40	2500	2500	2500	2500	2500	2500
8	Maintain Federal Migratory Bird Airport Depredation Permit under Migratory Bird Treaty Act and Alabama Wildlife Permit(s)	1	2.3	Annual	30	30	30	30	30	30	30	30	30	30	N/A	N/A	N/A	N/A	N/A	N/A
9	Evaluate effectiveness of erosion and sediment control measures IAW Stormwater Management Plan	1	3.1	As Needed	80	80	80	80	80	80	80	80	80	80	TBD	TBD	TBD	TBD	TBD	TBD
10	Manage stormwater runoff in order to reduce erosion, encourage infiltration upstream of major water bodies, and reduce nutrients before runoff enters major water bodies IAW Stormwater Management Plan	1	3.2	As Needed	120	120	120	120	120	120	120	120	120	120	3000	3000	3000	3000	3000	3000
11	Minimize nonpoint source pollution through implementation of BMPs, following existing spill prevention and hazardous materials management protocols, and education IAW Stormwater Management Plan	1	3.3	As Needed	60	60	60	60	60	60	60	60	60	60	3000	3000	3000	3000	3000	3000
12	Monitor at-risk construction sites to ensure erosion and sediment control measures are effective IAW Stormwater Management Plan	1	3.4	As Needed	80	80	80	80	80	80	80	80	80	80	TBD	TBD	TBD	TBD	TBD	TBD
13	NRM personnel will review proposed activities for potential to impact water resources	1	4.1	As Needed	40	60	60	60	60	60	60	60	60	60	200	200	200	200	200	200
14	If an activity will impact a wetland or other water resource, coordination with USACE and ADEM will be completed and mitigation options identified	1	4.1	As Needed	60	60	60	60	60	60	60	60	60	60	N/A	N/A	N/A	N/A	N/A	N/A
15	Maintain riparian management zones around water resources as compatible with airfield management	1	4.2	As Needed	60	60	60	60	60	60	60	60	60	60	4000	4000	4000	4000	4000	4000
16	Implement IPMP, including methods for control and reporting requirements	1	5.3	As Needed	80	120	120	120	120	120	120	120	120	120	TBD	TBD	TBD	TBD	TBD	TBD

Table B-1. Detailed Maxwell AFB INRMP Recurring NRM Activities																				
Abbreviated Table Presented in Section 10, Table 12					MAFB NRM Personnel Labor Hours										Equipment & Supply Funding					
	Activity	Priority	Objective(s) in Section 8.0	Timing	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY20	FY21	FY22	FY23	FY24	FY25
17	Monitor regularly for new invasive species or sudden increases in density of existing invasive species	1	5.3	As Needed	40	40	40	40	40	40	40	40	40	40	1500	1500	1500	1500	1500	1500
18	Conduct any tree management to minimize impacts to migratory birds and roosting bats	1	5.4	As Needed	40	40	40	40	40	40	40	40	40	40	TBD	TBD	TBD	TBD	TBD	TBD
19	Assist CE and BASH team in managing airfield environments so that trees and other vegetation do not violate airfield clearance specified in Uniform Facilities Criteria (UFC 3-260-01)	1	5.6	As Needed	80	80	80	80	80	80	80	80	80	80	TBD	TBD	TBD	TBD	TBD	TBD
20	Perform timber stand improvement operations to improve forest health	1	5.7	As Needed	240	240	240	240	240	240	240	240	240	240	TBD	TBD	TBD	TBD	TBD	TBD
21	Provide consultation on projects that impact trees on base. As a general policy, plantings should occur at the same or greater frequency than removals	1	5.7	As Needed	40	40	40	40	40	40	40	40	40	40	1000	1000	1000	1000	1000	1000
22	Use native plant species and materials for landscaping activities	1	5.7	As Needed	40	40	40	40	40	40	40	40	40	40	TBD	TBD	TBD	TBD	TBD	TBD
23	Maintain and promote Urban Forestry Program	2	5.8	Annual	40	40	40	40	40	40	40	40	40	40	1000	1000	1000	1000	1000	1000
24	Minimize BASH risk by deterring birds and other wildlife from the airfield	1	6.1	As Needed	120	120	120	120	120	120	120	120	120	120	2000	2000	2000	2000	2000	2000
25	Conduct formal or USDA partner annual deer population surveys	1	6.4	As Needed	40	40	40	40	40	40	40	40	40	40	400	400	7000	400	400	400
26	Manage aquatic vegetation to maintain properly balanced aquatic ecosystem	1	6.5	As Needed	100	100	100	100	100	100	100	100	100	100	6000	6000	6000	6000	6000	6000
27	Monitor for potential listed species during natural resources activities	1	7.6	As Needed	60	60	60	60	60	60	60	60	60	60	5000	5000	5000	5000	5000	5000
28	When new activities are undertaken at MAFB or BDZ, a review for impacts to listed species and their habitat should be conducted and reviewed by USFWS	1	7.7	As Needed	40	40	40	40	40	40	40	40	40	40	TBD	TBD	TBD	TBD	TBD	TBD
29	Provide environmental and natural resources training to MAFB personnel	1	9.0	As Needed	120	80	80	80	80	80	80	80	80	80	TBD	TBD	TBD	TBD	TBD	TBD

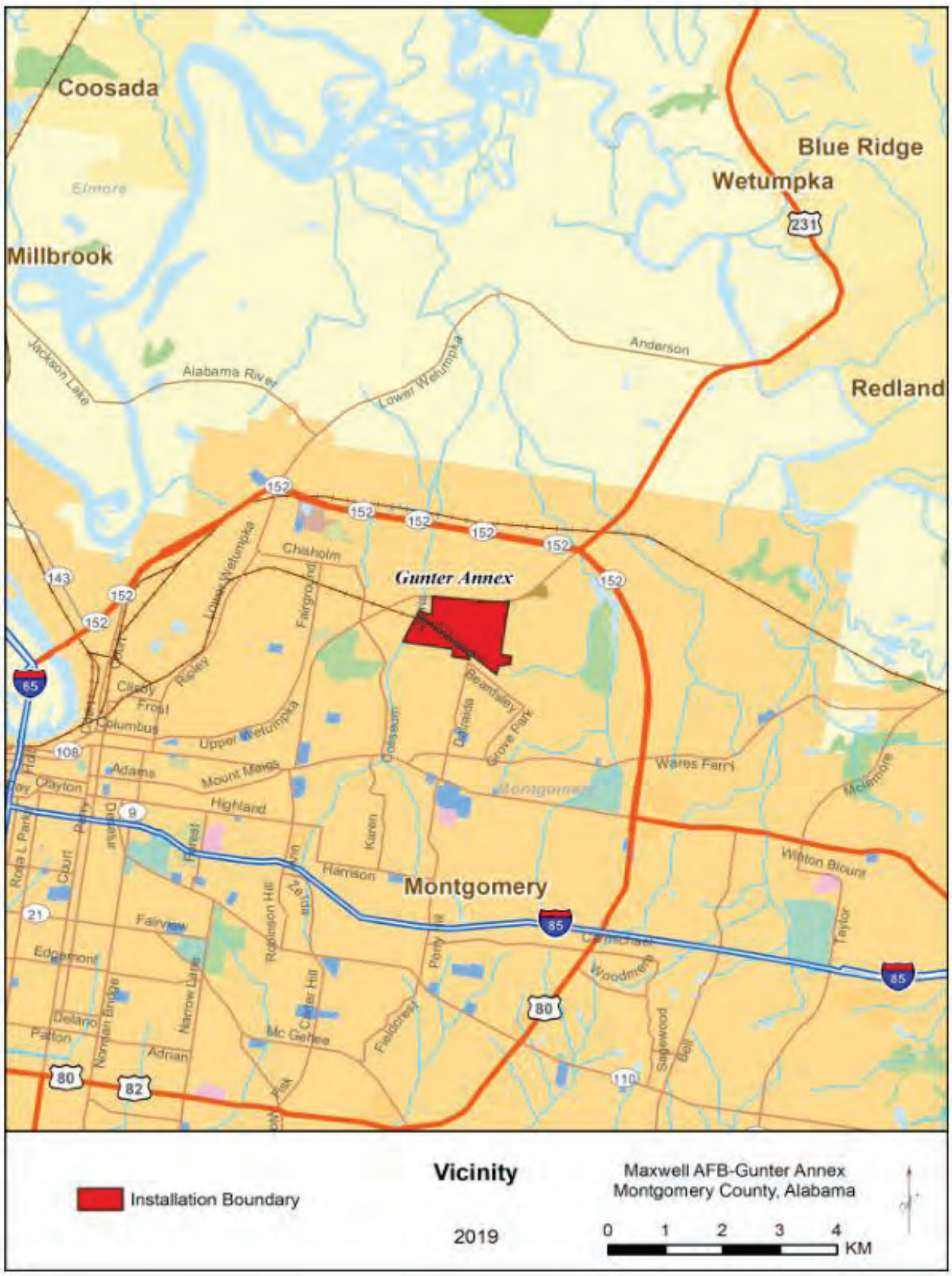
Table B-2. Detailed MAFB INRMP Projects

Table D-2. Detailed MAFB INRMP Implementation Projects																														
Abbreviated Table Presented in Section 10, Table 12					Labor Hours (MAFB Personnel and Contract Man-Hours)							Equipment and Supply Funding							Contractor Funding							Total Funding						
	Project	Priority	Objective(s) in Section 8.0	Projected Date	FY20	FY21	FY22	FY23	FY24	FY25	TBD FY	FY20	FY21	FY22	FY23	FY24	FY25	TBD FY	FY20	FY21	FY22	FY23	FY24	FY25	TBD FY	FY20	FY21	FY22	FY23	FY24	FY25	TBD FY
1	Update/revise INRMP as determined by INRMP Task Force meeting during review for operation and effect	1	1.2	2024	600	20	20	20	20	600		N/A	N/A	N/A	N/A	N/A	1000		45000	N/A	N/A	N/A	N/A	42000		48000	TBD	TBD	TBD	TBD	47000	
2	Maintain and improve Geographic Information System (GIS) data and access to that data by MAFB personnel	1	1.9	As Needed	TBD	120	120	120	120	120		TBD	TBD	TBD	TBD	TBD	TBD		TBD	5000	5000	5000	5000	5000		TBD	6500	6500	6500	6500	6500	
3	Implement BASH risk reduction measures	1	1.12	As Needed	TBD	120	120	120	120	120		TBD	TBD	TBD	TBD	TBD	TBD		TBD	6000	6000	6000	6000	6000		TBD	7000	7000	7000	7000	7000	
4	Maintain current USFWS and Alabama Wildlife Depredation permits to allow taking of birds or animals posing a hazard to human life and equipment on and around the flightline	1	2.3	As Needed	30	30	30	30	30	30		N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A		750	750	750	750	750	750	
5	Maintain current AL DCNR Depredation Permit for allow the taking of deer and coyote posing a hazard to human life and equipment on and around the flightline	1	2.3	Annually	20	20	20	20	20	20		N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A		500	500	500	500	500	500	
6	Develop erosion and sediment control manual with site-specific BMPs (especially for Vigilant Warrior Training Site and Lake Martin Recreation Areas)	2	3.1	2020	0	20	300	20	20	20		0	300	TBD	300	300	300		0	0	16500	0	0	0		0	800	TBD	800	800	500	
7	Maintain riparian management zones around water resources, as compatible with airfield management	1	3.5	As Needed	TBD	160	160	160	160	160		TBD	4000	4000	4000	4000	4000		TBD	7500	7500	7500	7500	7500		TBD	13000	13000	13000	13000	13000	
8	Review proposed activities for potential impacts to water resources	1	4.1	As Needed	40	60	60	60	60	60		200	200	200	200	200	200		N/A	N/A	N/A	N/A	N/A	N/A		1200	1700	1700	1700	1700	1700	
9	Coordinate with USACE and ADEM regarding activities likely to impact wetland or other water resources and identify mitigation options	1	4.1	As Needed	60	100	100	100	100	100		TBD	TBD	TBD	TBD	TBD	TBD		TBD	3000	3000	3000	3000	3000		TBD	TBD	TBD	TBD	TBD	TBD	
10	Update wetland and other water resources mapping and delineations	2	4.2	2020	TBD	20	100	20	20	20		TBD	500	3000	500	500	500		TBD	N/A	6000	N/A	N/A	N/A		TBD	500	9500	500	500	500	
11	Mitigate/enhance stream and riparian area IAW permits issued under Section 404 of Clean Water Act	1	4.4	As Needed	500	250	250	250	250	TBD		TBD	TBD	TBD	TBD	TBD	TBD		60000	30000	30000	30000	TBD	TBD		TBD	TBD	TBD	TBD	TBD	TBD	
12	Conduct vegetation survey using remote sensing and ground truthing	2	5.1	2020	0	50	360	50	50	50		0	500	3000	500	500	500		0	0	24000	0	0	0		0	1750	28000	1750	1750	1750	
13	Develop Golf Course Environmental Management Plan	3	5.1	2022	0	0	20	20	120	0		N/A	N/A	500	500	2000	N/A		0	0	0	0	6000	0		0	0	500	500	7000	0	
14	Monitor for new invasive species or sudden increases in densities of existing invasive species	1	5.3	As Needed	TBD	80	80	80	TBD	TBD		TBD	1000	1000	1000	1000	1000		30000	30000	30000	30000	TBD	TBD		TBD	TBD	TBD	TBD	TBD	TBD	
15	Monitor priority invasive species, once identified, and implement control projects if needed, possibly in conjunction with local government agencies	1	5.3	As Needed	TBD	80	80	80	TBD	TBD		TBD	TBD	TBD	TBD	TBD	TBD		30000	30000	30000	30000	TBD	TBD		TBD	TBD	TBD	TBD	TBD	TBD	
16	Remove any trees that are penetrating the Airspace Imaginary Surfaces at MAFB and BDZ	1	5.6	As Needed	0	TBD	TBD	TBD	TBD	TBD		0	TBD	TBD	TBD	TBD	TBD		0	TBD	TBD	TBD	TBD	TBD		0	TBD	TBD	TBD	TBD	TBD	
17	Conduct updated forest inventory as directed by AFI 32-7064	1	5.7	2020	0	TBD	600	TBD	TBD	TBD		0	0	2500	TBD	TBD	TBD		0	TBD	30000	TBD	TBD	TBD		0	TBD	37500	TBD	TBD	TBD	
18	Perform Timber Stand Improvement operations for enhanced forest health.	1	5.7	As Needed	40	240	240	240	240	240		1000	1000	1000	1000	1000	1000		TBD	TBD	TBD	TBD	TBD	TBD		TBD	TBD	TBD	TBD	TBD	TBD	
19	Provide consultation on projects that will impact base trees. Planting should occur at a greater frequency than removals.	1	5.7	As Needed	40	40	40	40	40	40		1000	1000	1000	1000	1000	1000		N/A	N/A	N/A	N/A	N/A	N/A		2000	2000	2000	2000	2000	2000	
20	Maintain and promote Urban Forestry Program	2	5.8	Annually	40	40	40	40	40	40		TBD	TBD	TBD	TBD	TBD	TBD		TBD	TBD	TBD	TBD	TBD	TBD		TBD	TBD	TBD	TBD	TBD	TBD	
21	Apply prescriptive fire as a tool to mimic the natural forces in fire maintained ecosystems.	1	5.9	Annually	60	60	60	60	60	60		TBD	TBD	TBD	TBD	TBD	TBD		TBD	TBD	TBD	TBD	TBD	TBD		TBD	TBD	TBD	TBD	TBD	TBD	
22	Install and maintain habitats that encourage pollination activities in appropriate areas on base.	2	6	2018	20	40	TBD	TBD	TBD	TBD		TBD	TBD	TBD	TBD	TBD	TBD		30000	TBD	TBD	TBD	TBD	TBD		TBD	TBD	TBD	TBD	TBD	TBD	
23	Conduct formal or USDA partner supported on-base deer population survey	1	6.4	As Needed	40	40	40	40	40	40		400	400	7000	400	400	400		N/A	N/A	N/A	N/A	N/A	N/A		1400	1400	8000	1400	1400	1400	
24	Establish and implement effective deer population control strategies in order to reduce BASH risk	1	6.4	As Needed	40	40	40	40	40	40		1500	1500	1500	1500	1500	1500		N/A	N/A	N/A	N/A	N/A	N/A		2500	2500	2500	2500	2500	2500	
25	Improve wild turkey and quail habitat at Vigilant Warrior Training Site and Lake Martin Recreation Area	2	6.4	As Needed	0	40	40	40	40	40		0	500	500	500	500	500		N/A	N/A	N/A	N/A	N/A	N/A		1500	1500	1500	1500	1500	1500	
26	Create and maintain small wildlife openings throughout forest	2	6.4	As Needed	20	20	20	20	20	20		200	200	200	200	200	200		N/A	N/A	N/A	N/A	N/A	N/A		700	700	700	700	700	700	
27	Manage vegetation to maintain properly balanced aquatic ecosystem	1	6.5	As Needed	40	40	40	40	40	40		TBD	TBD	TBD	TBD	TBD	TBD		3000	3000	3000	3000	3000	3000		6000	6000	6000	6000	6000	6000	
28	Use aquatic herbicide to control alligator weed in base lakes	1	6.5	As Needed	20	40	40	40	40	40		0	2000	2000	2000	2000	2000		0	3000	3000	3000	3000	3000		500	6000	6000	6000	6000	6000	
29	Install artificial structures to attract fish and provide cover for forage species	2	6.5	As Needed	60	20	20	20	20	20		200	TBD	TBD	TBD	TBD	TBD		N/A	N/A	N/A	N/A	N/A	N/A		1700	TBD	TBD	TBD	TBD	TBD	
30	Implement yearly fertilization program, as advised by AGFC, to increase lake productivity	1	6.5	Annually	TBD	40	40	40	40	40		TBD	2000	2000	2000	2000	2000		N/A	N/A	N/A	N/A	N/A	N/A		TBD	3000	3000	3000	3000	3000	
31	Update wildlife surveys with an emphasis on rare species	1	6.6	2021	0	TBD	TBD	TBD	TBD	TBD		0	TBD	TBD	TBD	TBD	TBD		0	TBD	TBD	TBD	TBD	TBD		0	TBD	TBD	TBD	TBD	TBD	
32	Conduct avian surveys to supplement previous inventories and establish distribution, abundance, and long range trends of seasonal bird communities found on the installation	2	6.7	2019	0	80	20	0	0	0		0	TBD	TBD	0	0	0		0	85000	0	0	0	0		0	TBD	TBD	0	0	0	
33	Manage rare water-dependent species (e.g., wood stork) by protecting the shorelines of, and water quality in, the Base Lakes, and streams.	1	7.1	2018	60	60	60	60	60	60		TBD	TBD	TBD	TBD	TBD	TBD		46000	46000	46000	46000	TBD	TBD		TBD	TBD	TBD	TBD	TBD	TBD	
34	Develop conservation management plan for wood stork	1	7.2	2019	0	TBD	TBD	TBD	TBD	TBD		0	TBD	TBD	TBD	TBD	TBD		0	TBD	TBD	TBD	TBD	TBD		0	TBD	TBD	TBD	TBD	TBD	
35	Conduct a survey to document status and likelihood of potential federally listed species	1	7.6	2020	0	TBD	TBD	TBD	TBD	TBD		0	TBD	TBD	TBD	TBD	TBD		0	TBD	TBD	TBD	TBD	TBD		0	TBD	TBD	TBD	TBD	TBD	
36	Develop comprehensive Invasive Species Management Plan	1	8.2	2020	500	500	TBD	TBD	TBD	TBD		1500	1000	TBD	TBD	TBD	TBD		82000	25000	TBD	TBD	TBD	TBD		169000	62000	TBD	TBD	TBD	TBD	
37	Provide environmental and natural resources training to MAFB personnel	1	9.1	As Needed	120	80	80	80	80	80		TBD	TBD	TBD	TBD	TBD	TBD		N/A	N/A	N/A	N/A	N/A	N/A		TBD	TBD	TBD	TBD	TBD	TBD	

Map. C-1. Maxwell Air Force Base Vicinity Map



Map C-2. Gunter Annex Vicinity Map



Map C-3. Vigilant Warrior Training Site Vicinity Map

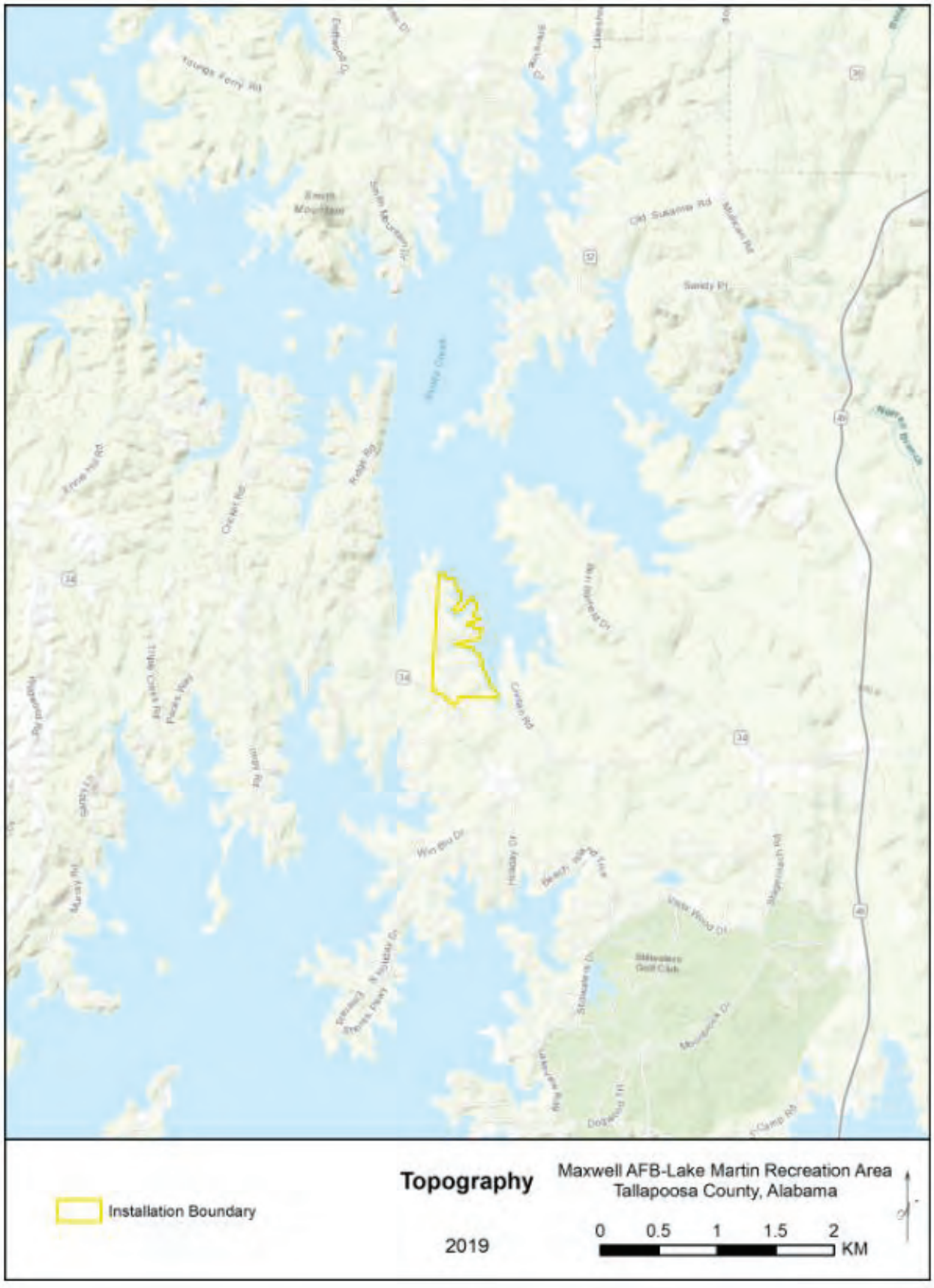
Map C-4. Lake Martin Recreation Area Vicinity Map

Map C-5. Maxwell Air Force Base Topography Map

Map C-6. Gunter Annex Topography Map

Map C-7. Vigilant Warrior Training Site Topography Map

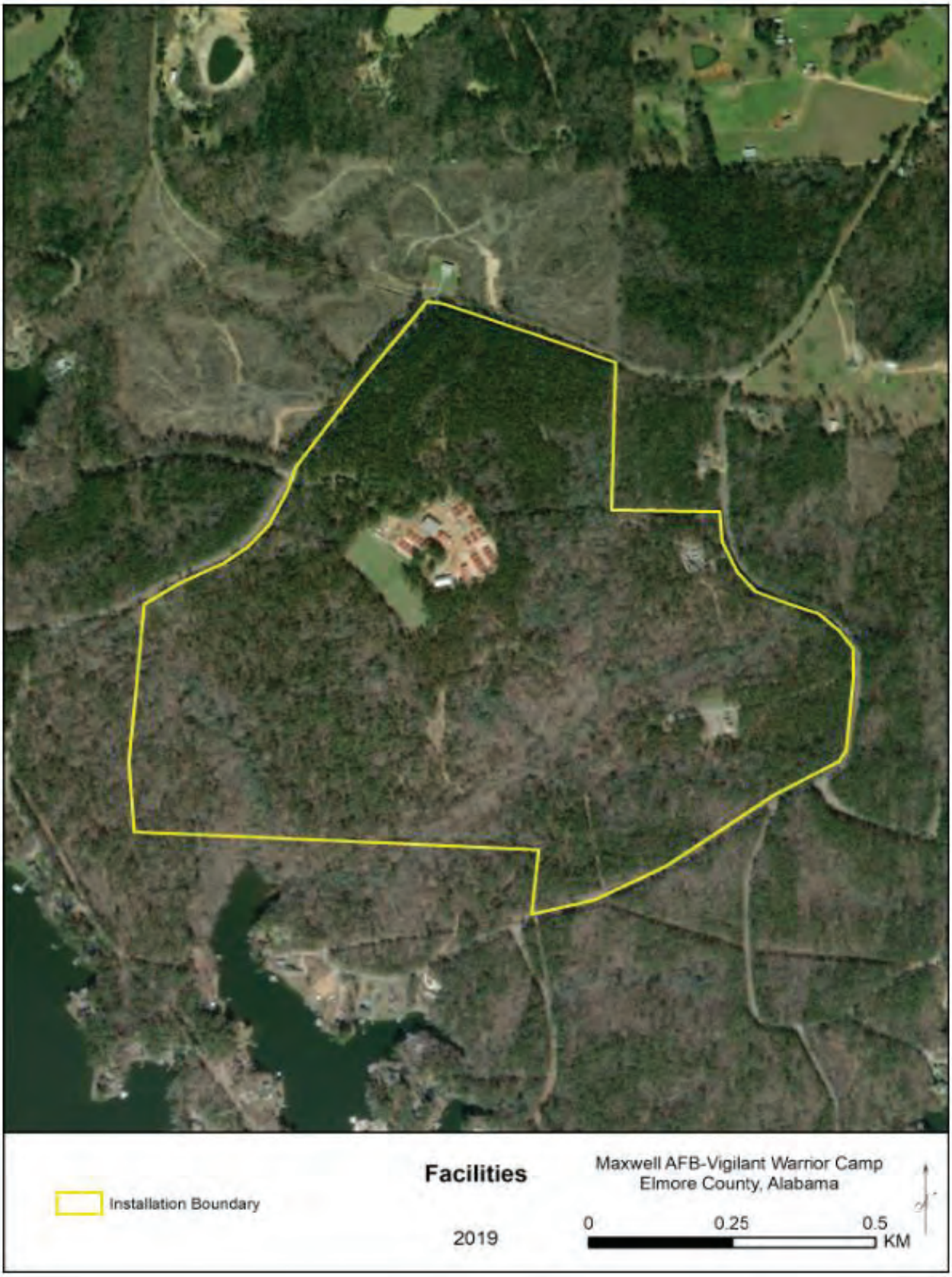
Map C-8. Lake Martin Recreation Topography Map



Map C-9. Maxwell Air Force Base Facility Map

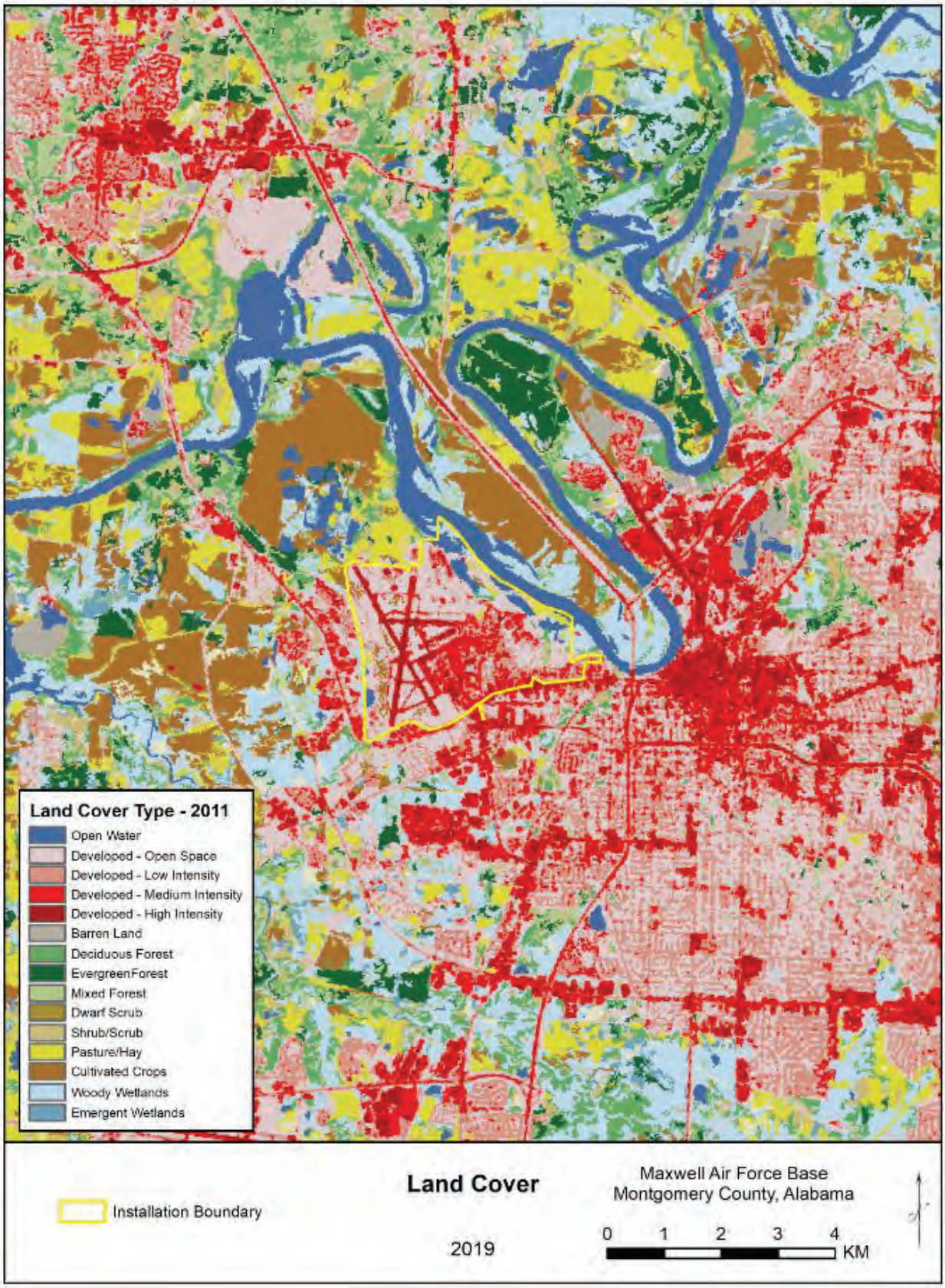
Map C-10. Gunter Annex Facility Map

Map C-11. Vigilant Warrior Training Site Facility Map

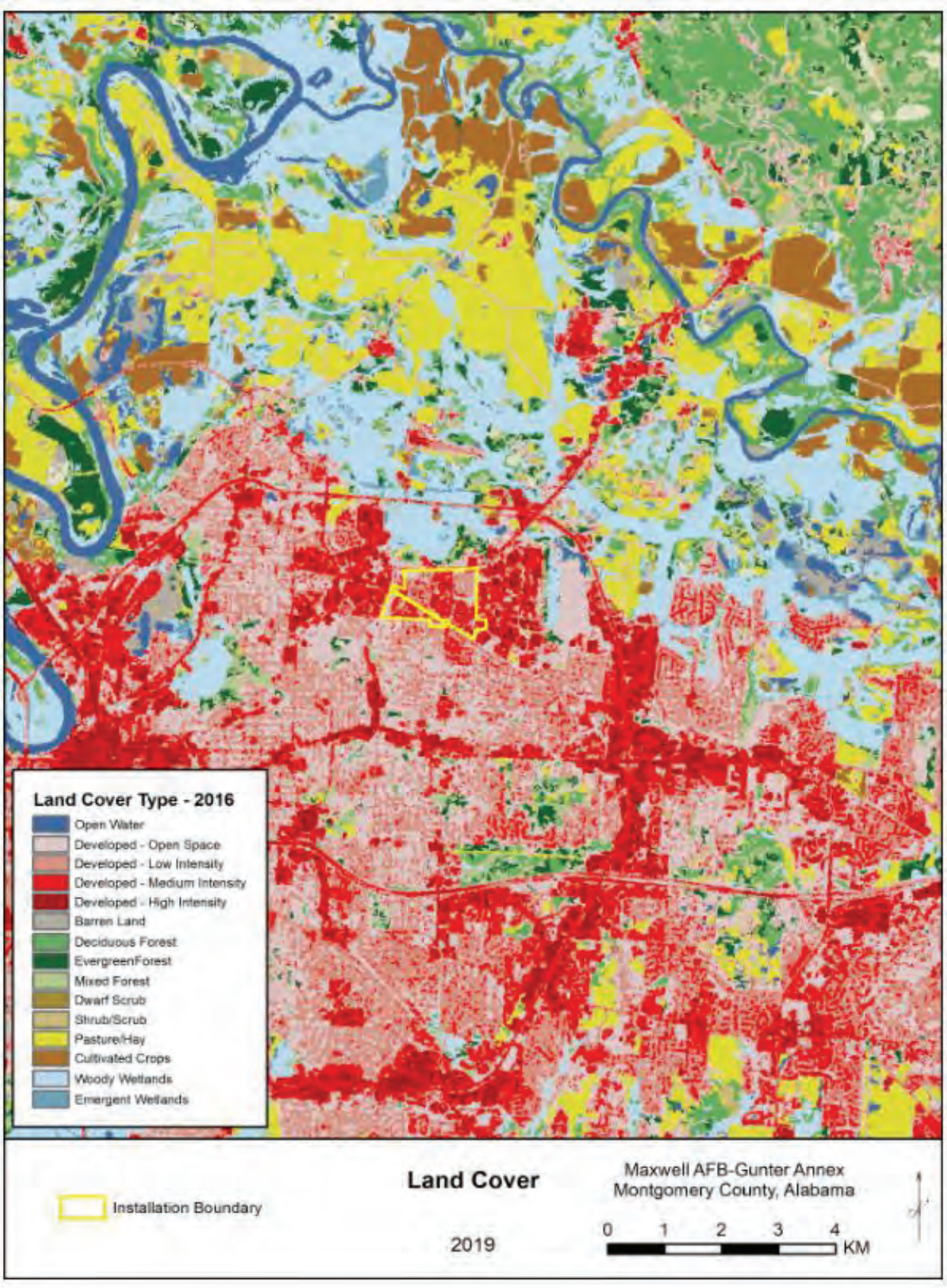


Map C-12. Lake Martin Recreation Area Facility Map

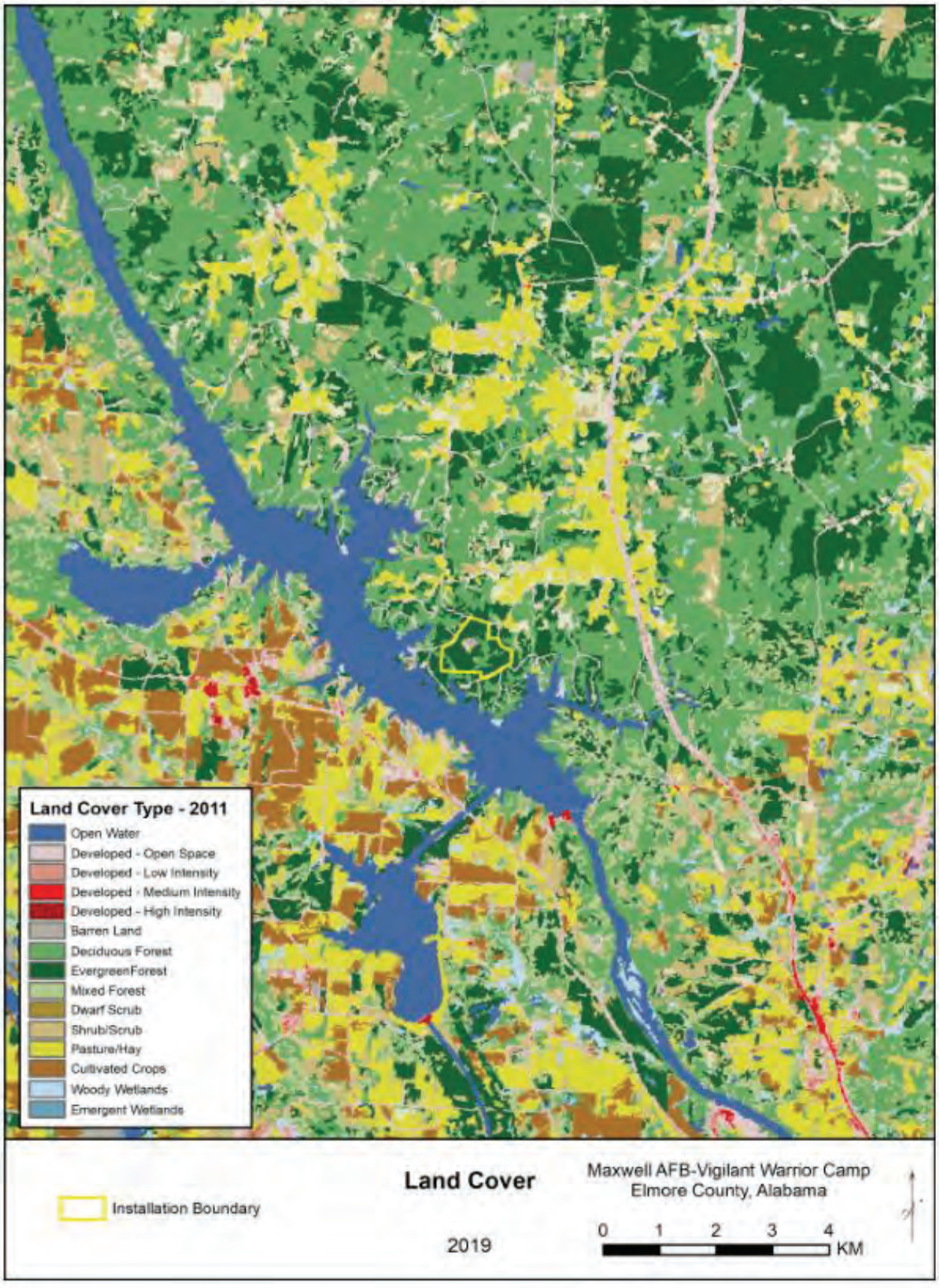
Map C-13. Maxwell Air Force Base Land Cover



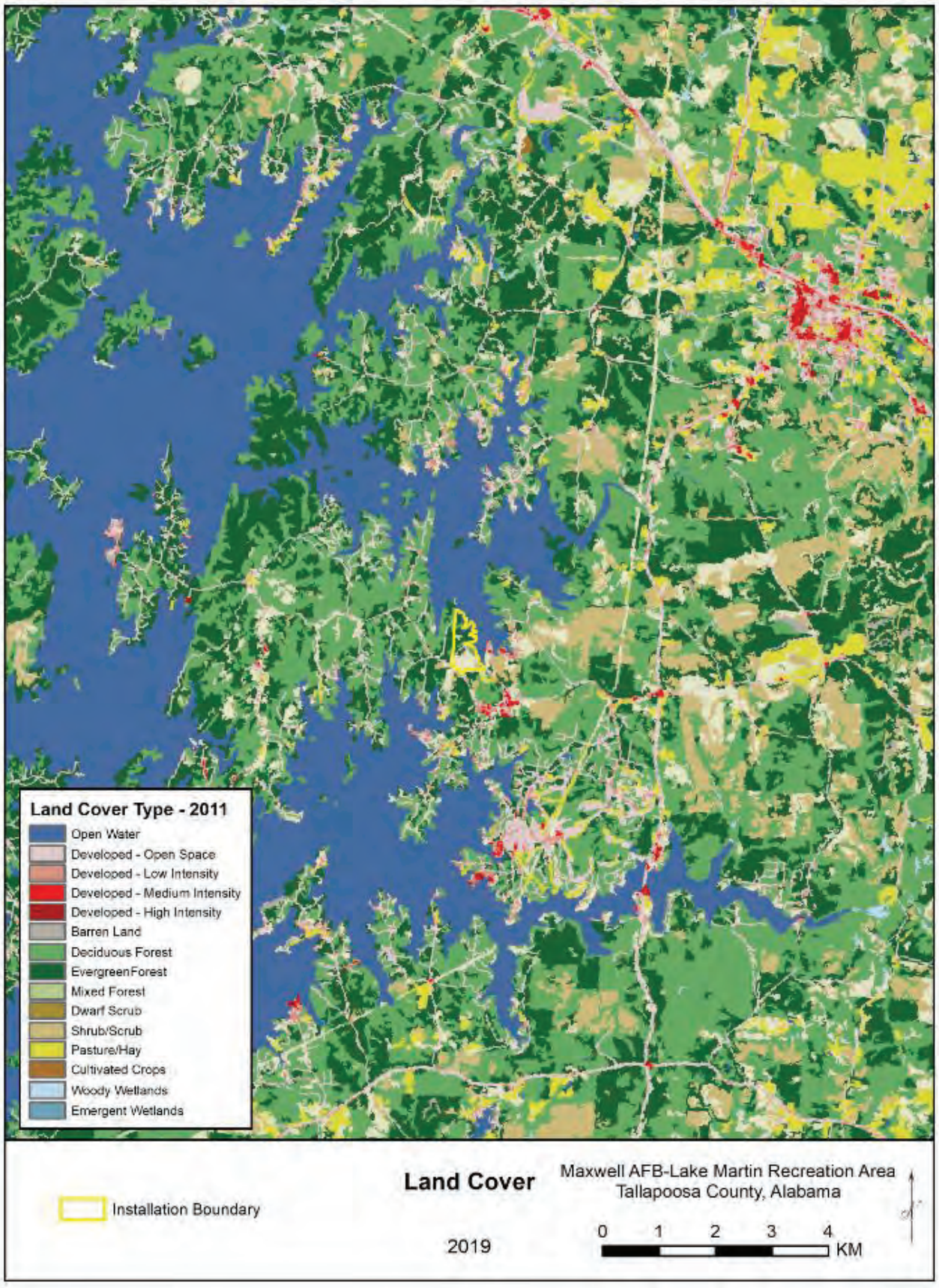
Map C-14. Gunter Annex Land Cover



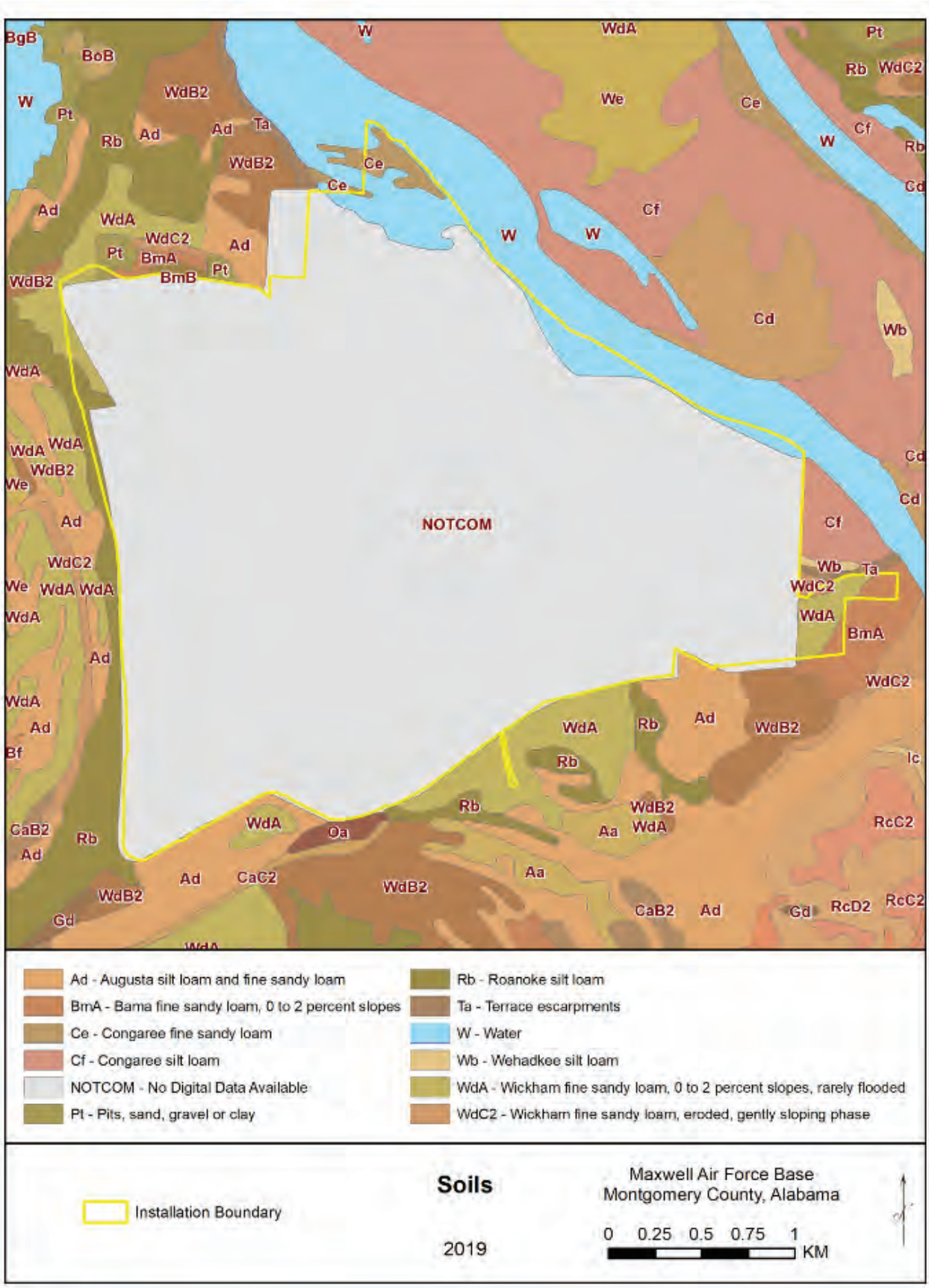
Map C-15. Vigilant Warrior Training Site Land Cover



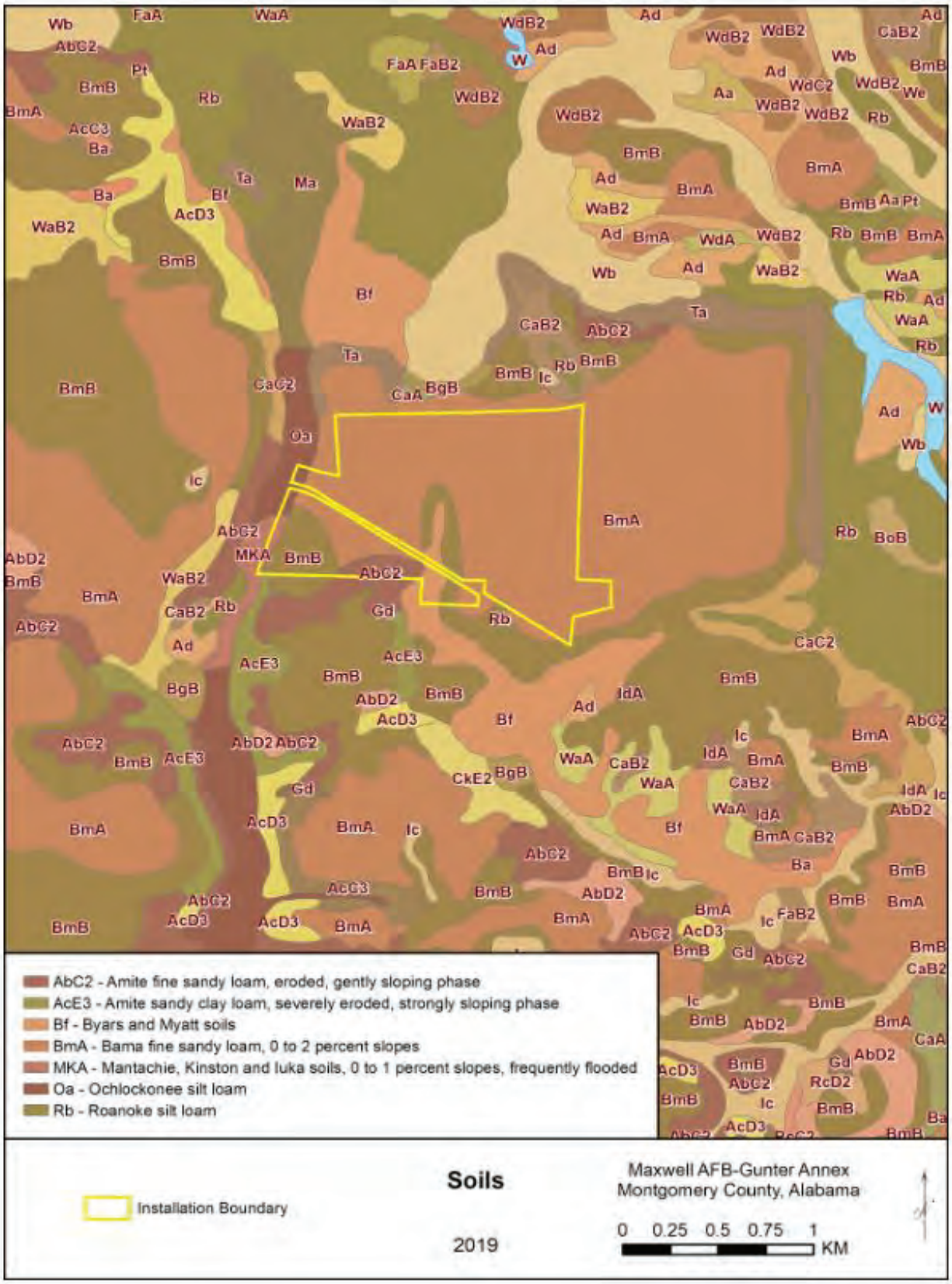
Map C-16. Lake Martin Recreation Area Land Cover



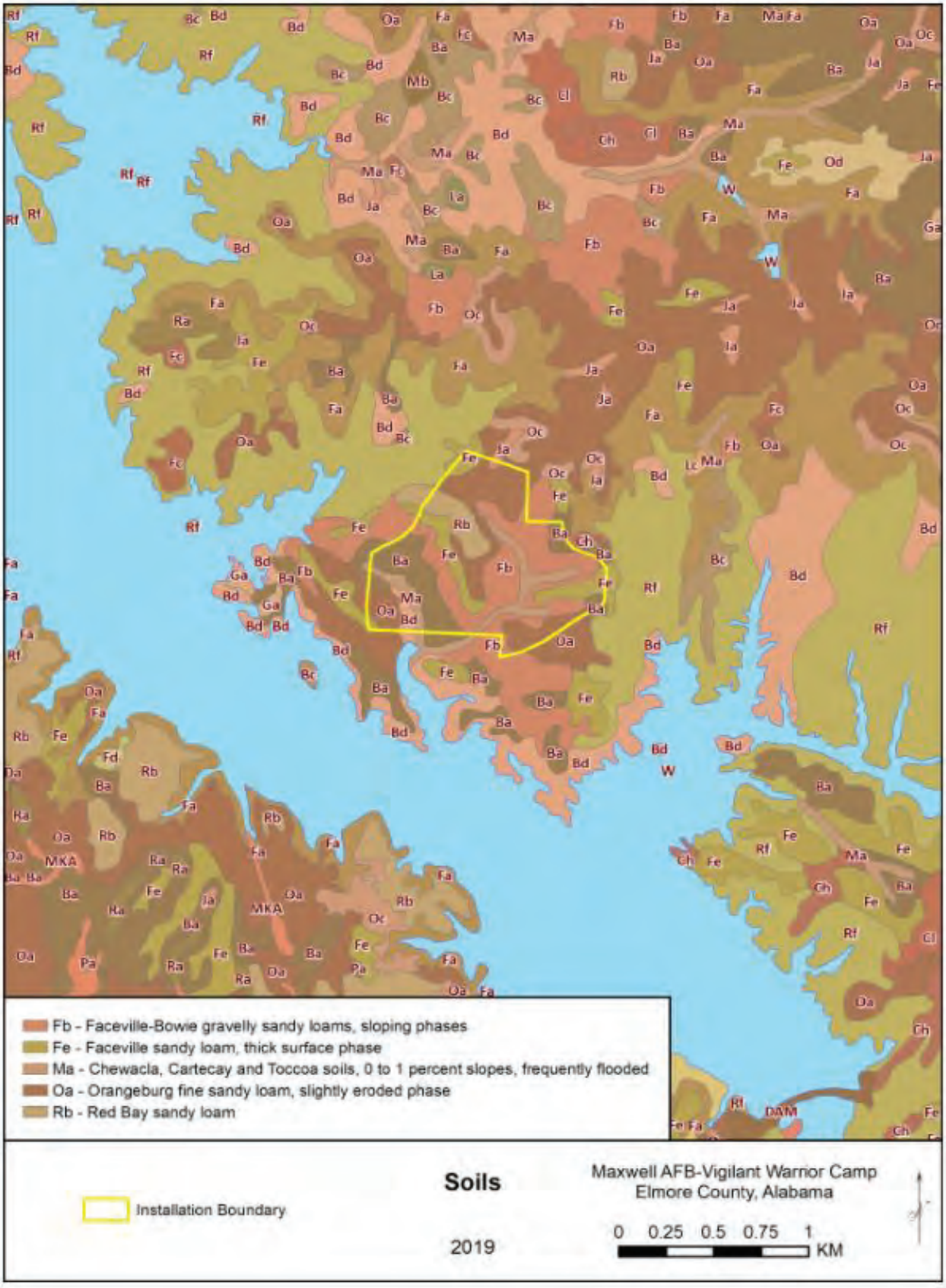
Map C-17. Maxwell Air Force Base Soils Map



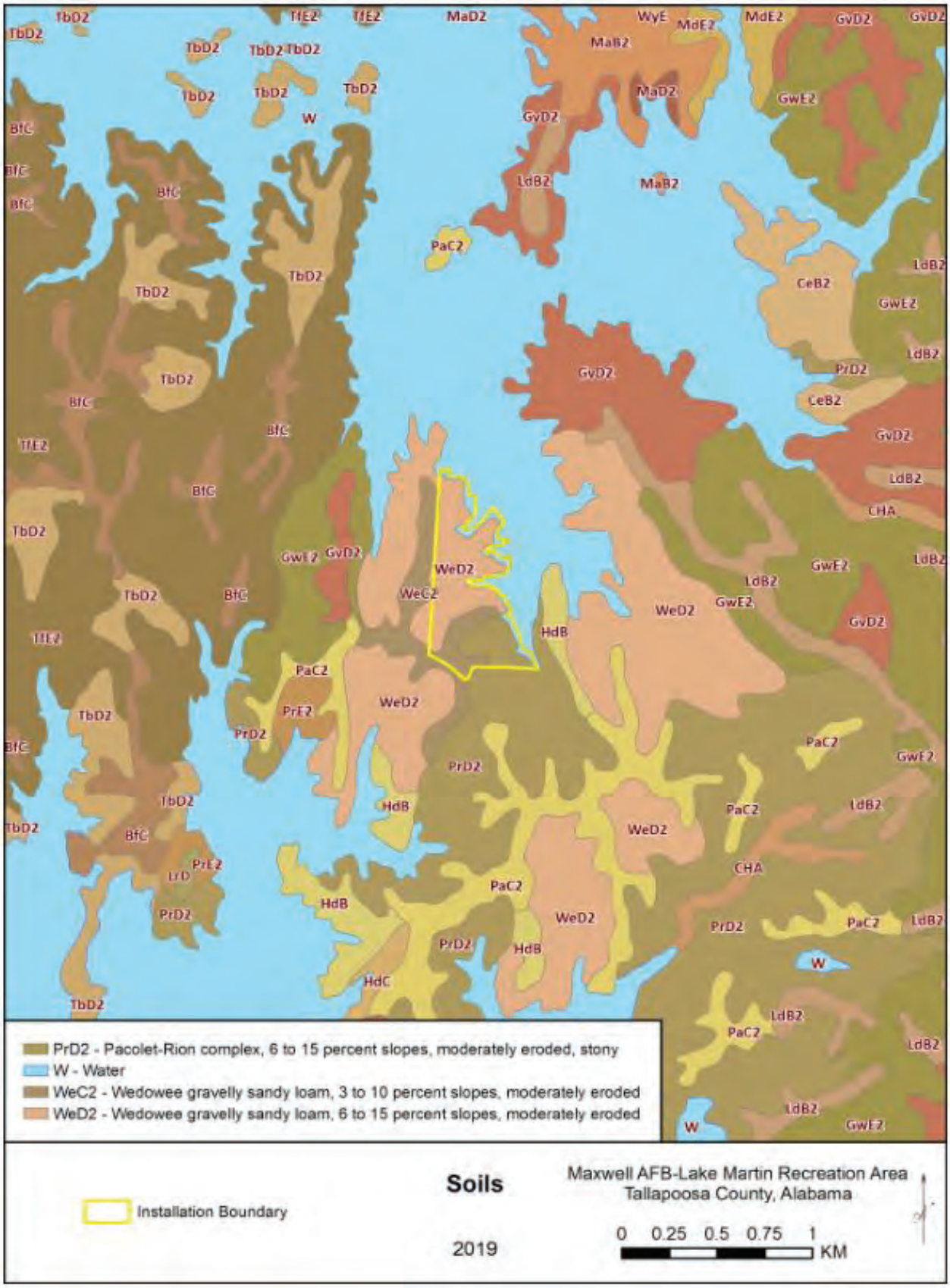
Map C-18. Gunter Annex Soils Map



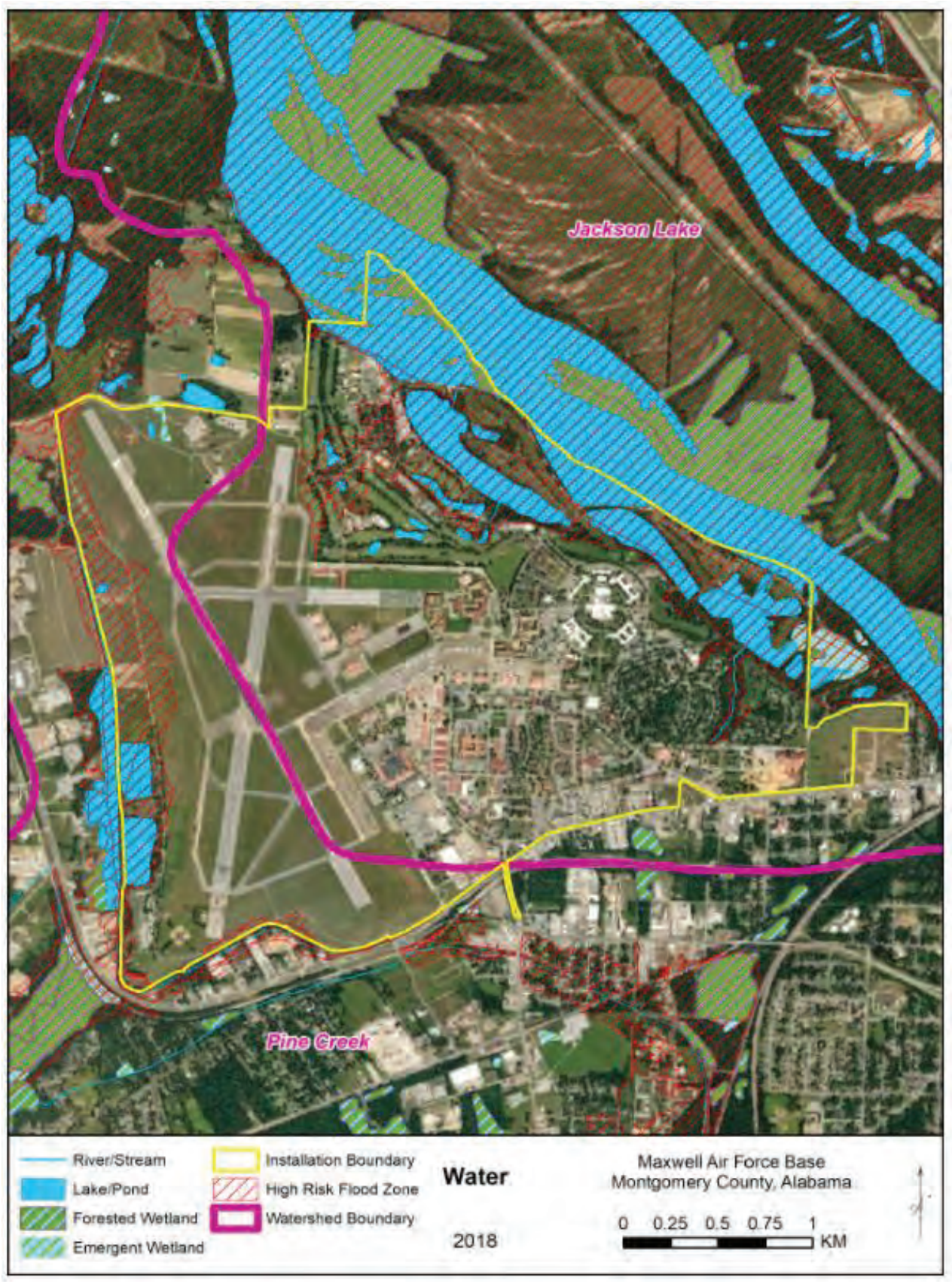
Map C-19. Vigilant Warrior Training Site Soils Map



Map C-20. Lake Martin Recreation Area Soils Map

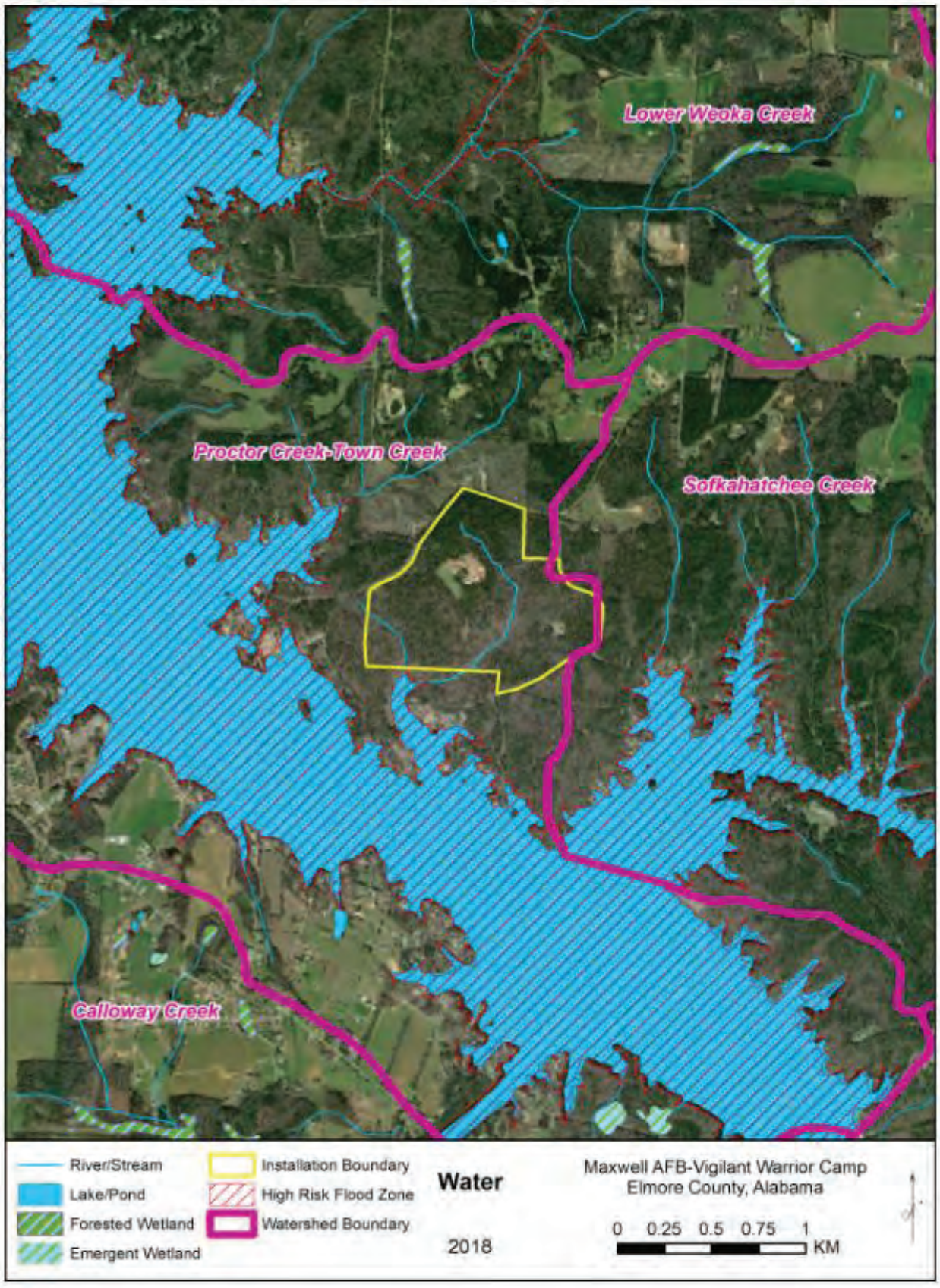


Map C-21. Maxwell Air Force Base Water Resources Map

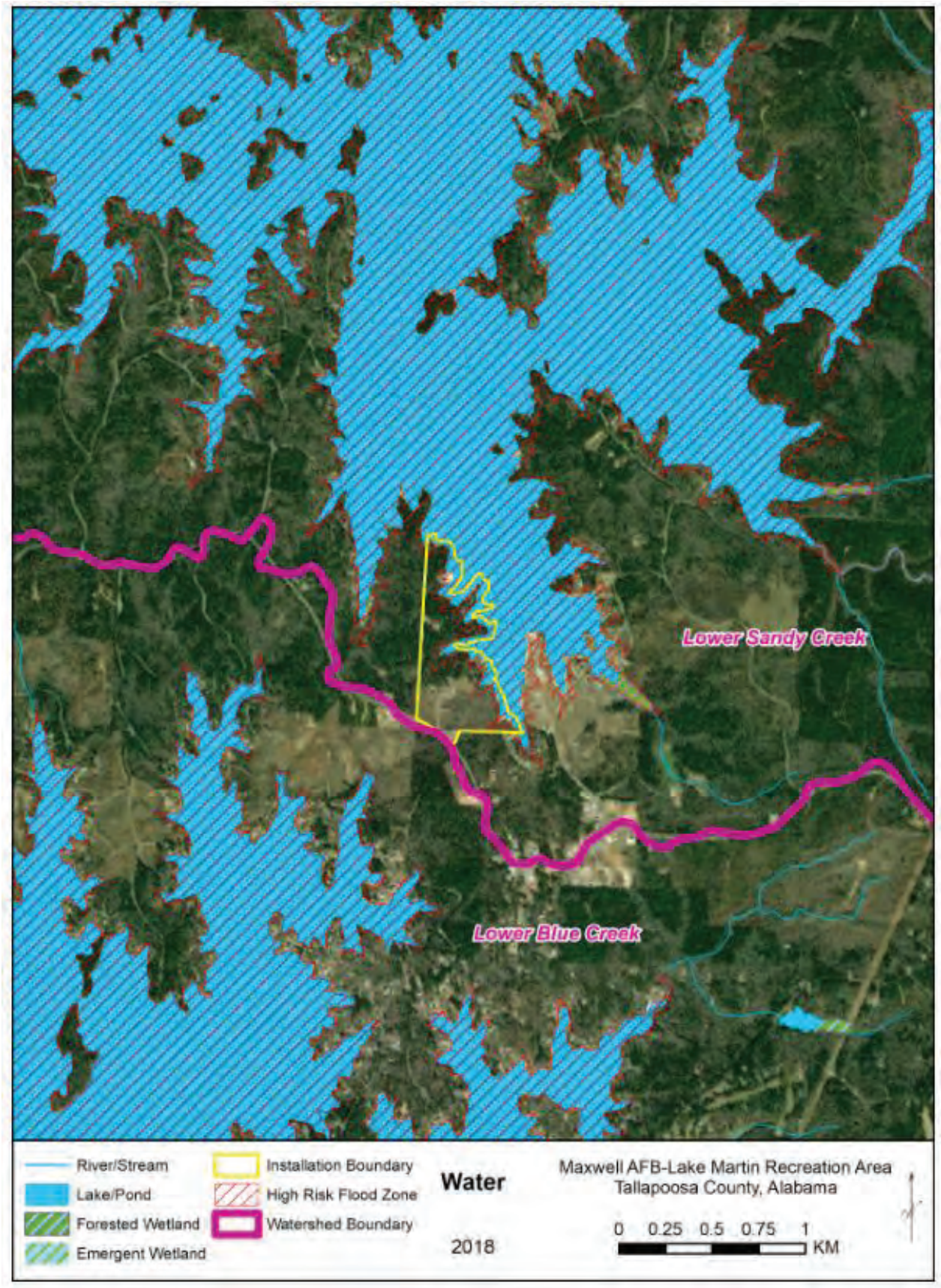


Map C-22. Gunter Annex Water Resources Map

Map C-23. Vigilant Warrior Training Site Water Resources Map



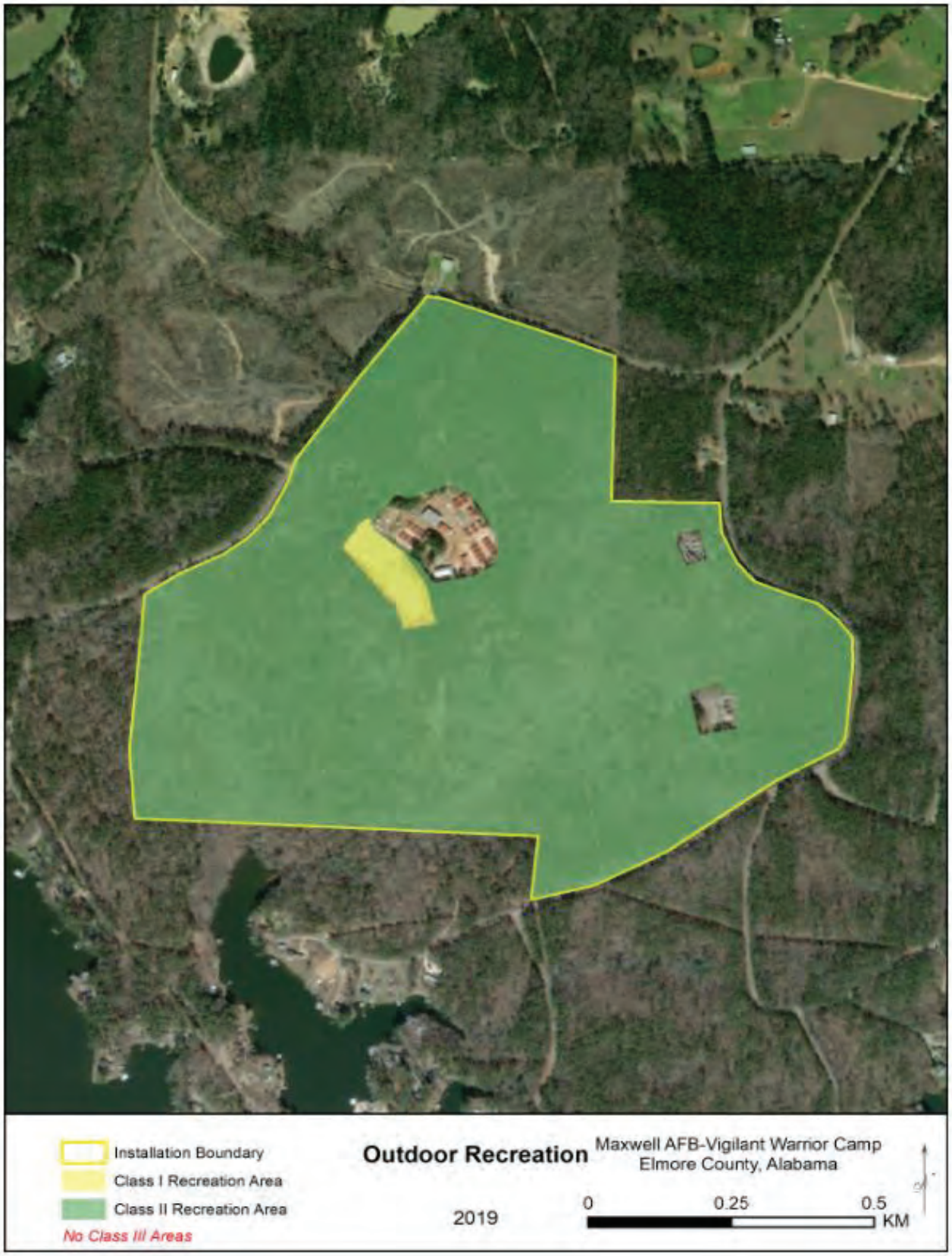
Map C-24. Lake Martin Recreation Area Water Resources Map



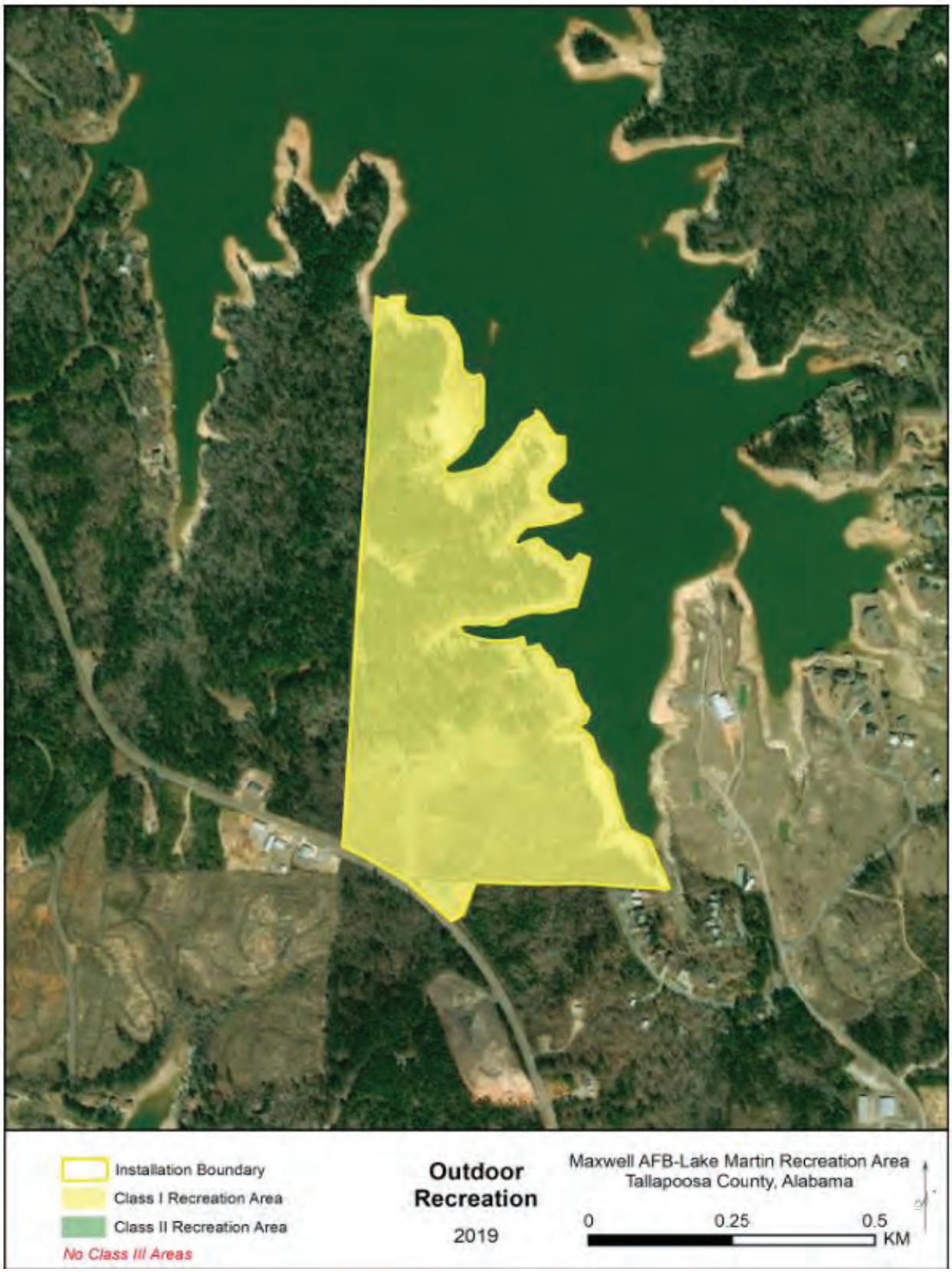
Map C-25. Maxwell Air Force Base Outdoor Recreation Classification

Map C-26. Gunter Annex Outdoor Recreation Classification

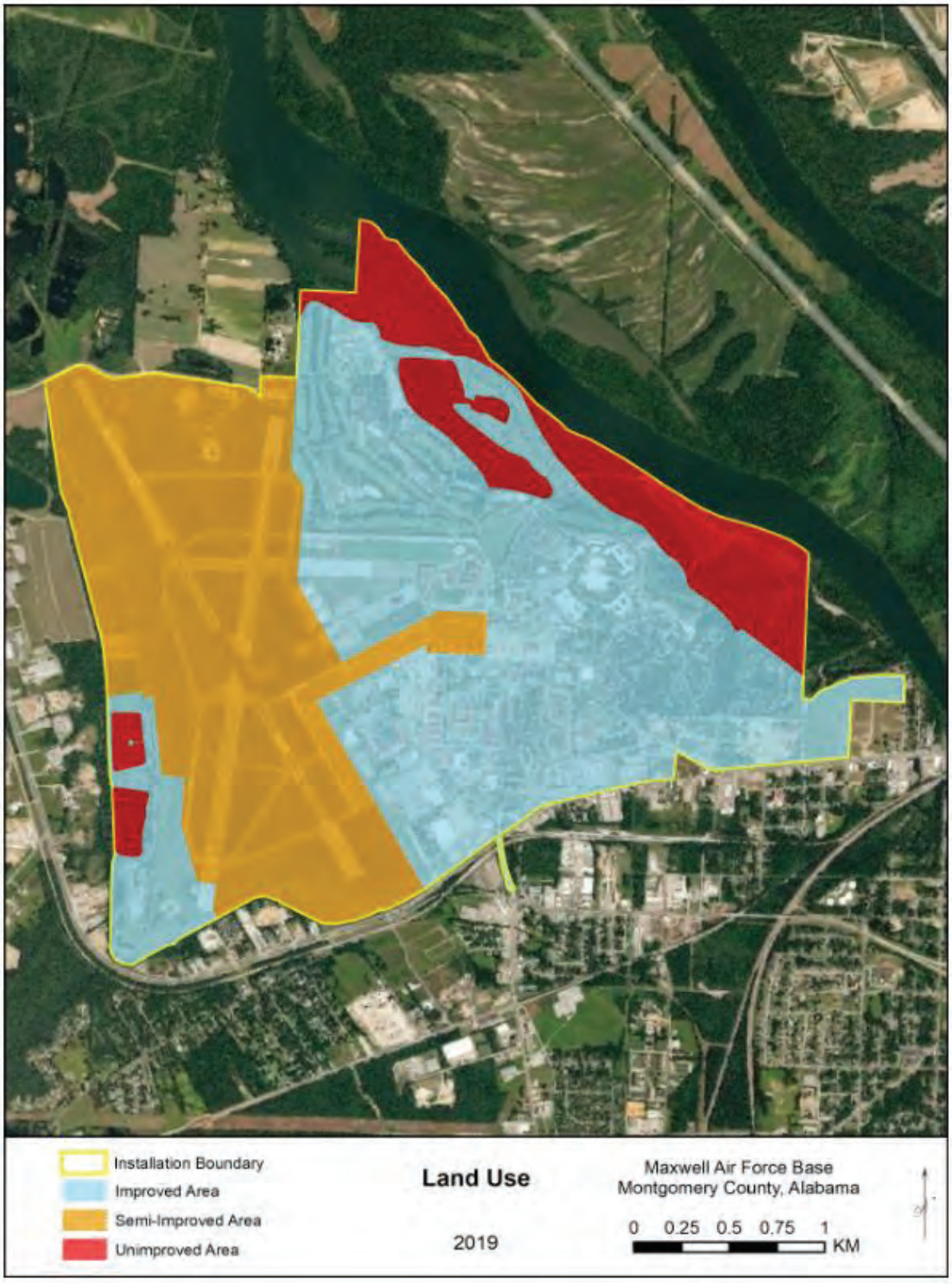
Map C-27. Vigilant Warrior Training Site Outdoor Recreation Classification



Map C-28. Lake Martin Recreation Area Outdoor Recreation Classification

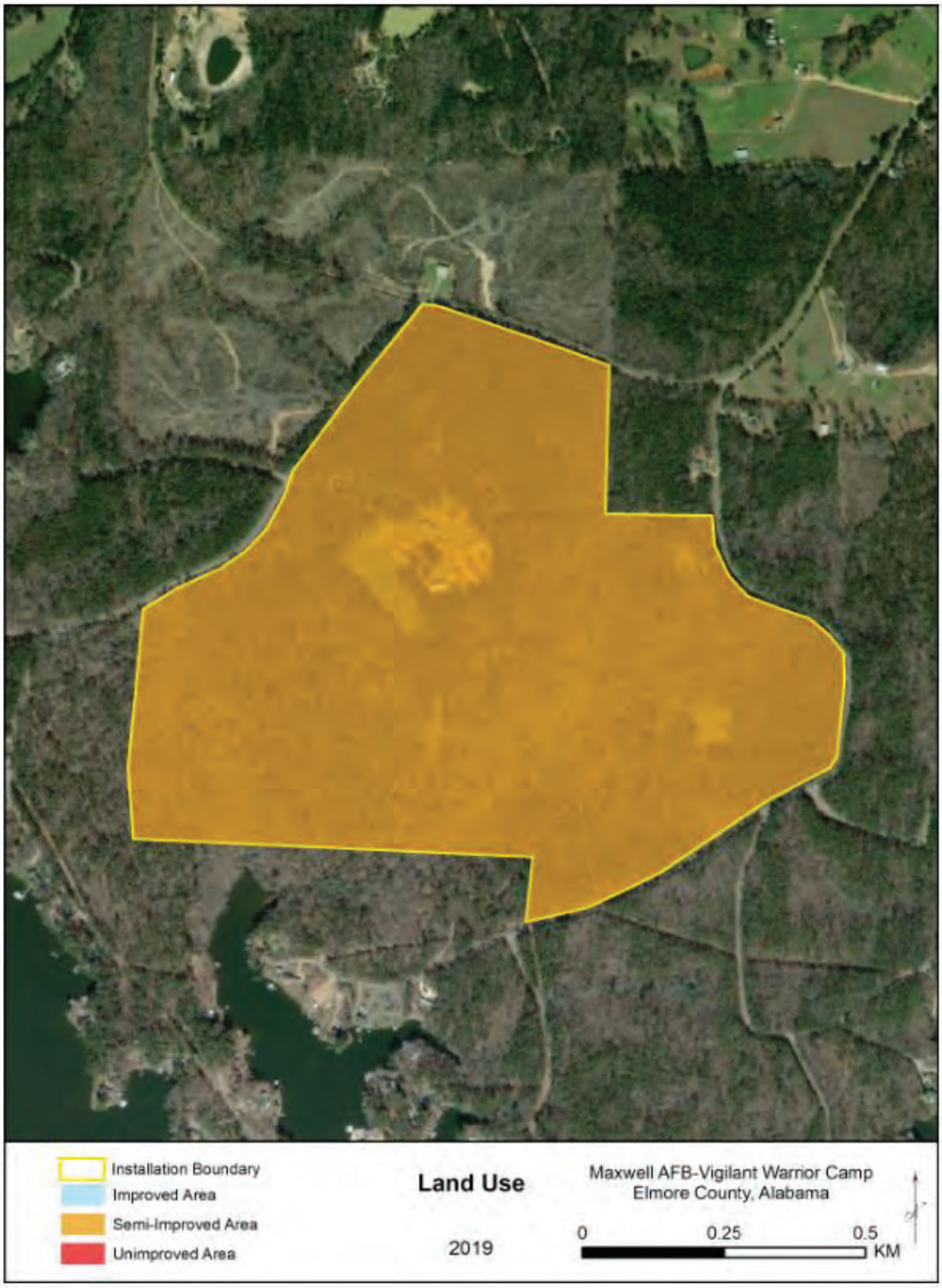


Map C-29. MAFB Land Use Categories



Map C-30. Gunter Annex Land Use Categories

Map C-31. Vigilant Warrior Training Site Land Use Categories



Map C-32. Lake Martin Recreation Area Land Use Categories

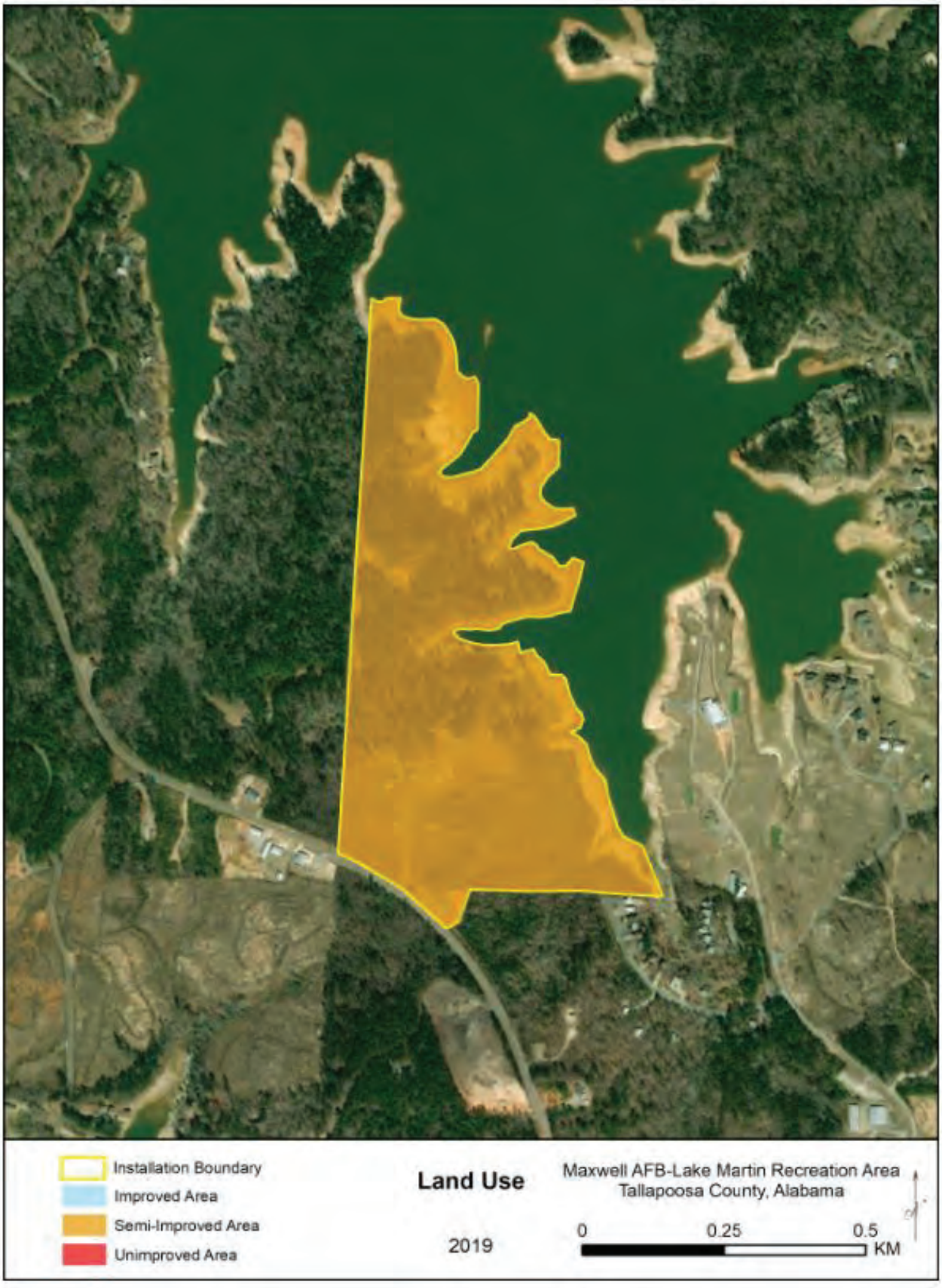


Table D-1. Average Precipitation and Temperature for Montgomery, AL (1981-2018)				
Month	**Average Rainfall (inches)**	**Temperature (°F)**		
		Minimum	**Maximum**	**Average**
January	4.65	36	57	46.5
February	5.28	39	62	50.5
March	5.94	45	70	57.5
April	4.02	52	77	64.5
May	3.54	61	84	72.5
June	4.06	68	90	79.0
July	5.24	71	92	81.5
August	3.98	71	92	81.5
September	3.98	65	87	76.0
October	2.91	53	78	65.5
November	4.61	44	69	56.5
December	4.84	37	60	48.5
Total [Average]	53.05 [4.42]	53.5	76.5	65.0
Source: NOAA 2018				

Due to the lack of readily available regionally-specific model outputs, the Nature Conservancy's ClimateWizard was used to determine likely future climate regimes under different emissions scenarios. ClimateWizard enables technical and non-technical audiences alike to access leading climate change information and visualize the regional impacts to both temperature and precipitation that are likely to occur in areas within the U.S. Historically, it appears Alabama's climate has been getting marginally cooler and wetter (**Figures 3** and **4**). In the future, Alabama's climate will generally grow warmer and wetter during this century as summarized on the Nature Conservancy's Climate Wizard site (http://www.climatewizard.org).

D.1.2 Vascular Plant Species

Vascular Plant Species				
Scientific Name	**Common Name**	**Counties**		
		Montgomery	**Tallapoosa**	**Elmore**
Acalypha gracilens	slender three seed mercury	X		
Acer rubrum	red maple	X	X	X
Aesculus pavia	red buckeye		X	X
Ailanthus altissima	tree of heaven	X		
Ajuga reptans	carpet bugle	X		
Albizia julibrissin	silktree	X	X	X
Ambrosia artemisiifolia	common ragweed	X	X	X
Ampelopsis cordata	heartleaf peppervine	X		
Arisaema triphyllum	common jack in the pulpit	X	X	X
Arnoglossum atriplicifolium	pale Indian plantain	X		
Arundinaria gigantea	giant cane	X	X	
Arundinaria tecta	switch cane			X
Asclepias variegata	white milkweed	X	X	X

Vascular Plant Species				
Scientific Name	Common Name	Counties		
		Montgomery	Tallapoosa	Elmore
Asimina parviflora	small fruit pawpaw	X	X	X
Asplenium platyneuron	ebony spleenwort	X	X	X
Athyrium asplenioides	southern lady fern	X	X	X
Baccharis halimifolia	groundsel tree	X		
Berchemia scandens	rattan vine	X	X	X
Bignonia capreolata	crossvine	X	X	X
Boehmeria cylindrica	false nettle	X	X	X
Brintonia discoidea	rayless mock goldenrod	X	X	
Callicarpa americana	American beauty berry	X	X	
Calycanthus floridus	eastern sweetshrub	X	X	X
Carex albolutescens	green white sedge	X	X	X
Carex atlantica	prickly bog sedge		X	
Carex complanata	flattened sedge	X		
Carex frankii	Frank's sedge	X	X	X
Carex leptalea var. *harperi*	bristle stalk sedge		X	X
Carpinus caroliniana	American hornbeam	X	X	X
Carya glabra	pignut hickory	X	X	X
Carya tomentosa	mockernut hickory	X	X	
Castanea pumila	common chinquapin	X		X
Chasmanthium laxum	slender spikegrass	X		X
Chasmanthium sessiliflorum	longleaf spikegrass		X	X
Cnidoscolus stimulosus	spurge nettle	X	X	X
Coleataenia anceps ssp.	beaked cutthroat grass	X	X	X
Collinsonia canadensis	northern horsebalm			X
Commelina virginica	Virginia dayflower	X	X	X
Cornus florida	flowering dogwood	X	X	X
Cornus stricta	swamp dogwood	X	X	X
Crataegus spathulata	little hip hawthorn	X	X	X
Croton capitatus	hogwort	X		X
Croton monanthogynus	prairie tea	X		
Cyclospermum leptophyllum	marsh parsley	X	X	X
Cynodon dactylon	bermuda grass	X	X	
Cyperus echinatus	globe flatsedge	X	X	X
Cyperus esculentus	northern nutsedge	X		
Cyperus retrorsus	pinebarren flatsedge	X		X
Daucus carota	Queen Anne's lace	X	X	
Dichanthelium boscii	Bosc's witch grass	X	X	
Dichanthelium commutatum	variable witch grass	X	X	X
Dichanthelium dichotomum	forked witch grass	X		
Dichanthelium laxiflorum	lax flower witch grass	X	X	
Dichanthelium villosissimum	long hair witch grass	X		
Dichondra carolinensis	Carolina pony's foot	X		X
Diodia virginiana	Virginia buttonweed	X	X	X
Diospyros virginiana	common persimmon	X	X	
Ditrysinia fruticosa	gulf Sebastian bush	X	X	X
Echinochloa colona	jungle rice			X

Vascular Plant Species				
Scientific Name	**Common Name**	**Counties**		
		Montgomery	**Tallapoosa**	**Elmore**
Elaeagnus pungens	thorny olive	X		X
Elephantopus carolinianus	Carolina elephant's foot	X	X	X
Elephantopus tomentosus	woolly elephant's foot	X	X	
Eleusine indica	Indian goose grass	X		X
Epifagus virginiana	beechdrops	X	X	
Eragrostis hirsuta	big top lovegrass	X	X	
Eragrostis minor	little lovegrass	X		
Erechtites hieraciifolius	pilewort	X	X	X
Eremochloa ophiuroides	centipede grass	X		
Erigeron bonariensis	American horseweed	X		X
Erigeron canadensis	common horseweed	X	X	X
Eupatorium capillifolium	common dog fennel	X	X	
Eupatorium hyssopifolium	hyssop leaf thoroughwort	X	X	
Eupatorium serotinum	late flowering thoroughwort	X	X	X
Euphorbia corollata	flowering spurge	X	X	X
Euphorbia maculata	milk purslane	X	X	X
Fagus grandifolia	American beech	X	X	X
Fraxinus pennsylvanica	green ash	X	X	
Gamochaeta coarctata	elegant cudweed	X	X	X
Gelsemium sempervirens	yellow jessamine	X	X	X
Gleditsia triacanthos	honey locust	X	X	X
Hamamelis virginiana	American witch hazel	X	X	X
Hexastylis arifolia	arrowleaf ginger	X	X	X
Hieracium venosum	rattlesnake weed		X	X
Hydrangea barbara	climbing hydrangea	X	X	X
Hypericum drummondii	St. John's wort	X	X	
Hypericum gentianoides	orange grass	X	X	X
Hypericum hypericoides	St. Andrew's cross	X	X	
Hypochaeris radicata	hairy cat's ear		X	X
Ilex opaca	American holly	X	X	X
Ilex vomitoria	yaupon holly	X	X	X
Jacquemontia tamnifolia	hairy clustervine	X	X	X
Juglans nigra	black walnut	X	X	
Juncus coriaceus	leathery rush		X	
Juncus effusus	soft rush	X	X	X
Juncus tenuis	path rush	X	X	X
Juniperus virginiana	eastern red cedar	X	X	
Kummerowia striata	Japanese clover	X		
Lactuca canadensis	tall lettuce	X		X
Leersia virginica	Virginia cutgrass	X	X	
Lepidium virginicum	Virginia peppergrass	X	X	X
Lespedeza repens	creeping bush clover	X		X
Lespedeza violacea	violet bush clover	X	X	X
Lespedeza virginica	slender bush clover	X	X	
Liatris elegantula	grassleaf blazing star	X	X	X
Ligustrum sinense	Chinese privet	X	X	X

Vascular Plant Species				
Scientific Name	**Common Name**	**Counties**		
		Montgomery	**Tallapoosa**	**Elmore**
Liquidambar styraciflua	sweet gum	X	X	
Liriodendron tulipifera	tulip poplar	X	X	X
Lolium arundinaceum	tall fescue	X		X
Lonicera japonica	Japanese honeysuckle	X	X	X
Lygodium japonicum	Japanese climbing fern	X		X
Macrothelypteris torresiana	Mariana maiden fern	X	X	X
Magnolia virginiana	sweet bay magnolia	X	X	
Melia azedarach	China berry	X	X	X
Mitchella repens	partridge berry	X	X	X
Mollugo verticillata	green carpetweed	X		X
Morella cerifera	common wax myrtle	X	X	X
Morus rubra	red mulberry	X	X	X
Muscadinia rotundifolia	muscadine	X	X	X
Nekemias arborea	peppervine	X	X	
Nyssa sylvatica	black gum	X	X	
Oenothera laciniata	cutleaf evening primrose	X	X	X
Onoclea sensibilis	sensitive fern	X	X	X
Oplismenus hirtellus ssp.	woods grass	X	X	X
Osmunda spectabilis	royal fern	X	X	X
Osmundastrum cinnamomeum	cinnamon fern	X	X	X
Ostrya virginiana	eastern hop hornbeam	X	X	
Oxalis dillenii	sour grass	X	X	X
Oxydendrum arboreum	sourwood	X	X	X
Parthenocissus quinquefolia	Virginia creeper	X	X	
Paspalum dilatatum	dallis grass	X	X	X
Paspalum notatum	bahia grass	X	X	X
Paspalum urvillei	Vasey's grass	X		X
Persicaria virginiana	jumpseed	X	X	X
Phlox glaberrima	smooth phlox	X	X	X
Phyllanthus urinaria	chamber bitter	X	X	
Physalis angulata	cutleaf ground cherry	X		X
Pinus taeda	loblolly pine	X	X	X
Pityopsis graminifolia	narrowleaf silkgrass	X		
Plantago lanceolata	English plantain	X		X
Pleopeltis michauxiana	resurrection fern	X	X	X
Pluchea camphorata	stinkweed	X	X	
Polygala polygama	racemed milkwort		X	X
Polypremum procumbens	juniper leaf	X	X	X
Polystichum acrostichoides	Christmas fern	X	X	X
Portulaca oleracea	common purslane	X		X
Prunus serotina	black cherry	X	X	X
Pseudognaphalium obtusifolium	eastern rabbit tobacco	X	X	
Pycnanthemum incanum var. *puberulum*	southern hoary mountain mint		X	
Pyrrhopappus carolinianus	Carolina false dandelion	X	X	X
Quercus alba	northern white oak		X	

Vascular Plant Species				
Scientific Name	**Common Name**	**Counties**		
		Montgomery	**Tallapoosa**	**Elmore**
Quercus falcata	southern red oak	X	X	X
Quercus nigra	water oak	X	X	X
Quercus stellata	post oak	X	X	
Rhododendron canescens	piedmont azalea	X	X	X
Rhus copallinum	winged sumac	X	X	X
Rhynchospora miliacea	millet beakrush		X	
Robinia pseudoacacia	black locust	X	X	
Rubus flagellaris	whiplash dewberry	X	X	X
Rubus pensilvanicus	southern blackberry	X	X	X
Rubus trivialis	southern dewberry	X		X
Ruellia caroliniensis	Carolina wild petunia	X	X	X
Salix nigra	black willow	X	X	X
Salvia lyrata	lyre leaf sage	X	X	X
Sanicula canadensis	Canadian black snakeroot	X	X	
Sassafras albidum	sassafras	X	X	
Schizachyrium scoparium	common little bluestem	X	X	
Scleria pauciflora var. *pauciflora*	few flower nutrush			X
Scutellaria elliptica	hairy skullcap	X		X
Scutellaria lateriflora	hoodwort		X	
Senna obtusifolia	coffeeweed	X		X
Silphium asteriscus	starry rosinweed	X		X
Smilax bona-nox	saw greenbrier	X	X	
Smilax glauca	white leaf catbrier	X	X	
Smilax rotundifolia	common greenbrier	X	X	
Smilax smallii	lance leaf greenbrier	X	X	X
Solidago altissima	tall goldenrod	X	X	
Sonchus asper	spiny leaf sow thistle	X		X
Sorghum halepense	Johnson grass	X		X
Spiranthes tuberosa	little ladies' tresses		X	X
Strophostyles umbellata	pink fuzzy bean	X	X	X
Stylisma humistrata	southern dawnflower	X	X	X
Stylosanthes biflora	side beak pencil flower	X	X	X
Tilia americana	American basswood	X		
Toxicodendron radicans	eastern poison ivy	X	X	X
Tradescantia ohiensis	Ohio spiderwort	X	X	X
Tragia urticifolia	nettle leaf noseburn	X	X	
Triadica sebifera	Chinese tallow tree	X		X
Tridens flavus	purple top	X	X	X
Trifolium campestre	low hop clover	X	X	X
Trifolium dubium	least hop clover	X	X	X
Trifolium repens	white clover	X	X	X
Trillium underwoodii	underwood's trillium		X	X
Ulmus alata	winged elm	X	X	X
Vaccinium arboreum	sparkleberry	X	X	X
Vaccinium elliottii	Elliot's blueberry	X	X	X

Vascular Plant Species				
Scientific Name	Common Name	Counties		
		Montgomery	Tallapoosa	Elmore
Vaccinium pallidum	early lowbush blueberry		X	
Vaccinium stamineum	common deerberry	X	X	X
Verbena brasiliensis	Brazilian vervain	X	X	X
Verbesina helianthoides	sunflower crownbeard		X	X
Viburnum nudum	possum haw viburnum	X		X
Viola hirsutula	southern woodland violet	X		
Viola sororia	common blue violet	X	X	X
Wahlenbergia marginata	southern rockbell	X	X	X
Source: Alabama Plant Atlas 2019				

D.1.3 Geology and Soils

MAFB lies within the Alluvial-Deltaic Plain of the upper Gulf Coastal Plain physiographic region. This region is characterized by low, rolling hills and shallow valleys. Alluvium and terrace deposits make up the primary surface geology at MAFB. These deposits consist primarily of inorganic sandy to gravelly clays and vary in thickness from 30 feet at the southern portion of the base to greater than 60 feet along the northern portion. Below the alluvial/terrace deposits is the Eutaw Formation. This formation varies from 110-170 feet thick and is predominantly sand and clay.

The majority of soils at MAFB, Gunter Annex, Vigilant Warrior Training Site, and Lake Martin Recreation Area shown on **Map D-17 – C-20** and **Table D-3** consist of the Amite series. These soils are primarily sandy loam, sandy clay loam, and sandy clay. However, development over the years has resulted in significant disturbances to the original soils. Most of the western side of Maxwell was once wetlands, but were filled in long ago for airfield construction and other purposes. Soils tend to be wet, acidic, and low in major plant nutrients.

Soil drainage across the installation varies, but the area has a seasonably high water table. The soil tends to be highly erodible, so development must be carried out in a manner that preserves and maintains the topsoil.

Table D-3. Mapped Soils of MAFB						
Series	**Permeability of Subsoil**	**Parent Material**	**Depth to Parent Material (ft.)**	**Reaction**	**Depth to Water Table (feet)**	**Rate of Infiltration**
Amite	Moderately slow	Sandy Loam	3-8	Medium to strong acid	3-4	Moderately Rapid
Byars	Moderate to Moderately Slow	Sandy Clay or Clays	2-3	Extremely to strong acid	1	Moderate
Myatt	Moderate to Moderately Slow	Sandy Clay or Clays	2-3	Very strong to moderate acid	1.5-2.5	Moderate
Red Bay	Well drained	Sandy Loam	3-6	Very strong to moderate acid	>4	Moderate
Orangeburg	Well drained	Sandy Loam	4-6	Very strong to moderate acid	>2	Moderate
Faceville	Well drained	Red clayey	5-6	Strongly acid	>6	Moderate to Well
Bowie	Moderately Rapid	Sandy and sandy Clay	3-4	Very to slightly acid	>10	Moderately Rapid
Wedowee	Well drained	Sandy Loam	2-5	Extremely to strong acid	>10	Moderate
Source: U.S. Department of Agriculture Soil Conservation Service. Montgomery County, Alabama Soil Survey. 1960.						

Appendix E. DoD Conservation Measure of Merit Reports – Available at MAFB Environmental Flight

E.1 DEPARC Report

E.2 Pest Management Measure of Merit (MOM)

Appendix F. Environmental Impact Analysis

F.1 Overview

As discussed in **Section 9.3.2**, the adoption of this INRMP requires an EIAP in accordance with the NEPA, CEQ Regulations (40 CFR § 1500-1508), and 32 CFR Part 989. The purpose of the Proposed Action, implementation of the MAFB INRMP, is to provide for the effective, long-term management of the site's natural resources while allowing the flight mission(s) to proceed. The INRMP is prepared to ensure natural resource conservation measures and military activities on mission land are integrated and consistent with federal stewardship requirements. The need for the Proposed Action is to ensure natural resources are managed effectively on MAFB, while allowing both the federal and state mission(s) to be accomplished.

This analysis assesses known, potential, and reasonably foreseeable environmental consequences related to implementing the INRMP and managing natural resources at MAFB. The following sections provide a description of the Proposed Action and alternatives considered (see **Appendix F.2**), an assessment of the environmental consequences associated with each alternative (see **Appendix F.3**), and an analysis of potential cumulative effects (see **Appendix F.4**). The analysis presented herein determines that an EIS is unnecessary for this Proposed Action and that a Finding of No Significant Impact (FONSI) is appropriate.

As discussed in **Section 1.1**, the MAFB INRMP is a living document that provides a framework for natural resources management into the future and is reviewed annually. Management practices included in this INRMP have been developed without compromising long-range goals and objectives. As the INRMP is implemented and updated, additional environmental analyses might be required as new management activities are developed and specific projects are implemented. The EIAP for the implementation of the M

AFB INRMP does not include an analysis of effects for individual actions or projects described in **Section 8.0** of the INRMP. Individual actions or projects that have the potential to impact the environment will be analyzed separately in accordance with the NEPA process described in **Section 1.3**.

F.2 Proposed Action and Alternatives

The Proposed Action includes the implementation of the MAFB natural resources management program in its entirety as presented in **Sections 7.0**. A description of the goals and objectives used to develop management measures for each natural resource area's issues and concerns and the rationale for why certain management measures were selected are provided in **Section 7.0**. As such, specific natural resources measures to be implemented under the Proposed Action, and evaluated in this analysis, are not repeated in this section.

The scope of this environmental impact analysis includes the evaluation of two alternatives, summarized as follows:

- Preferred Action Alternative – Implement the MAFB INRMP (Proposed Action).
- No Action Alternative – Continue with operations as currently conducted and do not implement the Proposed Action. Existing conditions and management practices would continue, and no new initiatives would be established. The No Action Alternative is used as a baseline against which the action alternative may be compared. Inclusion of a No Action Alternative is required and will be carried forward for further analysis.

NEPA requires all reasonable alternatives to be explored and objectively evaluated. The development of proposed management strategies for the INRMP included a screening analysis of resource-specific alternatives. The screening analysis involved the use of accepted criteria, standards, guidelines, and best professional judgment to identify management practices for achieving natural resource management objectives and included input from USFWS and ADCNR. Other management alternatives were considered

during the screening process and development of the INRMP, but were eliminated because they were not economically feasible, ecologically sound, or compatible with the requirements of the military mission.

F.3 Environmental Consequences

The existing physical, natural and human environment at MAFB is described in **Sections 2.2** and **2.3**. In accordance with NEPA, CEQ regulations, AFI 32-7061 and 32 CFR Part 989, the following resource areas were evaluated: climate, land use, air quality, noise, topography, geology, soils, water resources, biological resources, cultural resources, socioeconomics, environmental justice, infrastructure, and hazardous materials and waste.

Per 40 CFR Part 1501.7(a)(3), the CEQ recommends agencies identify and eliminate from detailed study any issues that are not significant or have been covered in another environmental review, narrowing the discussion to a brief presentation of why they will not have a significant effect on the human environment, or providing a reference to their coverage elsewhere. Resource areas considered but excluded from further analysis include: air quality, climate, noise, topography, geology, cultural resources, socioeconomics, environmental justice, and infrastructure. No impacts, positive or negative, are anticipated to occur to these resources as a result of the Preferred Action Alternative or No Action Alternative. Therefore, these resource areas have been eliminated from further discussion to keep the analysis relevant and concise.

Potential environmental consequences associated with the Preferred Action and No Action Alternatives for the remaining resource areas are provided below. A tabular summary of these potential environmental impacts is also presented in **Table F-1**.

F.3.1 Land Use

Preferred Action Alternative: No change in land use would occur as a result of INRMP implementation. Implementation of the INRMP would have long-term positive effects on the natural environment within MAFB and, over time, ensure the sustainability of AF lands to support mission requirements and training activities (i.e., no net loss in training land). Due to the integration of mission requirements in the creation of this plan, no negative impacts to training activities would be anticipated.

No Action Alternative: Adoption of the No Action Alternative would mean that an INRMP would not be implemented and the existing level of natural resources management would continue. Implementation of the No Action Alternative could cause undeveloped training lands and existing natural resources to degrade over time. This could ultimately affect the military mission at the MAFB, and result in a long-term negative impact.

F.3.2 Soils

Preferred Action Alternative: The MAFB NR team would take a proactive approach to prevent soil damage such as erosion or compaction. Indirect, long-term positive impacts would be expected, as undesirable changes in localized topography caused by erosion would be prevented. By implementing an effective soil erosion and sedimentation program, impacts on soils associated with erosion and sedimentation would be minimized, thereby resulting in long-term beneficial effects to MAFB.

No Action Alternative: The No Action Alternative does not include the implementation of soil conservation measures, nor does it include a plan of action to prevent or minimize potential soil problems related to erosion and sedimentation before their occurrence. It would include continuing existing BMPs already in use on MAFB. It would involve reactive management to problems after their occurrence, rather than managing the resource to prevent impacts. Therefore, implementation of the No Action Alternative could result in long-term negative impacts to MAFB natural resources.

F.3.3 Water Resources

Preferred Action Alternative: No effect to groundwater resources is anticipated. Implementation of the Proposed Action would be expected to result in beneficial effects to area water resources (i.e., surface waters, wetlands, floodplains) and water quality. Maintenance of sensitive areas, riparian buffers, and low water crossings would protect streams and wetlands by intercepting sediments, fertilizers, and pest control chemical residue transported in storm events, thereby protecting water quality on MAFB properties and adjacent water resources. In addition, proactive soil management practices and erosion control projects could prevent adverse impacts to water quality.

Implementation of the Preferred Action Alternative would protect wetlands through proactive planning, conservation and preservation. It would promote environmental awareness of MAFB personnel about jurisdictional waters (including wetlands), their value, and requirements for their protection. Increased understanding of the laws and regulations by MAFB personnel would help ensure MAFB remains in compliance and obtains the necessary permits prior to initiating work with the potential to impact water resources. Overall, implementation of the INRMP would be anticipated to result in several long-term positive effects to water resources and water quality.

No Action Alternative: Implementation of the No Action Alternative could result in major, long-term negative impacts to water resources due to a lack of information and environmental awareness regarding surface waters, floodplains, and wetlands at MAFB property and applicable laws and regulations. If appropriate permits are not obtained due to lack of knowledge of water resources present, this could result in a violation of the CWA as well as other federal and state regulations, which could indirectly harm the mission of MAFB. Typically, however, all necessary permits would be obtained even without the INRMP. No effect to groundwater resources is anticipated under this alternative.

F.3.4 Biological Resources

Preferred Action Alternative: Implementation of the INRMP would provide long- term beneficial effects to biological resources by maintaining and improving habitat conditions on MAFB. Maintaining and enhancing wetland habitat would provide beneficial effects to native species, including rare species. Implementation of the INRMP would benefit listed species at MAFB due to enhanced environmental awareness of protection and management measures for these species. However, responsibilities for protection of federally- listed species under the ESA would not change.

The National Defense Authorization Act (NDAA) of 2004 made a significant revision to the ESA. NDAA stated the Secretary [of the Interior] shall not designate as critical habitat any lands or other geographical areas owned or controlled by the DoD, or designated for its use, that are subject to an INRMP prepared under section 101 of the Sikes Act (16 USC § 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation. Under the 2004 NDAA, a military installation may have its INRMP obviate the need for critical habitat designation if the INRMP provides a benefit to listed species, and manages for long-term conservation of the species. To date, no critical habitat has been designated or has been proposed on MAFB property. The wood stork, a federally endangered bird has been documented as foraging at MAFB. If critical habitat for these or other species is proposed in the future within MAFB, the INRMP would be used to gain an exemption from such a designation.

No Action Alternative: Implementation of the No Action Alternative could result in direct, long-term adverse effects to native vegetative communities and biodiversity as a result of habitat degradation.

Under the No Action Alternative, responsibilities for protection of federally-listed species under the ESA would not change. However, the USFWS could, if appropriate, designate critical habitat for federally listed species within MAFB property boundaries, as no protection under the NDAA would be available to MAFB.

F.3.5 Hazardous Materials and Waste

Preferred Action Alternative: INRMP implementation would result in a more proactive approach to vegetation management at MAFB, resulting in more effective and decreased use of herbicides. A minor, beneficial impact associated with a reduction in hazardous materials use could be recognized as a result of the Proposed Action.

No Action Alternative: No change to the existing use of hazardous and toxic materials and waste generation would result. The MAFB personnel would continue to use pesticides and herbicides in accordance with the IPMP and applicable laws and regulations.

Table F-1. Summary of Environmental Consequences

Impact Issue	Preferred Action Alternative	No Action Alternative
Climate	□	□
Land Use	+	□
Air Quality	□	□
Noise	□	□
Topography	□	□
Geology	□	□
Soils	+	□
Water Resources	+	□
Biological Resources	+	□
Cultural Resources	□	□
Socioeconomics	□	□
Environmental Justice	□	□
Infrastructure	□	□
Hazardous and Toxic Materials/Wastes	+	□

LEGEND:
□ = No Impact
□ = Less-than-Significant Short-term Adverse Impact
□ = Less-than-Significant Long-term Adverse Impact
+ = Beneficial Impact

F.4 Cumulative Effects

Cumulative impacts on environmental resources result from incremental impacts of the Proposed Action when combined with other past, present, and reasonably foreseeable future projects in an affected area. Cumulative impacts can result from minor but collectively substantial actions undertaken over a period of time by various agencies (federal, state, or local) or persons. In accordance with NEPA, a discussion of cumulative impacts resulting from projects that are proposed, ongoing, recently completed, or anticipated to be implemented in the near future is required.

F.4.1 Preferred Action Alternative

Implementation of the INRMP would result in a comprehensive natural resources management strategy for the MAFB that includes compliance, enhancement, restoration, prevention, and conservation of military training lands. The goals and objectives of the INRMP, if implemented, would improve the existing management approach for natural resources on the installation, and meet legal and policy requirements consistent with natural resources management philosophies. Implementation of the INRMP would have long-term positive effects on the natural environment within MAFB and, over time, ensure the sustainability of AF land to support mission requirements and training activities. Due to the integration of mission requirements in the creation of this plan, no negative impacts to training activities would be anticipated.

F.4.2 No Action Alternative

Adoption of the No Action Alternative would mean that an INRMP would not be implemented and the existing level of natural resources management would continue. Regional cumulative benefits associated with implementing activities consistent with regional plans would not be recognized. MAFB personnel would not be in compliance with the Sikes Act and DoD policy which requires that all facilities with significant natural resources prepare and implement an INRMP.

F.5 Conclusions

The environmental analysis performed concludes there would be no significant impact, either individually or cumulatively, to the local environment or quality of life as a result of implementing the Preferred Action Alternative. This determination is based on thorough review and analysis of existing resource information, and coordination with knowledgeable, responsible personnel from the MAFB and other relevant local, state, and federal agencies.

Generally, the potential environmental consequences associated with implementing the Preferred Action Alternative, as proposed, would be expected to result in either a positive effect or no effect to the natural, cultural, and socioeconomic environments. Overall, through its emphasis on resource avoidance, repair and/or monitoring, implementation of the INRMP is anticipated to result in net positive effects by sustaining and enhancing extant on-site natural resources while allowing training to proceed, and has been determined to be the best, most appropriate, and most practicable alternative.

Adoption of the No Action Alternative would mean that an INRMP would not be implemented and the existing level of natural resources management would continue. Implementation of the No Action Alternative could cause undeveloped land and existing natural resources to degrade over time. This could ultimately affect the military mission at MAFB. Implementation of the No Action Alternative would therefore be expected to result in a long-term negative impact.

Trees Approved for Planting on Maxwell Air Force Base and Gunter Annex		
Common Name	**Scientific Name**	**Features and Comments**
Allegheny Chinkapin	*Castanea pumila*	A native, deciduous, large shrub or small tree. Edible chestnuts are contained in spiny burs. Nuts may attract wildlife. Susceptible to American chestnut blight.
American Beech	*Fagus gradifolia*	Slow-growing, native, large shade tree. Good fall color
American Chestnut	*Castanea dentate*	A native tree (now rare) that was almost wiped out by American chestnut blight. Edible nuts contained in spiny burs.
American Elm	*Ulmus Americana*	Tall, native, deciduous shade tree. Highly susceptible to Dutch Elm disease. Plant only disease-resistant cultivars.
American Hornbeam	*Carpinus caroliniana*	A small, native, deciduous tree. Wood is extremely hard.
American Smoketree	*Cotinus coggygria*	Small, native, flowering ornamental tree. May display good fall color.
American Sycamore	*Platanus occidentalis*	Very large, native, deciduous shade tree. Distinctive white, mottled bark in winter. Grows well on MAFB.
Amur Maackia	*Maackia amurensis*	Small to medium slow-growing tree. Good for confined or urban spaces.
Ash, Green	*Fraxinus pennsylvanica*	Native; Susceptible to the emerald ash borer.
Ash, White	*Fraxinus Americana*	Native; Cultivars have superior fall color. Susceptible to the emerald ash borer
Beech, American	*Fagus grandifolia*	Large, native, deciduous tree. Edible nuts contained in burs.
Beech, European	*Fagus sylvatica*	Large, deciduous tree. Grows more easily under cultivation than the American Beech.
Birch, Sweet	*Betula lenta*	Large tree native to the eastern U.S. Popular in landscapes. May experience stress in long, hot summers.
Birch, River	*Betula nigra*	Small native tree; often has multiple trunks. Distinctive curling, peeling bark. Can grow is flood plains and swamps.
Bald Cypress	*Taxodium distichum*	Large, native, deciduous tree. Grows well on MAFB.
Blackgum or Tupelo	*Nyssa sylvatica*	Medium sized, native, deciduous tree. Good scarlet fall color.
Buckeye, Ohio	*Aesculus glabra*	Medium sized, native, deciduous tree. “Horse chestnuts” are poisonous to humans.
Buckeye, Yellow	*Aesculus flava (octandra)*	Tall, oval-shaped, native, deciduous tree. More disease-resistant than Ohio buckeye. Nuts are poisonous to humans.
Camellia, most varieties	*Camellia* spp.	Large evergreen shrub or small tree. Showy late-winter or early-spring flowers. Many colors and cultivars available.
Carolina Silverbell	*Halesia tetraptera (Halesia Carolina)*	Native small to medium-size flowering tree. White flowers in early spring. Grows naturally as an understory small tree.
Cedar, Deodar	*Cedrus deodara*	Non-native, evergreen specimen tree. Requires well-drained, fertile soil - not clay.
Catalpa, Southern	*Catalpa bignonioides*	Medium sized, native, deciduous tree. Irregular crown with sprawling branches. Fairly resistant to pests and disease.
Chinese Pistache	*Pistacia chinensis*	Excellent medium-size shade tree. Prefers full sunlight; good scarlet fall color.
Crape Myrtle	*Lagerstroemia* spp.	Popular ornamental; grows well on MAFB. Multi-stemmed, small deciduous tree. Showy flowers in coral, pink, white, or purple.
Dawn Redwood	*Metasequoia glyptostroboides*	A fast-growing, large, deciduous conifer. Sheds its needles in fall.
Dogwood, Flowering	*Cornus florida*	Showy white or pink flowers in spring. Understory native tree; best in partial shade.
Eastern Redbud	*Cercis canadensis*	Native flowering shrub or small tree. Attractive magenta flowers in spring. Understory tree; best in filtered light.

Trees Approved for Planting on Maxwell Air Force Base and Gunter Annex		
Common Name	**Scientific Name**	**Features and Comments**
Elm, American	*Ulmus americana*	Tall, native, deciduous shade tree. Highly susceptible to Dutch Elm disease. Plant only disease-resistant cultivars.
Fringetree, White	*Chionanthus virginicus*	Large, native shrub or small tree. Fluffy white blooms; excellent ornamental.
Ginkgo, **Male tree only** Female trees are prohibited due to foul odor	*Ginkgo biloba*	Attractive fan-shaped leaves. Brilliant yellow fall color. Resistant to disease and insects.
Hardy Rubbertree	*Eucommia ulmoides*	Medium to large deciduous tree. Glossy dark green foliage; drought-resistant. Resistant to pests and disease.
Hawthorn	*Cratagus* spp.	Thornless cultivars are acceptable. Small to medium deciduous tree. Good fall color; prone to rust diseases.
Hickory, most native varieties	*Carya* spp.	Medium to large native deciduous trees. Some species produce edible nuts.
Holly, most varieties, excluding Rotunda	*Ilex* spp.	Prefer native species or cultivars such as 'Emily Bruner,' 'Mary Nell,' 'Nellie R. Stevens' that do not revert to "Rotunda."
Japanese-Cedar	*Cryptomeria japonica*	Very large, evergreen, coniferous tree. Intolerant of poor soils.
Japanese Grey-Bark Elm	*Zelkova serrata*	Medium-sized deciduous tree. Good fall color.
Japanese Maple	*Acer palmatum*	Small tree with good fall color. Plant as an understory tree in dappled shade.
Katsura Tree	*Acer palmatum*	Medium to large shade tree. Inconspicuous flowers but good foliage color.
Loblolly-Bay	*Gordonia lasianthus*	Small to medium, native, evergreen tree. Popular as a hardy ornamental tree. Can survive in damp, acidic soils.
Loquat	*Eriobotrya japonica*	Small tree with attractive dark green foliage. Edible fruit could be a choking hazard around young children; seeds are somewhat toxic.
London Planetree	*Platanus acerifolia*	Very large, deciduous shade tree.
Magnolia, most varieties	*Magnolia* spp.	Beautiful native evergreen with glossy, dark green leaves and showy flowers. Fallen leaves and large seed pods can be a nuisance; choose location away from pedestrian traffic.
Maple, Japanese	*Acer palmatum*	Small tree with colorful foliage. Plant as an understory tree in dappled shade.
Maple, Trident	*Acer buergeranum*	Medium sized tree with good foliage color.
Oaks, most native varieties	*Quercus* spp.	Most native species grow well on MAFB. Acorns can be a nuisance, slipping hazard, or choking hazard around children. Consider placing back from pedestrian traffic.
Oriental Planetree	*Platanus orientalis*	Very large, wide tree with broad leaves, making it a prized shade tree.
Osage Orange	*Maclura pomifera*	Native trees have thorns; choose thornless cultivars. Large fruit can be messy; choose location carefully.
Pecan	*Carya* spp.	Large, native, deciduous tree. Edible nuts.
Persian Ironwood	*Parrotia persica*	Large, deciduous tree. Provides stunning fall color.
Pines, most native varieties and cultivars	*Pinus* spp.	Tall, evergreen conifers. Many native varieties grow easily at MAFB.
Redbud, Eastern	*Cercis canadensis*	Native, flowering shrub or small tree. Attractive magenta flowers in spring. Understory tree; best in filtered light.
Red Bay	*Persea borbonia*	Native evergreen with glossy green leaves. Prefers light shade. Aromatic bay leaves can be used in cooking.

Trees Approved for Planting on Maxwell Air Force Base and Gunter Annex		
Common Name	**Scientific Name**	**Features and Comments**
River Birch	*Betula nigra*	Small, native tree; often has multiple trunks. Distinctive curling, peeling bark. Can grow is flood plains and swamps.
Serviceberry	*Amelanchier* spp.	Large, native shrub or small yard tree. Showy white flowers in spring, edible berries in summer, and rich color in fall.
Sourwood	*Oxydendrum arboreum*	Small to medium-sized native tree. Grows slowly and has a fairly short life span. Sensitive to drought and high heat.
Southern Catalpa	*Catalpa bignonioides*	Medium sized, native, deciduous tree. Irregular crown with sprawling branches. Fairly resistant to pests and disease.
Southern Wax myrtle	*Myrica cerifera*	Aromatic evergreen shrub or small tree. Needs pruning to develop its shape.
Sugarberry	*Celtis laevigata*	Large, native, deciduous tree. Leaf litter inhibits seed germination and growth of some other grasses and plants.
Sweetbay	*Lauris noblis*	Aromatic, native evergreen with glossy leaves Bay leaves can be used in cooking.
Sweetgum	*Liquidambar styraciflua*	Native deciduous tree; seed pods can be a nuisance; choose location carefully.
Swamp Cottonwood	*Populus heterophylla*	Large native deciduous tree; needs moist soil
Swamp Tupelo	*Nyssa biflora*	Large native deciduous tree; requires wet site
Sycamore, American	*Platanus occidentalis*	Very large, native, deciduous shade tree. Grows well at MAFB.
Walnut, Black	*Juglans nigra*	Large, native, deciduous tree with edible nuts Nut hulls may be messy & staining; choose location carefully.
Walnut, White (Butternut)	*Juglans cinerea*	Tall, native, deciduous tree with edible nuts. Does not favor dry, compact, or infertile soil. Usually grows at higher elevations than black walnut.
White Basswood	*Tilia heterophylla Tiliaceae*	Large, native, deciduous tree. Does not tolerate very wet or very dry conditions.
Witch Hazel	*Hamamelis* spp.	Small, native tree. Grows well in low-lying rich soil.
Yellow Poplar (Tulip Poplar)	*Liriodendrum tulipfera*	Tall, fast-growing, native tree. Grows well at MAFB. Avoid very wet or very dry conditions.

Shrubs Approved for Planting on Maxwell Air Force Base and Gunter Annex			
Common Name	**Scientific Name**	**Common Name**	**Scientific Name**
Abelia shrubs	*Abelia* sp.	Japanese cleyera	*Cleyera japonica*
Anisetree, small	*Illicium parviflorum*	Japanese fatsia	*Fatsia* sp.
Anisetree, Florida	*Illicium floridanum*	Japanese pittosporum	*Pittosporum* sp.
Azaleas	*Rhododendron* sp.	Jasmine, Showy	*Jasminum floridum*
Butterfly bush	*Buddleia* sp.	Jasmine, Winter	*Jasminum nudiflorum*
Camellia	*Camellia* sp.	Jasmine, Showy	*Jasminum floridum*
Chinese sweetspire	*Itea virginica*	Jasmine, Winter	*Jasminum nudiflorum*
Crape myrtle	*Lagerstroemia* sp.	Leucothoe, Fetterbush	*Leucothoe* sp.
Flowering quince	*Chaenomeles* sp.	Lorapetalum – only dwarf varieties authorized	*Loropetalum*
Forsythi	*Forsynthia* sp.	Mahonia	*Mahonia* sp.
Fothergilla, Large	*Fothergilla major*	Podocarpus	*Podocarpus* sp.
Fuzzy deutzia	*Deutzia scabra*	Southern waxmyrtle	*Myrica cerifora*
Golden St. John's wort	*Hypericum frondosum*	Spirea	*Spiraea* sp.
Holly, most varieties & Cultivars, except Rotunda	*Ilex* sp.	Sweetgale, Bog Myrtle	*Myrica gale*

Hydrangea	*Hydrangea* sp.	Tea olive, False holly	*Osmanthus* sp.
Indian hawthorn (white flowering)	*Raphieolepis indica*	Viburnum	*Viburnum* sp.

Undesirable Trees Not Approved for Planting on Maxwell Air Force Base and Gunter Annex			
Common Name	**Scientific Name**	**Common Name**	**Scientific Name**
Maples	*Acer* sp.	Eastern Hop-Hornbeam	*Ostrya virginiana*
Tree-of-heaven	*Ailanthus altissima*	Princesstree	*Phellodendron amurense*
Silktree or Mimosa	*Albizia julibrissin*	Trifoliate orange or Hardy orange	*Poncirus trifoliate*
Camphor tree	*Cinnamomum camphora*	Poplars	*Populus* sp.
Russian Olive	*Elaeagnus* sp.	Callery pear "Bradford"	*Pyrus calleryana*
Korean Evodia	*Evodia danielli*	Sawtooth Oak	*Quercus acutissima*
Ginkgo - Female trees prohibited	*Ginkgo biloba*	Willows	*Salix* sp.
Carolina silverbell	*Halesia carolina*	Chinese Tallowtree	*Triadica sebefera*
Castor-aralia	*Kalopanax pictus*	Elms	*Ulmus*
Apples, Crabapple	*Malus* sp.	Tungoil tree	*Vernicia fordii*
Chinaberry Tree	*Melia azedarach*	Mulberry	*Morus* sp.

Undesirable Shrubs Not Approved for Planting on Maxwell Air Force Base and Gunter Annex			
Common Name	**Scientific Name**	**Common Name**	**Scientific Name**
Bamboo – Spreading varieties prohibited	*Bamboo* spp.	privet	*Ligustrum* sp.
Barberry	*Berberis* spp.	Pyracantha, Scarlet firethorn	*Pyracantha* sp.
Cotoneaster	*Cotoneaster* spp.	Rotunda variety, Holly	*Ilex cornuta*
Gardenia	*Gardenia* sp.	Thorny olive, Autumn olive	*Elaeagnus* sp.
Honeysuckle	*Lonicera* spp.	Tropical soda apple	*Solanum viarum*
Multiflora rose	*Rosa multiflora*	Yew	*Taxus* spp.
Nandina	*Nandina* species		

MAFB Procedure/MOU for Nuisance Alligators

October 2014

1. MAFB establishes this procedure to ensure compliance with Alabama Department of Conservation and Natural Resources Administrative Code, Chapter 220-2-.95, ***Alligator Nuisance Control Hunter Regulations*** (Attachment 1).
2. This procedure will be established and coordinated between the Alabama Department of Conservation Wildlife and Freshwater Fisheries Law Enforcement Division and Maxwell Air Force Base, giving MAFB authority to remove nuisance alligators in accordance with the DCNR requirements.
3. Roles and Responsibilities:
    a) The MAFB Pest Control Specialist (42 CES/CEOIE) will be the primary point of contact for removal of nuisance wildlife. [Currently, Mr. Bob Davis]
    b) 42 CES/CEOIE will coordinate with the MAFB Environmental Office (42 CES/CEIE) for consultation with federal or state regulatory agencies and to ensure compliance with applicable Natural Resource regulations.
    c) 42 CES/CEOIE will coordinate with MAFB Safety (42 ABW/SE) and MAFB Security Forces (42 SFS) to secure proper authorization for discharge of a firearm and lethal removal of an alligator, if needed.
4. MAFB Civil Engineer Squadron (42 CES) will coordinate with MAFB Safety (42 ABW/SE) and MAFB Security Forces (42 SFS) to monitor alligator presence and activity on base. The criteria specified in Alabama DCNR Administrative Code, Chapter 220-2-.95(3)(c), ***Nuisance Alligator Problem Assessment (NAPA)***, provides the framework for determining if an alligator is a nuisance. MAFB personnel will utilize these criteria, with the following considerations.
    a) Notifications from the general public will come through the CE Service Desk (in person or through the customer service call number). From this notification, a work order will be generated for 42 CES/CEOIE concerning nuisance wildlife. The CE Service Desk will attempt to determine the specific location and actions of the alligator (e.g., is it just sunning quietly near the lake, or is it stalking the family pet in the backyard where children play?)
    b) The mere sighting of an alligator does not classify a nuisance case. 42 CES/CEOIE will gather preliminary data to provide justification of classifying an alligator as a nuisance (NAPA guidelines 2-4).
    c) Maxwell Air Force Base is located adjacent to the Alabama River and alligators will always be present to some degree or another. Alligators are able to move freely from the base lakes and the Alabama River onto and around MAFB

6. MAFB personnel are not equipped to carry out live capture and relocation of alligators (NAPA, Step 5). Therefore, any removal needed will be carried out by lethal means.
7. Removal efforts will be conducted only under the direct supervision of the MAFB Pest Management Specialist.
8. If an emergency situation arises where harm to a person is imminent, appropriate measures may be taken to safeguard human life and health. Any required reporting to DCNR will be made as soon as possible, but within 24 hours, about the incident.
9. As required by the DCNR, the carcass will be buried for disposal. The designated disposal area will be in the vacant land west of the airfield along the northwestern boundary of the installation. The DCNR requires, "**No parts of any alligator may be taken as keepsakes or souvenirs by any person or persons.**"
10. The DCNR requires reporting within 24 hours, via e-mail or leaving a voice mail message, of any alligators removed. 42 CES/CEOIE will report the date, time and approximate size to the designated Alabama Wildlife and Freshwater Fisheries Law Enforcement Division and Montgomery County Conservation Enforcement Officer. Current contact is Conservation Enforcement Officer Vance Wood, 334-422-1944, vance.wood@dcnr.alabama.gov. 42 CES/CEOIE will also inform the environmental office, 42 CES/CEIE.

Violation of the DCNR requirements by any person or persons may result in possible fines and/or imprisonment pursuant to state and federal laws, which are so written to preserve and protect the American Alligator. This agreement is in effect today's date and is standing until further notice or withdrawn by the Alabama Wildlife and Freshwater Fisheries Law Enforcement Division.

CEO Vance Wood
State of Alabama WFFLE

12 NOV 14
Date

MICHAEL S. ALLEN, GS-14, DAFC
Director, 42d Civil Engineer Squadron
Maxwell AFB, AL

26 Feb 15
Date

October 2014

Appendix I. Urban Forest Management Plan

I.1 Urban Forest Management Plan to be added when complete.

Appendix J. Recreational Fishing Plan

J.1 Recreation Fishing Plan to be added when complete.

Federal Laws

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

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

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

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

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

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

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

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

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

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

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

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

governments, non-governmental organizations, and individuals) which call for each party to provide matching funds or services to carry out natural resources projects or initiatives.

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

Federal Energy Regulatory Commission, Wetland and Waterbody Construction and Mitigation Procedures – provides guidance to project sponsors by identifying baseline mitigation measures for minimizing the extent and duration of project-related disturbance on wetlands and waterbodies,

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

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

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

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

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

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

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

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

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

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

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

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

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

Federal Regulations

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

Federal Executive Orders

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

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

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

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

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

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

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

Off-Road Vehicles on Public Lands (EO 11989) – ensures the use of off-road vehicles on public lands will be controlled and directed so as to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands

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

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

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

DoDI, AFI, & Air Force Pamphlets (PAM)

DoDI 4150.07 – Pest Management Program

DoDI 4165.57 – Air Installations Compatible Use Zones

DoDI 4715.03 – Natural Resources Conservation Program

DoDI 6055.06 – Fire and Emergency Services Program

AFI 32-1053 – Integrated Pest Management Program

AFI 32-7001 – Environmental Management

AFI 32-7020 – The Environmental Restoration Program

AFI 32-7061 – Environmental Impact Analysis Process

AFI 32-7062 – Air Force Comprehensive Planning

AFI 32-7064 – Integrated Natural Resources Management

AFI 32-7065 – Cultural Resources Management

AFPAM 91-212 – BASH Techniques

Department of Defense Memoranda

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

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

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

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

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

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

Memorandum, Assistant Deputy Under Secretary of Defense (Environment), 5 Aug 02, Subject: Access to Outdoor Recreation Programs on Military Installations for Persons with Disabilities.

Memorandum, Assistant Secretary of Army (Environment, Safety and Occupational Health), Deputy Assistant Secretary of the Navy (Environment), Deputy Assistant Secretary of the Air Force (Environment, Safety and Occupational Health), 20 Sep 11, Subject: Interim Policy on Management of White Nose Syndrome in Bats.

EMERGENCY CONTACTS:

Spill/Fire (Fire Department)	42 CES/CEF	911
Law Enforcement (Security Forces)	42 SFS/SFOSP	911

ENVIRONMENTAL CONTACTS:

Installation Environmental	42 CES/CEI	334-953-3954
Natural Resource Manager	42 CES /CEIE	334-953-6417
NEPA Program Manager	42 CES/CEIE	334-953-6417
Quality Assurance Service Contracts	42 CES/CEO	334-953-3595
Geobase Office	42 CES/CEPD	334-953-4159
Pest Management	42 CES/CEOIE	334-953-7002
Bioenvironmental Engineer	42 ADS/SGGB	334-953-5848
Public Health	42 ADS/MPH	334-953-5606

42 ABW/CC

42 ABW/CV

42 ABW/JA

42 ABW/PA

42 MSG/CC

42 CES/CD

42 CES/CEA

42 CES/CEIEA

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Montgomery Public Library
Attn: Government Documents
245 High Street
Montgomery, Alabama 36104

Wetumpka Public Library
Attn: Government Documents
Wetumpka, Alabama 36092

Dadeville Public Library
Attn: Government Documents
205 N. West Street
Dadeville, Alabama 36853

15.0 ASSOCIATED PLANS

Tab 1 – Wildland Fire Management Plan to be added when complete.

Tab 2 – Bird/Wildlife Aircraft Strike Hazard (BASH) Plan – Available at MAFB Environmental Flight.

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Maxwell Air Force Base
42D AIR BASE WING

42 ABW PLAN 91-212

BIRD/WILDLIFE AIRCRAFT STRIKE HAZARD (BASH) PLAN

OPR: 42 ABW/SE
Maxwell AFB, AL
24 October 2018

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Certified Current by 42 ABW Plans Officer (WPO), 42 ABW/XPO

Tab 3 – Golf Environmental Management (GEM) Plan – Available at MAFB Environmental Flight.

Tab 4 – Integrated Cultural Resources Management Plan (ICRMP) – Available at MAFB Environmental Flight.

Tab 5 – Integrated Pest Management Plan (IPMP) – Available at MAFB Environmental Flight.

FOR OFFICIAL USE ONLY

42D AIR BASE WING

PEST MANAGEMENT PLAN (PMP)

Integrity – Service – Excellence

OPR: 42D CES
Civil Engineer Squadron

2017

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Tab 6 – Invasive Species Survey and Management Plan to be added when complete.

16.0 LIST OF PREPARERS

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