Notice of Availability
Draft Integrated Natural Resources Management Plan
Tyndall Air Force Base

An Integrated Natural Resources Management Plan (INRMP) for Tyndall Air Force Base (AFB) has been prepared and is available for public review and comment.

The purpose of this INRMP is to provide interdisciplinary strategic guidance for the management and protection of natural resources at Tyndall AFB, located in Bay County in northwest Florida. The primary objective of Tyndall AFB's Natural Resources program is to ensure continued access to the land and airspace required to accomplish the Air Force mission while maintaining natural resources in a healthy condition. The INRMP is prepared, in cooperation with the U.S. Fish and Wildlife Service, NOAA Fisheries, and Florida Fish and Wildlife Conservation Commission, to ensure that natural resources management and mission activities are integrated and in agreement with state and federal mandates. This INRMP establishes guidelines for the protection, conservation, and use of natural resources at Tyndall AFB. The INRMP integrates and prioritizes wildlife, fire, and forest management activities to sustain and restore Tyndall AFB's ecosystems and ensure "no net loss" in the operational capability of these resources to support Tyndall AFB mission activity.

Your comments on this Draft INRMP are requested. Letters and other written or oral comments provided may be published in the Final INRMP. As required by federal law and Air Force Instruction, Tyndall AFB will review all comments before finalizing the INRMP. Any personal information provided, including private addresses, will be used only to identify your statement during the public comment period or to compile a mailing list to fulfill requests for Final INRMP copies or associated documents. Only the names and respective comments of respondents will be disclosed. Personal home addresses and phone numbers will not be published in the Final INRMP.

The Draft INRMP is available on the web at: www.tyndall.af.mil. Comments may be submitted through 02 September 2025 and should be provided to Mr. Jose Cintron, 325 CES/CEIE, 100 Checkertail Way (Building 36233), Tyndall AFB, FL, 32403, (850) 283-2713, jose.cintron.1@us.af.mil.

US DEPARTMENT OF THE AIR FORCE
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

TYNDALL AIR FORCE BASE

(See INRMP signature pages for plan approval date)

ABOUT THIS PLAN

This installation-specific Environmental Management Plan is based on the United States Department of the Air Force (DAF, formerly US Air Force [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) and DAF Instructions (DAFIs); Department of Defense Instructions (DoDIs); DAF Playbooks; federal, state, and local requirements; Biological Opinions; and permits are referenced.

Certain sections of this INRMP begin with standardized, DAF-wide "common text" language that addresses DAF 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 DAF-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/Point of Contact (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 Management.*

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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 08, *Environmental Management Plan Review, Update, and Maintenance*, the standard content in this INRMP template is reviewed periodically, updated as appropriate, and approved by the Natural Resources Subject Matter Expert (SME).

This version of the template is current as of 11 October 2024 and supersedes the 2020 version.

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

Installation INRMP

Record of Review—The INRMP is updated no less than annually, or as changes to natural resource management and conservation practices occur, including those driven by changes in applicable regulations. IAW the Sikes Act and Department of the Air Force Manual (DAFMAN) 32-7003, *Environmental Conservation*, the INRMP is required to be reviewed for operation and effect no less than every 5 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 5 years. Approval of a new or revised INRMP is documented by signature on a signature page signed by the Installation Commander (or designee), and a designated representative of the US Fish and Wildlife Service (USFWS), state fish and wildlife agency, and National Oceanic and Atmospheric Administration (NOAA) Fisheries when applicable (DAFMAN 32-7003).

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

INRMP APPROVAL/SIGNATURE PAGES

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

Tyndall Air Force Base

1. The Tyndall Air Force Base (AFB) Integrated Natural Resources Management Plan (INRMP) provides specific administrative and operational plans for managing natural resources at Tyndall AFB, and it fulfills the requirements defined in Department of the Air Force Manual (DAFMAN) 32-7003, *Environmental Conservation*.
2. This plan is effective upon the commander's signature and supersedes all previous versions of the Tyndall AFB INRMP.
3. This plan will be (1) verified annually by the Environmental Element and (2) reviewed by Air Force Civil Engineer Center/Installation Support Services and all signature parties no less than once every 5 years (as required by DAFMAN 32-7003), in coordination with the United States Fish and Wildlife Service and the Florida Fish and Wildlife Conservation Commission.
4. The Office of Primary Responsibility for this document is 325th Civil Engineer Environmental Element, Natural Resources Section (325 CES/CEIEA).
5. Execution of this plan will be directed by the Commander, 325th Fighter Wing or his/her designated representative.
6. The effective date of the INRMP is the date the last required signature is obtained.

_____ _____

CHRISTIAN M. BERGTHOLDT, Colonel, USAF Date

Commander

_____ _____

Constance Cassler, Conservation Delivery Division Manager Date

United States Fish and Wildlife Service, Florida Ecological Service Office

_____ _____

BRIANNA BJORDAHL, Northwest Region Conservation Biologist Date

Florida Fish and Wildlife Conservation Commission

EXECUTIVE SUMMARY

The Integrated Natural Resources Management Plan

The primary objective of the Department of the Air Force (DAF) Natural Resources Program is to sustain, restore, and modernize natural infrastructure to ensure operational capability and no net loss in the capability of the lands to support the military mission of the installation. The Integrated Natural Resources Management Plan (INRMP) is the principal tool for managing military installation natural resources, in accordance with (IAW) the Sikes Act (16 US Code § 670 et seq.).

This INRMP provides strategic direction for natural resources management at Tyndall Air Force Base (AFB), Florida. It provides natural resources management goals and objectives to ensure continued access to the land and airspace required to accomplish the mission while maintaining the natural resources in a healthy condition. In particular, it focuses on supporting the ongoing restoration efforts since Hurricane Michael and enhancing ecosystem resiliency to similar events.

Tyndall AFB's INRMP provides a descriptive basis for planning and review under the National Environmental Policy Act (NEPA) and supports management of natural resources in coordination with multiple stakeholders. It identifies and prioritizes conservation goals to benefit the management of threatened and endangered (T&E) species and habitats and federally protected wetlands, as well as to integrate and prioritize wildlife, fire, ecosystem, and forest management activities.

Standards outlined by the INRMP foster successful and timely integration of conservation and military activities. INRMP implementation helps ensure military ground operators have quality environments to utilize for training and promotes future mission capability through responsible stewardship of natural resources and ecosystem management. Impact-avoidance and minimization measures protect resources and may reduce future operational costs. Tyndall AFB's conservation activities and outdoor recreation program promote positive relationships with the public, agencies, and organizations. New management actions are required to be evaluated through NEPA, IAW 90 Federal Register 27857, *Department of Defense Implementation of the National Environmental Policy Act*.

The INRMP organizes its management aims into Goals, Objectives, and Projects. Management goals express a vision for a desired condition for the installation's natural resources and are the primary focal points for INRMP implementation. Management goals for this INRMP include the following:

- Provide natural resource management and coordination services in support of the mission.
- Restore and manage forest ecosystems for mission use, protected species, and habitat improvement.
- Enable long-term sustainability of barrier island environments for military use and protection of the installation infrastructure by protecting T&E species and their habitats.
- Restore and protect wetland habitats to comply with federal laws and protect T&E species.
- Provide a variety of uses, values, products, and services to present and future generations while maintaining sustainable ecosystems.

Although these goals support Tyndall AFB's desired management direction, achieving management goals takes time and is subject to funding and budget flows.

1.0 OVERVIEW AND SCOPE

This Integrated Natural Resources Management Plan (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 US Department of the Air Force (DAF, formerly the US Air Force [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 DAF adaptability in all environments. The DAF 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 DAF Natural Resources Program is to sustain, restore, and modernize natural infrastructure to ensure operational capability and no net loss in the capability of DAF lands to support the military mission of the installation. The plan outlines and assigns responsibilities for the management of natural resources, discusses related concerns, and provides program management elements that will help to maintain or improve the natural resources within the context of the installation's mission. The INRMP is intended for use by all installation personnel. The Sikes Act is the legal driver for the INRMP.

1.1 Purpose and Scope

The purpose of this INRMP is to provide interdisciplinary strategic guidance for natural resources management on Tyndall Air Force Base (AFB). The INRMP outlines Tyndall AFB's plan to sustain and restore natural resources to ensure operational capability. This plan provides a means of successfully accomplishing the base mission while integrating natural resources management. Additionally, the INRMP provides guidelines for the continued multiple use and sustained yield of Tyndall AFB's biologically diverse natural environment.

To ensure that natural resources management and other mission activities are integrated and in agreement with state and federal mandates, the INRMP is prepared in cooperation with the US Fish and Wildlife Service (USFWS), Florida Fish and Wildlife Conservation Commission (FWC), and other pertinent groups and agencies.

The installation Natural Resources Manager (NRM) conducts annual reviews in coordination with internal stakeholders and local representatives of USFWS and FWC. The annual review is classified as complete when the installation commander or appropriate designee certifies the INRMP as valid and current.

1.2 Management Philosophy

Interdisciplinary Approach

INRMP goals and objectives are developed in cooperation with state and federal agencies, military mission user groups, and other interested stakeholders to address natural resource management needs at Tyndall AFB. Once internal coordination and review of the INRMP is complete, it is provided to the USFWS and FWC for review and signature. The signature of these agencies reflects their mutual agreement on those portions of the INRMP within the scope of the agency's authority.

Applying Air Force Principles for Ecosystem Management

The principles of ecosystem management and biodiversity conservation serve as the foundations of the INRMP. The goal of ecosystem management is to preserve and enhance ecosystem integrity. Over the long-term, ecosystem management aims to improve the sustainability and biological diversity of terrestrial and aquatic ecosystems while supporting sustainable economies and communities. These principles further

enable military mission success through sound stewardship and ensure continued access to the land and airspace required to accomplish the DAF mission.

Ecosystem management at Tyndall AFB includes the following DAF principles:

- Maintenance or restoration of native ecosystems across their natural range where practical and consistent with the military mission.
- Maintenance or restoration of ecological processes, such as fire and other disturbance regimes, where practical and consistent with the military mission.
- Maintenance or restoration of the hydrological processes in floodplains and wetlands, when feasible.
- Collaboration with other Department of Defense (DoD) components as well as other federal, state, and local agencies, and adjoining property owners.
- Provision 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 DAF mission.

Tyndall AFB also employs adaptive management, which is a systematic process for continually improving natural resources management policy and practices by continually monitoring current operations and applying lessons learned to modify these programs as warranted (Department of the Air Force Manual [DAFMAN] 32-7003, *Environmental Conservation*).

Supporting the Base Comprehensive Planning Process

The INRMP is a key component plan of the Base Comprehensive Plan, as detailed in Air Force Instruction (AFI) 32-7062, *Air Force Comprehensive Planning*. The INRMP identifies natural resource features that need to be considered and incorporated into the Base Comprehensive Plan regarding future installation development. The INRMP also details natural resources management activities that may need to be considered during comprehensive planning efforts.

1.3 Authority

The INRMP was developed to meet the requirements of the Sikes Act (16 US Code [USC] § 670 et seq.) as amended by the Sikes Act Improvement Act; Department of Defense Instruction (DoDI) 4715.03, *Natural Resources Management*; Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*; and DAFMAN 32-7003.

To ensure the preparedness of the Armed Forces, the Sikes Act requires military departments to provide for the following:

- The conservation and rehabilitation of natural resources on military installations
- The sustainable multipurpose use of the resources, which shall include hunting, fishing, and non-consumptive uses
- Subject to safety requirements and military security, public access to military installations to facilitate the use of natural resources

Each INRMP shall, to the extent appropriate and applicable, provide for the following:

- Fish and wildlife management, land management, forest management, and fish and wildlife-oriented recreation, invasive and nuisance species management
- Fish and wildlife habitat enhancement or modifications

- Wetland protection, enhancement, and restoration, where necessary for support of fish, wildlife, or plants
- Integration of, and consistency among, the various activities conducted under the plan
- Establishment of specific natural resource management goals, objectives, and timeframes for proposed action
- Sustainable use by the public of natural resources, if that use is consistent with the needs of fish and wildlife resources
- Public access to the military installation, if necessary or appropriate, subject to the requirements necessary to ensure safety and military security
- Enforcement of applicable natural resource laws (including regulations)
- No net loss in the capability of military installation lands to support the military mission of the installation
- Other activities that the Secretary of the military department determines appropriate

DoDI 4715.03, *Natural Resources Management*, is the overarching instruction for DoD natural resource management and is the primary agent for implementing policy (including the Sikes Act), assigning responsibilities, and prescribing procedures for the integrated management of natural resources on DoD property. This DoDI was updated on 18 March 2011, and Incorporating Change 2 was added on 31 August 2018.

AFPD 32-70, *Environmental Quality*, establishes policies to responsibly manage natural and cultural resources on DAF properties, clean up past environmental damage, meet current environmental standards, plan future activities to minimize impacts, and eliminate pollution from DAF activities whenever possible. Under this directive, a DAF Environmental Quality Program was developed. This program conducts cleanup, compliance, conservation, and pollution prevention. Additionally, this directive states that the DAF will pursue adequate funding to meet environmental legal obligations.

DAFMAN 32-7003, *Environmental Conservation*, implements AFPD 32-70 and DoDI 4715.03. This instruction provides details on how to manage natural resources on DAF installations to comply with applicable federal, state, and local laws and regulations. The INRMP for Tyndall AFB facilitates compliance with federal, state, and local environmental requirements. These requirements deal with analysis of potential environmental impacts; water and air quality; wetlands; threatened and endangered (T&E) species, marine mammals, migratory birds, and other wildlife; forest and fire management; and public access and recreation. The relevant statutes, executive orders (EOs), and the application of various Natural Resources Program components to significant laws and regulations are listed in the Annotated Summary of Key Legislation Related to Design and Implementation (Table 14-1).

Installation-specific policies are listed below in Table 1-1.

Table 1-1. Installation-specific policies (including state and/or local laws and regulations)

Policy	Description
Executive Order (EO) 21-19, *Take and Transport Prohibitions for Sliders and Softshell Turtles*	Prohibits the take or transport of any softshell turtle (Florida softshell, *Apalone ferox*; smooth softshell, *A. mutica*; and spiny softshell, *A. spinifera*) and yellow-bellied slider (*Trachemys scripta scripta*) to prevent the spread of turtle bunyavirus. This EO is to remain in force until amended or rescinded by subsequent order and will be reviewed annually to determine continued necessity.

Table 1-1. Installation-specific policies (including state and/or local laws and regulations)

Policy	Description
Florida Administrative Code (FAC) 5B-40, *Preservation of Native Flora of Florida*	Regulations for obtaining/issuance of permits to harvest plants on the endangered and commercially exploited plant list; regulated plant index; investigation of suspected violations, preservation of endangered, commercially exploited and/or threatened plants involved, and reporting suspected violations; and endangered and threatened Native Flora Conservation Grants Program.
FAC 62, *Department of Environmental Protection*	Establishes responsibilities for the Florida Department of Environmental Protection.
FAC 68, *Regulation of Wild Animal Life and Freshwater Aquatic Life in the State*	Mandates that all freshwater and aquatic life in the waters within the jurisdiction of the State of Florida [and] all wild animal life within the jurisdiction of the State of Florida, whether such wild animal life is privately owned or otherwise, is subject to the regulation of the Florida Fish and Wildlife Conservation Commission (FWC). FWC shall regulate migratory birds consistent with the laws of the United States governing the conservation and protection of all migratory birds.
FAC 68A-27.003, *Florida Endangered and Threatened Species List; Prohibitions*	No person shall take, possess, or sell any threatened species or parts of their nests or eggs except as authorized by FWC rule, permit from FWC, or FWC-approved guideline.
FAC 68A-27.005, *Designation of Species of Special Concern; Prohibitions; Permits*	No person shall take, possess, transport, or sell any Species of Special Concern or parts thereof or their nest or eggs, except as authorized by permit from the FWC Executive Director, permits being issued upon reasonable conclusion that the permitted activity will not be detrimental.
FAC 68A-27.007, *Permits and Authorizations for the Take of Florida Endangered and Threatened Species*	Establishes requirements for permits and authorizations to take Florida endangered and threatened species.
FAC 68A-13, *General Hunting Regulations*	Hunting regulations for the State of Florida.
FAC 68A-14.001, *Establishment Orders for Designated Areas*	FWC establishment of Wildlife Management Area, wildlife and environmental area, wildlife refuge, bird sanctuary, restricted hunting area, Critical Wildlife Area, fish management area, or miscellaneous area. Regulations of these areas shall be noticed by posting on the area and by electronic media. Public small-game hunting areas may be established within Wildlife Management Areas, wildlife and environmental areas, fish management areas, and public use areas.
FAC 68A-15.004, *General Regulations Relating to Wildlife Management Areas*	General regulations and prohibitions related to hunting, fishing, or trapping on wildlife management areas posted as closed to these activities.
FAC 68A-15.063(17), *Specific Regulations for Wildlife Management Areas—Northwest Region—Tyndall AFB Wildlife Management Area*	Provides hunting and fishing regulations for Tyndall Air Force Base (AFB).

Table 1-1. Installation-specific policies (including state and/or local laws and regulations)

Policy	Description
FAC 68A-16.002, *Bald Eagle* (*Haliaeetus leucocephalus*)	No person shall take, feed, disturb, possess, sell, purchase, or barter any bald eagle or parts thereof, or their nests or eggs, or attempt to engage in any such conduct, except when such conduct is authorized by the US Fish and Wildlife Service. On public land, it is unlawful for any person to knowingly enter any area posted as closed for the protection of bald eagles, their nests, or their nest trees, except the staff or authorized agents of the managing public entity for that area.
FAC 68A-19.005, *General Regulations Relating to Critical Wildlife Areas*	The taking of fish and wildlife is prohibited within any area posted as a Critical Wildlife Area, except as authorized in the order establishing the Critical Wildlife Area. Public access, including vehicles, vessels, and dogs is prohibited within areas posted as "Closed to Public Access." The FWC Executive Director may issue permits authorizing access for scientific or conservation purposes to a Critical Wildlife Area where public access is prohibited; authorized persons must possess a copy of the authorization when engaged in such activities. Regulations for any specific Critical Wildlife Area that differ from the general regulations set forth in this rule shall be established by the order establishing the Critical Wildlife Area.
FAC 68A-4.001, *General Prohibitions*	General prohibited actions for freshwater fish and wildlife. This includes the intentional feeding of bears and other animals.
Florida Statute Chapter 373, *Water Resources*	Provides for the state water resource plan; permitting of consumptive uses of water; regulation of wells; management and storage of surface waters; finance and taxation; miscellaneous provisions; water supply policy, planning, production, and funding; and the Florida Springs and Aquifer Protection Act.

1.4 Integration with Other Plans

The INRMP is designed to integrate with the Installation Development Plan (IDP) and the Air Installation Compatible Use Zone to comply with federal, state, and local laws governing the protection of ecologically sensitive land and wildlife species. This is accomplished by close coordination of project development with the 325th Civil Engineer Squadron Environmental Element (325 CES/CEIE). All aspects of development projects are thoroughly reviewed for environmental impact and consultation is sought from federal and state agencies where appropriate (Section 2.4).

Collisions with birds and other wildlife have the potential to cause millions of dollars in damage to aircraft and the loss of human life. The 325th Fighter Wing Flight Safety (325 FW/SEF) is the office of primary responsibility for monitoring and implementing the Bird/Wildlife Aircraft Strike Hazard (BASH) Plan (Tab 5). DAFMAN 32-7003 and DAF Instruction (DAFI) 91-202/Air Combat Command Supplement 1, *The USAF Mishap Prevention Program*, mandate that Tyndall AFB's Natural Resources Office (325 CES/CEIEA) participates in the development, review, approval, and implementation of the Tyndall AFB BASH Plan. Additional Natural Resources Office responsibilities include maintaining current state and federal permits to manage birds and wildlife for airfield safety (Section 7.12).

The INRMP and the Integrated Pest Management Plan (IPMP; Tab 7) are mutually supportive plans that address nonnative invasive plant species and nuisance wildlife. Tyndall AFB's Invasive and Nuisance

Species Component Plan (Tab 2) supplements the IPMP by describing the management of nonnative invasive, pest, and nuisance species (Section 7.11).

The INRMP and Wildland Fire Management Plan (WFMP; Tab 4) are mutually supportive plans that work in union to achieve both natural resources and wildland fire management objectives. The INRMP partially drives the need for wildland fire as a management tool, and the WFMP restores natural disturbance to the landscape (Section 7.9).

The INRMP and the Cultural Resources Management Plan (ICRMP; Tab 6) are mutually supportive plans that ensure successful management of cultural and natural resources. The ICRMP serves as a 5-year planning and decision document for cultural resource management and compliance procedures. Any action that may impact an installation's cultural resources is identified and compliance actions are recommended in the ICRMP (DAFMAN 32-7003). The INRMP supports the ICRMP by coordinating natural resources planning efforts with cultural resources management priorities to avoid management conflicts.

2.0 INSTALLATION PROFILE

Table 2-1. Installation profile

Office of Primary Responsibility (OPR)	The 325th Civil Engineer Squadron Environmental Element (325 CES/CEIE) has overall responsibility for implementing the Natural Resources Management Program and is the lead organization for monitoring compliance with applicable federal, state, and local regulations.
Natural Resources Manager/Point of Contact (POC)	Name: Jay Morgan Phone: 850-527-2009 Email: jay.morgan.4@us.af.mil
State and/or local regulatory POCs (Include agency name for Sikes Act cooperating agencies)	Constance Cassler, US Fish and Wildlife Service Brianna Bjordahl, Florida Fish and Wildlife Conservation Commission
Total acreage managed by installation	30,000
Total acreage of wetlands	11,704
Total acreage of forested land	13,973
Does installation have any Biological Opinions (BOs)? (If yes, list title and date, and identify where they are maintained)	Current: BO 4-P-98-020, 2016-2019 BO 4-P-00-211, 2016-2019 BO 04EF3000-2020-F-0145 BO 09E30000-2023-0090495-S7
Natural Resources Program Applicability (Place an X in the brackets "[X]" next to each program that must be implemented at the installation. Document applicability and current management practices in Section 7.0)	☒ Fish and Wildlife Management ☒ Outdoor Recreation and Access to Natural Resources ☒ Conservation Law Enforcement ☒ Management of Threatened, Endangered, and Host Nation-Protected Species ☒ Water Resource Protection ☒ Wetland Protection ☒ Grounds Maintenance ☒ Forest Management ☒ Wildland Fire Management ☐ Agricultural Outleasing ☒ Integrated Pest Management Program ☒ Bird/Wildlife Aircraft Strike Hazard (BASH) ☒ Coastal Zone and Marine Resources Management ☒ Cultural Resources Protection ☒ Public Outreach ☒ Geographic Information Systems (GIS)

2.1 Installation Overview

2.1.1 Location and Area

Tyndall AFB is located on 30,000 acres in southeastern Bay County, approximately 13 miles east of Panama City, Florida (Figure 1 in Tab 9). Tyndall has no geographically separated units (GSUs). The installation contains 23,678.35 acres of unimproved land, 1,284.35 acres of semi-improved land, and 4,852.96 acres of improved land (Section 2.4.2). The base is a combination of developed and natural areas on a peninsula that is bisected by US Highway 98 (Figure 2 in Tab 9). The base is approximately 18 miles long and 3 miles wide and is surrounded by East Bay, St. Andrews Bay, and the Gulf of America (GOA, formerly Gulf of Mexico) to the north, west, and south, respectively. Crooked Island West (CIW) and Crooked Island East (CIE), which form St. Andrews Sound, are barrier spits on the GOA. In addition to airspace associated with Tyndall AFB, Tyndall also conducts air operations in range airspace that is shared with other DAF bases and DoD branches, including areas over the GOA.

Tyndall AFB's forested areas and beaches are particularly valued for mission activities. This unique setting in close proximity to overwater airspace provides a sea-to-land transition area, which is a vital resource for military operations. Additionally, other ground-training units utilize Tyndall AFB's forested areas and adjacent water assets.

Table 2-1. Installation/Geographically Separated Unit (GSU) Location and Area Descriptions

Installation/GSU	Main Use/ Mission	Acreage	Addressed in Integrated Natural Resources Management Plan?	Describe Natural Resource Implications
Tyndall Air Force Base	Personnel training; weapons evaluation	30,000	Yes, in Section 2.0	Potential impacts to forests, wetlands, water resources, threatened and endangered species, and coastal zone and marine resources. Additionally, there may be Bird/Wildlife Aircraft Strike Hazard concerns.
GSUs	None	—	—	—

2.1.2 Installation History

Old Town St. Andrews (present-day Panama City) was settled in the late 1820s. Turpentine production and logging were the main sources of economic revenue in the region through the early 20th century. Tyndall Field was established in 1941 during the nation's military buildup, and during World War II, over 45,000 gunners received training at Tyndall. Highlights of the installation's history after the war include the following:

- 1940s: Tyndall Field became the home of Air University's Air Tactical School.
- 1950s: The base was placed under the Air Training Command and was designated as the Air Force Pilot Instrument School to train all-weather jet interceptor pilots and air weapons controllers. In 1957, Tyndall Field became an Air Defense Command unit with the activation of the 73d Air Division and the 4756th Air Defense Wing. The primary base mission became that of a weapons employment center.

- 1960s: The Air Force Air Defense Weapons Center replaced the 4756th Air Defense Wing.
- 1970s: Air Force Civil Engineer Support Agency, the worldwide focal point for air base operability processes, moved to Tyndall Field from Washington, D.C. In 1979, Tyndall Field was transferred to the Tactical Air Command.
- 1980s: The 325th Fighter Weapons Wing was activated in 1981 and began its mission with F-101, F-106, and T-33 aircraft. It was soon redesignated as the 325th Tactical Training Wing, which assumed responsibility for all F-22 maintenance training for the Tactical Air Command, and began F-22 pilot training.
- 1990s: The Air Defense Weapons Center was deactivated, and the 1st Air Force and North American Aerospace Defense Command moved to Tyndall AFB from Langley AFB. In 1991, the 325th Tactical Training Wing was redesignated as the 325th Fighter Wing (325 FW).
- 2000s: The 325 FW remained the sole F-15 air superiority training wing until 2010. Training was performed by the 1st, 2d, and 95th Fighter Squadrons until the latter 2 squadrons were deactivated in 2006 and 2010, respectively. The 337th Air Control Squadron (assigned to the 33d Fighter Wing at Eglin AFB but located at Tyndall) remains the only air battle manager training unit in the DAF. Tyndall AFB was selected as the center for training the Air Force's newest F-22 Raptor and received the first Raptor in 2004. The 43d Fighter Squadron (part of the 325 FW) provides training for new pipeline students and pilots transitioning from other airframes. A full history is available in the ICRMP (Tab 6) or through the base historian's office.
- 2010s: Tyndall AFB's major command changed from Air Education Training Command to Air Combat Command, with the last plane of the combat F-22 squadron arriving in 2014. That year, the QF4 drones began to be replaced by QF16s. On 10 October 2018, Hurricane Michael made landfall on Tyndall AFB as a Category 5 storm, resulting in catastrophic damage to the base's infrastructure and natural resources, rendering it incapable of hosting the F-22 mission for the foreseeable future.
- 2020s: Following Hurricane Michael, Tyndall AFB implemented several long-range planning objectives from its IDP and its 21st Century Installation Concepts. Currently, Tyndall AFB is rebuilding as the "Installation of the Future" (Section 7.13), implementing a data-driven, informed, and resilient installation design. In September 2023, Tyndall received the F-35 as part of the wing beddown.

2.1.3 Military Missions

The 325 FW is proud of its evolving mission "to develop resourceful and resilient Airmen trained to project unrivaled combat airpower on behalf of the United States of America." Today, the installation is being rebuilt to support not only standard base functions, but also F-35 Lightning II aircraft and operations. The host unit, the 325 FW, is a subordinate unit to the 19th DAF and the Air Combat Command. Descriptions of the major units and tenants at Tyndall AFB are provided below.

325th Fighter Wing

Prior to Hurricane Michael, the 325 FW conducted academic and hands-on training for F-22 Raptor pilots to fly in air superiority roles. After Hurricane Michael, all Tyndall AFB-based F-22 operations stopped, resulting in a dramatic reduction in operations. The 325 FW is supported by the following 4 groups:

- **325th Operations Group**—The 325th Operations Group consists of the 43d Fighter Squadron, 325th Training Support Squadron, 325th Operations Support Squadron, and the 95th Fighter Squadron. The group staff provides guidance and assistance in successfully executing the training mission and ensures quality performance and standardized procedures for pilots, air weapons

directors/air battle managers, aircraft maintenance personnel, weapons load crews, and air traffic controllers.

- **325th Maintenance Group**—The 325th Maintenance Group provides responsive, reliable, and resourceful maintenance for the 325 FW. The group is composed of 2 squadrons whose unique missions directly contribute to the overall mission accomplishment of the group.
- **325th Mission Support Group**—The primary mission of the 325th Mission Support Group is to provide excellent mission support to Tyndall AFB personnel through world-class customer service, protection, resources, and infrastructure. These support services and activities include providing civil engineering, security forces, communications, personnel, services, contracting, supply, and transportation support for 20,279 Active-Duty, civilian, dependent, and retired personnel.
- **325th Medical Group**—The 325th Medical Group operates as an outpatient medical facility with family practice, pediatrics, dental, flight medicine, optometry, physical medicine, and women's health clinics. The clinics are supported by outstanding ancillary services, including radiology, with extensive capabilities like computerized tomography (CT) scanning and a clinical laboratory that provides a wide variety of testing services. The group also offers a clinical pharmacy, nutritional medicine programs, and essential base support services such as public health, bioenvironmental engineering, and aerospace physiology.

Major Associate Tenants

Major associate tenants at Tyndall AFB are described as follows:

- **53d Weapons Evaluation Group**—The 53d Weapons Evaluation Group conducts air-to-air Weapon Systems Evaluations Programs, overseeing flight operations and recovery of full-scale (QF-4 and QF-16) and subscale (BQM-34 and MQM-107) drone targets. The DAF, Air National Guard, Navy, Canadian Air Defense Force units, and other foreign military forces come to Tyndall AFB to fire their missiles at realistic targets over the GOA. The 53d Weapons Evaluation Group includes the 81st Test Support Squadron, 82d Aerial Targets Squadron, and 83d Fighter Weapons Squadron.
- **Air Force Civil Engineer Center (AFCEC)**—The AFCEC office at Tyndall AFB is a field satellite agency of AFCEC headquarters in Port San Antonio, Texas. AFCEC missions include facility investment planning, design and construction, operations support, real property management, readiness, energy support, environmental compliance and restoration, audit assertions, acquisition, and program management. In addition, through the Installation Support Teams, AFCEC has many INRMP-related responsibilities. The teams' primary INRMP-related task is to provide execution guidance and to oversee implementation of Natural Resources Management Programs on installations within the command.

  The AFCEC Environmental Directorate (AFCEC/CZ) is responsible for managing DAF restoration, compliance, sustainability, and National Environmental Policy Act (NEPA) programs. The directorate members provide environmental technical assistance and advice to DAF installations, major commands, and other clients. The directorate develops execution strategies for environmental and sustainability issues, projects, and programs based on best practices garnered from experience and research. The directorate is organized into 4 divisions: Restoration, Technical Support, Compliance, and Operations.

  The Requirements and Acquisition Division (formerly the Air Force Research Laboratory) at Tyndall AFB manages the life-cycle of airbase systems and equipment.

- **Air Base Technologies Division**—The Air Base Technologies Division is a sub-group of AFCEC and applies science, technology, and engineering to advance fixed and deployed airbase capabilities in force protection, infrastructure, and homeland defense.
- **Detachment 1, 801st Rapid Engineer Deployable Heavy Operational Repair Squadron Engineers (RED HORSE)**—The mission of RED HORSE is to provide agile combat support training to Active-Duty, Air National Guard, and DAF Reserve civil engineer, services, and personnel teams in order to construct, operate, and maintain forward-operating bases for deployed forces.

Tenants and their responsibility for natural resources is listed below in Table 2-1.

Table 2-2. Listing of tenants and natural resources responsibility

Tenant Organization	Natural Resources Responsibility
AFNORTH	325th Civil Engineer Environmental Element, Natural Resources Section (325 CES/CEIEA)
53d Weapons Evaluation Group	325 CES/CEIEA
Air Force Civil Engineer Center	325 CES/CEIEA
Air Base Technologies Division	325 CES/CEIEA
801st RED HORSE Training Squadron	325 CES/CEIEA
Tyndall Program Management Office	325 CES/CEIEA
44th Fighter Group	325 CES/CEIEA
Airey Noncommissioned officer (NCO) Academy	325 CES/CEIEA
337th Air Control Squadron	325 CES/CEIEA
Air Force Office of Special Investigation	325 CES/CEIEA

2.1.4 Natural Resources Needed to Support the Military Mission

Natural resources are valuable assets of the DAF. 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 DAF adaptability in all environments. Some of these environments include open fields, forested land, and coastal shorelines. The DAF has stewardship responsibility over the physical lands on which installations are located to ensure all natural resources are properly conserved, protected, and used in a sustainable manner. The primary objective of DAF Natural Resources Programs is to sustain, restore, and modernize natural infrastructure to ensure operational capability and no net loss in the capability of DAF lands to support the military mission of the installation.

This INRMP provides strategic direction for natural resources management at Tyndall AFB. Standards outlined by the INRMP foster successful and timely integration of conservation and military activities. It provides natural resources management goals and objectives to ensure continued, sustainable access to the land and airspace required to accomplish the Air Force mission while maintaining natural resources.

Natural resources needed to support the mission at Tyndall AFB include properly functioning coastal, forest, and wetland ecosystems. Healthy ecosystems benefit the mission by providing ecosystem services, areas for ground training exercises, land-to-sea transition zones, habitat for T&E species, buffer zones for military operations, and infrastructure protection from storms and high water events.

Avoidance and minimization of impacts to natural resources may protect them and reduce future operational costs and regulatory burden. INRMP implementation helps ensure that military ground operators have

quality environments to utilize for training, and it promotes future mission capacity through good stewardship of natural resources and ecosystem management. Tyndall AFB's conservation activities and Outdoor Recreation Program promote positive relationships with the public and other agencies and organizations.

2.1.5 Surrounding Communities

Bay County has a population of approximately 190,000 people (US Census Bureau 2023). Bay County's economic base is a mixture of military, tourism, logging, services, manufacturing, construction, and commercial fishing. Tyndall AFB and the Naval Support Activity in Panama City are the largest contributors to the county's economic base.

Regional Land Use

Cities and towns located near Tyndall AFB include Parker, Callaway, and Springfield, Florida (Figure 3 in Tab 9). Land use in Parker is primarily residential housing, with commercial development along major thoroughfares. Callaway, located east of Parker, is also a residential community, containing primarily single-family homes. Springfield, located northwest of Tyndall AFB, contains residential, industrial, commercial, public, and recreational land uses. Areas of unincorporated land to the northeast, between Tyndall AFB and Mexico Beach, were predominately managed by timber cultivation, pulp, and paper mills until Hurricane Michael.

Hurricane Michael was one of the most intense hurricanes to make landfall in the United States, leaving damage across an 80-mile-wide swath that encompassed 11 counties in the Florida Panhandle. Regionally, timber damage ranged from catastrophic (95% loss) to moderate (15% loss), impacting an estimated 2.8 million acres and totaling an estimated $1.3 billion in lost timber values (Florida Forest Service 2018). In addition to planned future residential and commercial growth and accompanying encroachments, post-hurricane forest conversions to development or other agricultural uses will occur in areas around Tyndall AFB. Tyndall AFB is coordinating with county and regional planning bodies to ensure that development is compatible with its military missions.

2.1.6 Local and Regional Natural Areas

While Tyndall AFB encompasses approximately 30,000 acres, it is situated in an area that is rich with other public conservation lands and easements (Figure 3 in Tab 9). Many of these surrounding areas contain habitats similar to those found on the installation, including sandhills, flatwoods, ephemeral wetlands, bays, and coastal habitats. These areas include the following:

- St. Andrews State Park
- Lathrop Bayou Tract
- T. H. Stone Memorial St. Joseph Peninsula State Park
- Panama City Airport Conservation Easement
- St. Joseph Bay State Buffer Preserve
- Econfina Creek Water Management Area
- Apalachicola National Forest (and other contiguous conservation lands)

2.2 Physical Environment

2.2.1 Climate

Tyndall AFB has a subtropical climate characterized by long, humid, warm summers and mild winters, with the GOA moderating both summer and winter temperatures. Temperatures rarely drop below 40 °F in winter or rise above 95 °F during summer (Table 2-3), although consistently high humidity creates conditions that generally feel much higher than the thermometer readings. Average precipitation is around 62 inches per year, with a year-round rainfall average of above 3 inches per month and distinctly heavier rainfall during summer (Table 2-3). Like most of the Florida Panhandle, Tyndall AFB's local precipitation regime is characterized by high levels of variability and a high degree of influence from extreme precipitation events, and storms that deliver over 2 inches in a 24-hour period are common, especially during the summer. Winds are generally moderate and seasonally variable, with fall and winter dominated by northerly and northeasterly winds that ultimately give way to warmer, wetter southwesterly patterns through the spring and summer. The mild climactic conditions in this region contribute to a long growing season, which averages 285 days per year.

Tyndall AFB's position along the GOA exposes it to a variety of extreme weather events that play important roles in its overall climatic character, including frequent intense convective rainfall events and severe tropical storms that produce extremely high winds, heavy rainfall, and tidal surges. Hurricane Michael caused catastrophic damage to the installation, but near-misses from tropical storms and outlying rain bands produced by distant storms can also have severe impacts, mainly in the form of heavy rainfall, potential for tornado formation, and flooding. Since 1980, 18 named storms of tropical storm strength or greater have passed within 60 miles of Tyndall AFB (Office for Coastal Management and National Oceanic and Atmospheric Administration [NOAA] 2024).

Table 2-3. Average high temperatures, average low temperatures, and average precipitation amounts for Panama City, Florida

Variable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average High Temperature (°F)	64	67	73	79	85	89	91	91	89	82	73	67
Average Low Temperature (°F)	43	46	52	58	66	73	75	75	71	61	50	45
Average Precipitation (Inches)	4.8	5.0	5.0	4.1	3.3	5.8	7.4	7.4	7.0	3.5	3.7	4.3

Source: Data for 1990 to 2020 from National Oceanic and Atmospheric Administration [NOAA] National Centers for Environmental Information (2023)

Related to these conditions, both Florida and nearby coastal states face significant exposure to serious natural hazards. Natural resource management impacts and broader considerations for operational readiness are summarized in Section 7.16.

2.2.2 Landforms

Tyndall AFB occupies portions of 2 physiographic subdivisions of the East Gulf Coastal Plain physiographic province: the Gulf Coastal Lowlands and Flatwoods Forest. The Gulf Coastal Lowlands are characterized by lagoons, barrier islands, coastal swamps, and marshes. Within Tyndall AFB, the coastal setting includes barrier islands, beaches, sand dunes, bayous, and tidal marshes. More interior landscape settings include well-drained, gently sloping uplands, poorly drained flatwoods, and permanent and ephemeral ponds and wetlands. The peninsula has a maximum elevation of approximately 30 feet above mean sea level, and the established airfield elevation is 18 feet above mean sea level.

2.2.3 Geology and Soils

Geology

The quaternary sediments found within the Florida Panhandle are described as undifferentiated Pleistocene–Holocene sediments comprised of fine to coarse-grained sands, silty sands, and silty clay (Scott 2001). In areas near Tyndall AFB, the uppermost deposits are moderately permeable, with varying amounts of interstitial silt and clay and occasional hardpan layers. Deeper layers consist of the Intracoastal Formation, a very sandy, microfossil-bearing, poorly consolidated limestone interlaced with silica-rich, fine-grained deposits. The soil acidity (pH) in the Florida coastal region is acidic. Although sinkholes are common in Florida, none have been historically noted at Tyndall AFB.

Soils

Soils at Tyndall AFB are formed from sandy marine sediments and are predominately sandy, acidic, and poorly drained, have low shrink-swell potential, and are relatively close to the underlying water table. According to data produced by the United States Department of Agriculture (USDA), 20 different soil types are present on Tyndall AFB (Table 2-4, Figure 4 in Tab 9). General soil type categories include Sand, Fine Sand, Loamy Sand, and Muck (Figure 5 in Tab 9).

Table 2-4. Soil series on Tyndall Air Force Base

Soil Series	Attributes	Associated Natural Habitats	Depth to Water Table
Allanton Sand	Very deep, poorly and very poorly drained; Runoff is slow; Permeability is moderate but impeded by high water table, prone to ponding; Strongly acidic.	Depressional areas and drainageways in Flatwoods	0 to 6 inches
Arents	Artificial: mixture of various soil series (from earth moving operations such as dredging and filling). Natural: very deep, somewhat poorly drained, have a very low available water capacity, variable permeability, negligible surface runoff, and are not prone to flooding or ponding.	—	8 to 36 inches

Table 2-4. Soil series on Tyndall Air Force Base

Soil Series	Attributes		Associated Natural Habitats	Depth to Water Table
Bayvi Loam	Very deep; Very poorly drained; Friable; Low available water capacity, slow runoff, rapid permeability (but internal drainage is impeded by the high-water table), very high surface runoff, and are very prone to flooding (especially during high tides)		Tidal marshes	0 to 6 inches
Centenary Sand	Very deep; well drained or somewhat excessively drained; Moderately permeable with negligible to very low runoff; Strongly acidic.		Uplands/Sandhills	—
Chipley Sand	Very deep; Somewhat poorly drained; Very rapid or rapidly permeable; Light gray, dark gray, yellowish brown/brownish yellow		Uplands/Sandhills	—
Dirego Muck	Very deep; Very poorly drained; Rapidly permeable but impeded by high water table; Flooded daily by high tides; Slightly acidic		Tidal marshes	—
Foxworth Sands	Very deep; moderately to somewhat excessively drained; Rapid to very rapidly permeable; Very strongly to slightly acidic		Uplands/Flatwoods and Sandhills	30 to 72 inches
Fripp-Corolla Complex	Fripp	Very deep; Excessively drained; Rapidly permeable; Very slow runoff; Slightly acidic	Steep dunes adjoining beaches and coastal waterways	—
	Corolla	Moderately well and somewhat poorly drained; Medium acidic through moderately alkaline; Gray, dark grayish brown, light brownish gray, very pale brown	Interdunal swales, coastal depressions, and sloughs	

Table 2-4. Soil series on Tyndall Air Force Base

Soil Series	Attributes		Associated Natural Habitats	Depth to Water Table
Hurricane Sands	Very deep; Very poorly drained; Slow permeability with rapid runoff; Moderately to very strongly acidic; Not prone to ponding or flooding, but are very susceptible to wind erosion		Uplands/Flatwoods and Sandhills	24 to 42 inches
Kureb Sands	Very deep; Excessively drained; Slow runoff with rapid permeability; slightly acidic		Upland/Sandhills	> 72 inches
Lakeland Sand	Very deep; Excessively drained; Rapidly to very rapidly permeable with slow runoff; Strongly acidic		Upland/Sandhills	>80 inches
Leon Sand	Very deep; Poorly drained; Rapidly permeable on surface, high surface runoff not prone to ponding; Susceptible to wind erosion; Strongly acidic		Uplands/Flatwoods	6 to 18 inches
Mandarin Sand	Very deep, somewhat poorly drained, have a low available water capacity, rapid permeability on the surface, very low surface runoff, are not prone to ponding or flooding, but are very susceptible to wind erosion; Very strongly acidic		Uplands/Flatwoods	18 to 42 inches
Osier Fine Sand	Very deep, poorly drained, have a low available water capacity, rapid permeability (but internal drainage is impeded by the high-water table), negligible surface runoff, are not prone to flooding, but are prone to ponding, and are very susceptible to wind erosion; Extremely acidic		Floodplains and depressions in flatwoods	0 to 6 inches
Pamlico–Dorovan Complex	Pamlico	Very poorly drained; Ponded or very slow runoff; Flooding is rare to frequent; Moderate to moderately rapid permeability in organic layers and slow to very rapid in mineral layers; Extremely acidic	Floodplains and Depressional areas	

Table 2-4. Soil series on Tyndall Air Force Base

Soil Series	Attributes		Associated Natural Habitats	Depth to Water Table
	Dorovan	Very deep: very poorly drained; moderately permeable with slow runoff and ponded water on surface in depressions; Strongly or very strongly acidic	Floodplains, Hardwood swamps, and Depressions	
Pickney Fine Sand	Very deep, very poorly drained, have a moderate available water capacity, rapid permeability on the surface (but internal drainage is impeded by the high-water table), negligible surface runoff, frequently ponded and occasionally prone to flooding, very susceptible to wind erosion; Very acidic		Floodplains and Depressions	0 to 6 inches
Pits	Excavated areas		—	—
Pottsburg Wet Sands	Very deep, poorly drained, have a low available water capacity, rapid permeability on the surface, negligible surface runoff, are not prone to ponding or flooding, and are very susceptible to wind erosion; Very strongly acidic		Upland/Flatwoods	0 to 6 inches
Resota Fine Sand	Very deep, moderately well drained, have a very low available water capacity, very rapid permeability on the surface, negligible surface runoff, are not prone to ponding or flooding, and are very susceptible to wind erosion; Very acidic		Upland/Sandhill/Scrub	42 to 60 inches
Rutledge Sand	Very deep, very poorly drained, have a low available water capacity, rapid permeability on the surface (but internal drainage is impeded by the high-water table), negligible surface runoff, are not prone to flooding but frequently pond, and are very susceptible to wind erosion; Strongly acidic		Floodplains and stream terraces	0 to 6 inches

2.2.4 Hydrology

Groundwater

The surficial aquifer at Tyndall AFB ranges in thickness from approximately 50 to 100 feet below ground surface and is not used as a potable source (Agency for Toxic Substances and Disease Registry 2011). The Floridan Aquifer is approximately 250 to 350 feet below the surface.

Surface Waters

Tyndall AFB is located entirely within the St. Andrews Bay Watershed. Approximately 40% of the installation is considered wetlands in the form of marshes, swamps, bogs, or similar habitats (Figure 6 in Tab 9). Floodplains are generally flat, lowland areas bordering inland and coastal waters that are subject to a 1% or greater chance of flooding in any given year (100-year floodplain). In inland environments, floodplains are typically the results of freshwater precipitation and/or runoff, and they generally have long durations, whereas coastal floodplains are often the results of short-duration freshwater precipitation and/or runoff, as well as intense storm surge.

Figure 7 in Tab 9 depicts storm surge areas in the watershed. Major surface water features within this watershed include the GOA, St. Andrews Bay (including West, East, and North bays), St. Joseph Bay, Deer Point Lake Reservoir, and St. Andrews Sound. This watershed contains several freshwater lakes, some of which are artificial (created via excavation or impoundment), whereas others (such as the coastal dune lakes) were developed naturally with coastal and land processes. There are no named rivers on Tyndall AFB, but several unnamed sinuous watercourses branch inland from major bayous. Other notable water bodies occurring on or in close proximity to Tyndall AFB include Felix Lake, PQM 102 Lake, Olympia Pond, Sandy Creek, Wild Goose Lagoon, and Grand Lagoon.

Many of the shorelines (bay and coastal) of Tyndall AFB are within the 100-year floodplain. As such, Tyndall AFB is vulnerable to flooding from torrential rainfall and tidal surges associated with tropical storms and hurricanes. In general, in areas north of US Highway 98 within Tyndall AFB, surface waters drain to the north. In areas south of US Highway 98 within Tyndall AFB, surface waters drain to the south. Floodplains on Tyndall AFB are depicted in Figure 8 in Tab 9.

2.3 Ecosystems and the Biotic Environment

2.3.1 Ecosystem Classification

The National Hierarchical Framework of Ecological Units is a mapping classification based on natural associations of ecological factors (Cleland et al. 1997). According to this classification system, Tyndall AFB is within the Humid Temperate Domain, Subtropical Division, and the Outer Coastal Plain Mixed Forest Province (Bailey 2016). Ecosystems in this domain are subject to seasonal fluctuations in precipitation and temperature and the length of the winter season, which results in vegetation classes such as prairie, broadleaf deciduous forest, and evergreen coniferous forests; These areas also experience high humidity, the absence of very cold winters, ample rainfall (heaviest in summer months), severe thunderstorms (frequent in summer months), the possibility of tropical hurricanes, and moderately wide-ranging temperatures (Bailey 2016).

Situated in the Florida Panhandle, Tyndall AFB is within one of the nation's leading biodiversity hotspots (areas with high species richness and rarity), with upwards of 50 imperiled species known to occur in the region, many of which depend on longleaf pine (*Pinus palustris*) forests (Stein et al. 2000). Figure 2-1 depicts these biodiversity hotspots and the rarity-weighted richness for critically imperiled and imperiled species in the United States, showing the moderate to high index values in Florida Panhandle in and around Tyndall AFB (NatureServe 2013).

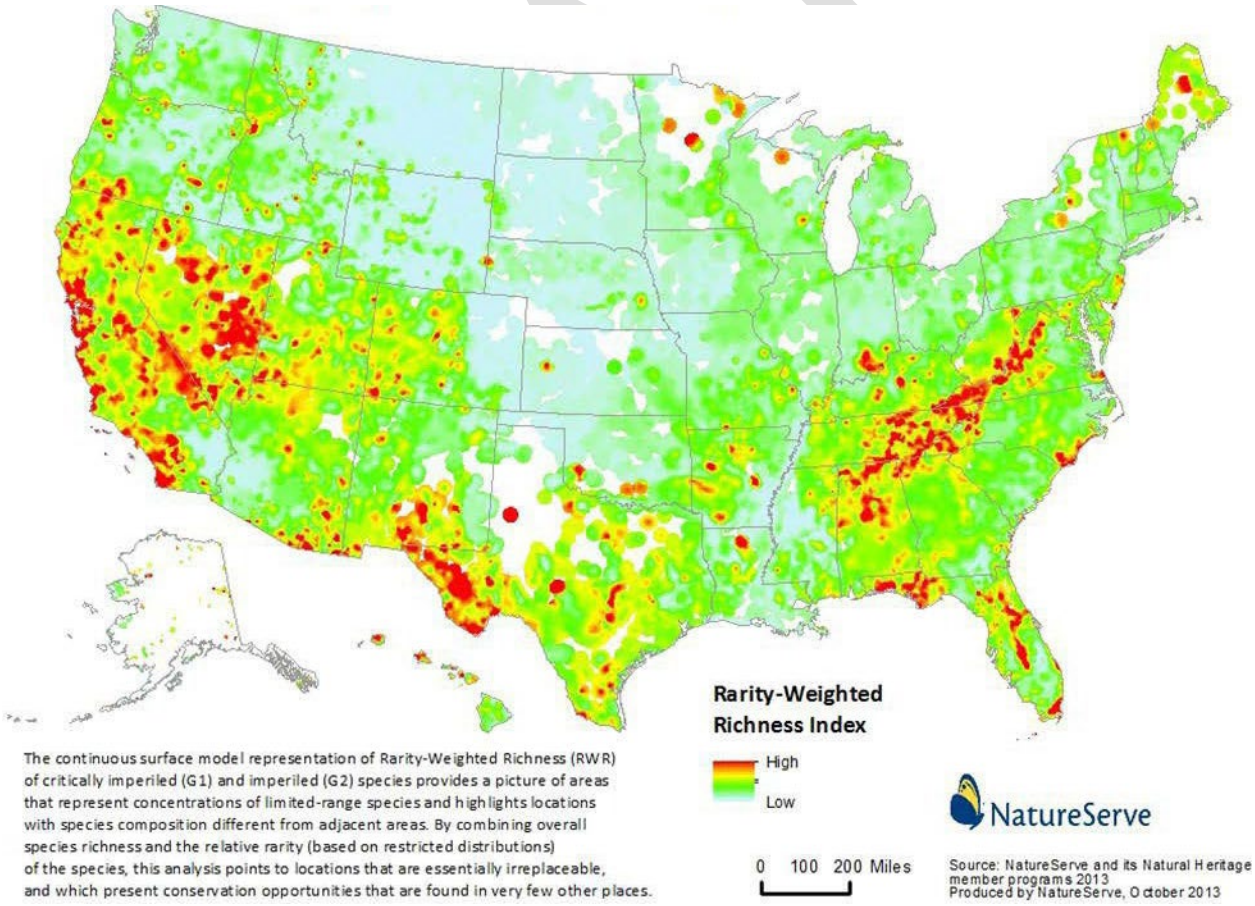

Figure 2-1. Rarity-weighted richness model of critically imperiled and imperiled species in the United States (Source: NatureServe 2013)

2.3.2 Vegetation

2.3.2.1 Historical Vegetation Cover

At the time of European settlement, Tyndall AFB had intact coastal ecosystems and upland longleaf pine ecosystems. The longleaf pine ecosystem is a fire-dependent system, characterized by an open canopy, sparse shrub midstory, and a floristically diverse herbaceous understory, and it is maintained by frequent, low-intensity fires. Prior to European settlement, the longleaf pine ecosystem was maintained by natural fires resulting from lightning strikes and fires that were intentionally set by Native Americans. During European settlement, forest resource use for include naval stores and timber harvesting increased, and by the mid-1800s, these industries were important economic drivers in the region. As such, many of the forests were burned to facilitate access to turpentine trees. The early 1900s saw the peak in the exploitation of longleaf forests, and by the 1920s, most of the virgin timber was decimated and the naval stores industries were waning (Florida Natural Areas Inventory [FNAI] 2005).

Prior to its ownership by the Air Force in the 1940s, most of Tyndall AFB was forested with longleaf pine, which was then clearcut across the installation. Reforestation of Tyndall AFB began in the early 1960s, with the focus on planting commercial slash pine (*Pinus elliottii*) and sand pine (*Pinus clausa*) plantations to generate revenue for the Tyndall AFB Forestry Program. In 2006, Tyndall AFB began the shift from commercially-based forestry (timber production) to an ecologically-based forestry program that emphasizes restoration of pre-settlement vegetation conditions and natural processes through selective thinning, natural and artificial regeneration of native species, and prescribed fire. Due to the size of the base, Tyndall AFB anticipated the transition to be gradual, taking 30 to 35 years. The shift away from commercial forestry practices promotes restoration of the structure, community composition, and function of the longleaf pine ecosystem, which is a regional conservation priority due to its importance as habitat for many T&E species.

When Hurricane Michael made landfall on Tyndall AFB, with its maximum sustained winds of 160 miles per hour, it caused catastrophic damage to Tyndall AFB and surrounding areas. In addition to significant loss and damage to base infrastructure, natural resources were severely impacted. Approximately 12,000 acres of pine forest sustained severe (5,000 acres) or catastrophic (7,000 acres) wind damage. Cleanup operations were initiated in December 2018 on 9,432 acres and were completed in March 2020. From 2020 through January 2025, a total of 7,611,977 longleaf pine seedlings were planted (including initial planting and replanting following 1-year survival checks where survival was low) as a part of reforestation effort on Tyndall AFB. In addition to longleaf pine reforestation, direct seeding of native groundcover occurred on 647 acres from 2022 through 2024. These largely successful reforestation efforts were achieved through partnerships with Eglin AFB and the Arbor Day Foundation.

2.3.2.2 Current Vegetation Cover

FNAI classified the vegetative communities on Tyndall AFB in 2022 in accordance with (IAW) the *Guide to the Natural Communities of Florida* (FNAI 2010) or as a defined altered land cover type. Surveys identified the dominant upland natural communities within Tyndall AFB as Mesic Flatwoods, Wet Flatwoods, Scrubby Flatwoods, Salt Marshes, Scrub, Baygalls (including restoration areas), and Unconsolidated Substrates (bare sand or open water including tidal creeks). The surveys indicated that many of Tyndall AFB's natural communities were in active restoration (as of 2022) as a result of damage from Hurricane Michael and subsequent salvage logging operations. Table 2-5 and Figure 9 in Tab 9 depict natural communities and altered land cover types on Tyndall AFB as documented in FNAI (2022*a*).

Table 2-5. Natural and altered community types identified within Tyndall Air Force Base (Source: FNAI 2022*a*)

Natural Community/Altered Land Type	Acreage
Abandoned Field/Abandoned Pasture	12.50
Artificial Pond	266.78
Restoration Basin Swamp	26.14
Basin Swamp	48.74
Restoration Baygall	1,168.86
Baygall	365.15
Beach Dune	736.29
Borrow Area	5.09
Canal/Ditch	22.37
Clearing	910.00
Coastal Dune Lake	52.67
Coastal Grassland	786.18
Coastal Interdunal Swale	745.33
Depression Marsh	43.75
Developed	4,277.02
Restoration Dome Swamp	115.97
Dome Swamp	11.67
Mesic Flatwoods	5,317.02
Restoration Mesic Hammock	84.86
Mesic Hammock	12.29
Road	502.24
Salt Marsh	1,818.21
Sandhill	573.39
Sandhill Upland Lake	34.35
Scrub	1,419.80
Scrubby Flatwoods	1,990.07
Restoration Shrub Bog	77.76
Shrub Bog	794.96
Spoil Area	67.61
Unconsolidated Substrate	1,164.39
Utility Corridor	73.70
Wet Flatwoods	5,091.30
Restoration Wet Prairie	876.81
Wet Prairie	5.86
Restoration Xeric Hammock	152.93
Xeric Hammock	163.60
Total	**29,815.66**

Natural Community Descriptions

To the extent possible, the dominant natural communities found on Tyndall AFB are described using the FNAI (2010) descriptions and terminology. Dominant communities on Tyndall AFB are described below.

Several T&E plants inhabit Tyndall AFB's natural communities, including the federally threatened Godfrey's butterwort (*Pinguicula ionantha*) and telephus spurge (*Euphorbia telephioides*), as well as Henry's spiderlily (*Hymenocallis henryae*), which is under review for federal listing. These species are further discussed in Section 7.4.

Mesic/Scrubby/Wet Flatwoods

Flatwoods communities are characterized by an open canopy that is typically dominated by pine trees. The lower strata varies considerably between the flatwoods variants, influenced by soils, hydrology, and fire characteristics. Mesic flatwoods are the most widespread natural community at Tyndall AFB, occupying over 5,000 acres and consisting of a remnant canopy of slash pine, along with a scattered subcanopy of slash pine, occasional longleaf pine, sand live oak (*Quercus geminata*), and cabbage palm (*Sabal palmetto*). Mid and low-story shrubs are comprised of southern bayberry (*Morella cerifera*), rusty staggerbush (*Lyonia ferruginea*), yaupon (*Ilex vomitoria*), fetterbush (*Lyonia lucida*), saw palmetto (*Serenoa repens*), and gallberry (*Ilex glabra*), in addition to other younger specimens of upper canopy species. The herbaceous ground layer is very diverse and includes wiregrass (*Aristida stricta*), bluestem (*Andropogon* spp.), bracken fern (*Pteridium aquilinum*), needlepod rush (*Juncus scirpoides*), hemlock witchgrass (*Dichanthelium portoricense*), cypress witchgrass (*Dichanthelium ensifolium* var. *ensifolium*), beaksedge (*Rhynchospora* spp.), Carolina yellow-eyed grass (*Xyris caroliniana*), sweet goldenrod (*Solidago odora*), flatsedge (*Cyperus* spp.), and many other herbaceous species. The open structure in mesic flatwoods communities is maintained by frequent, low-intensity fire, which facilitates reproduction of native species and limits encroachment by woody shrubs and hardwoods. Historic fire return intervals for mesic flatwoods communities are around 1 to 3 years, with fire occurring primarily during the growing season.

Scrubby flatwoods typically feature an open canopy of slash, sand, and longleaf pines over areas of open white sand and low shrubby understories. Other remnant canopy and subcanopy species at Tyndall AFB include sand live oak, southern magnolia (*Magnolia grandiflora*), and turkey oak (*Quercus laevis*). Shrubs are more prevalent in areas that were not heavily impacted by salvage logging and include species such as myrtle oak (*Quercus myrtifolia*), laurel oak (*Quercus hemisphaerica*), Chapman's oak (*Quercus chapmanii*), rusty staggerbush, woody goldenrod (*Chrysoma pauciflosculosa*), Florida rosemary (*Ceratiola ericoides*), saw palmetto, false rosemary (*Conradina canescens*), shiny blueberry (*Vaccinium myrsinites*), American beautyberry (*Callicarpa americana*), and yaupon. Diverse herbaceous layers within scrubby flatwoods include bracken fern, bluestem, sandyfield beaksedge (*Rhynchospora megalocarpa*), whip nutrush (*Scleria triglomerata*), witchgrass species (including cypress witchgrass), fringed nutrush (*Scleria ciliata*), October flower (*Polygonella polygama*), broomsedge bluestem (*Andropogon virginicus*), and other herbaceous species. Scrubby flatwoods communities also depend on frequent, low-intensity fires during the growing season to sustain their structure, although the fire interval is slightly higher than that in mesic flatwoods, with a typical fire return interval of around 2 to 5 years.

Wet flatwoods often occur as an ecotone community between mesic flatwoods and bogs, prairies, domes, or swamps. Wet flatwoods communities have a sparse or absent midstory, with the ground layer densely occupied by hydrophytic grasses, forbs, and low-growing shrub species. The composition of the ground layer is heavily influenced by the fire frequency, with greater shrub cover in areas with infrequent fire and higher herbaceous species cover in areas that burn more regularly. The remnant canopy layer of wet flatwoods at Tyndall AFB features slash pine (many as standing dead trees), swamp bay (*Persea palustris*), sand live oak, longleaf pine, and live oak (*Quercus virginiana*). Sub-canopy species are sand live oak, red cedar (*Juniperus virginiana*), red bay (*Persea borbonia*), cabbage palm, sweetbay (*Magnolia virginiana*), and southern magnolia. Midstory and understory layers that are not heavily impacted by salvage logging are largely regenerating, featuring notable species such as southern bayberry, gallberry, large gallberry (*Ilex*

coriacea), cabbage palm, titi (*Cyrilla racemiflora*), yaupon, red bay, sand live oak, red cedar, bog tupelo (syn., bear tupelo, *Nyssa ursina*) black titi (*Cliftonia monophylla*), fetterbush, swamp bay, sweetbay, groundsel tree (syn., salt myrtle, eastern Baccharis, *Baccharis halimifolia*), and many species of St. Johnswort (*Hypericum* spp.). The herbaceous strata is commonly the most diverse, especially in areas where salvage operations did not occur. Many species of beaksedge and witchgrass are present, in addition to sawgrass (*Cladium jamaicense*), spadeleaf (*Centella asiatica*), savannah meadowbeauty (*Rhexia alifanus*), switchgrass (*Panicum virgatum*), saltmeadow cordgrass (*Spartina patens*), needlegrass rush (syn., black needlerush, *Juncus roemerianus*), tenangle pipewort (*Eriocaulon decangulare*), Virginia chainfern (*Woodwardia virginica*), pine barren goldenrod (*Solidago fistulosa*), goldencrest (*Lophiola aurea*), and pink sundew (*Drosera capillaris*). To maintain grass-dominant understories in wet flatwoods communities, a fire return interval of 1 to 3 years is ideal, as it will maintain the structure while limiting woody shrub encroachment (FNAI 2022*a*).

Scrub

Scrub communities occur throughout Tyndall AFB on dry, sandy ridges. Evergreen shrubs are diagnostic of this community, particularly oak species (sand live oak, myrtle oak, and Chapman's oak), along with sand pine and Florida rosemary. Many scrub communities, especially those that were managed as pine plantations prior to Hurricane Michael, lack significant canopy, subcanopy, or midstory cover (FNAI 2022*a*). A canopy of pines may be present but is not dominant. Other species present in the canopy, subcanopy, and midstory are slash pine, laurel oak, turkey oak, longleaf pine, winged sumac (*Rhus copallinum*), and rusty staggerbush. A variety of regenerating species occupy the woody understory, notably, woody goldenrod, saw palmetto, false rosemary, shiny blueberry, American beautyberry, yaupon, fetterbush, pricklypear (*Opuntia* spp.), Adam's needle (*Yucca filamentosa*), scarlet calamint (*Calamintha coccinea*), and gopher apple (*Geobalanus oblongifolius*). Herbaceous cover is sparse in scrub communities. Scrub communities are not ignited as easily as many other fire-adapted communities at Tyndall AFB and subsequently have a variable but historically longer fire return interval, although fires often burn at a higher intensity throughout these communities.

Shrub Bog (including Restoration Shrub Bogs)

These communities on Tyndall AFB are situated in areas bordering swamps, rivers, flatwoods communities, and depressions. Shrub bogs have mucky soil with less than a foot of water. Upper canopies are sparse or absent, especially in active restoration areas that were heavily impacted by Hurricane Michael and logging operations. Woody midstory species present in shrub bogs are titi, black titi, sweetbay, red bay, gallberry, yaupon, fetterbush, peelbark St. Johnswort (*Hypericum fasciculatum*), and slash pine. Herbaceous species are sparse if present but may include clustered sedge (*Carex glaucescens*), tenangle pipewort, Carolina redroot (*Lachnanthes caroliana*), maidencane (*Panicum hemitomon*), and beaksedges. Shrub bogs may also be home to some of Tyndall AFB's rare plant species. Without sufficient fire in the growing season, shrub bogs may expand into adjacent flatwoods and wet prairie communities.

Baygall (including Restoration Baygalls)

Baygalls are wetland communities characterized by an evergreens forest situated in depressions, slope bottoms, and other lowland areas with wet, acidic soils. These hydrophytic communities retain freshwater runoff from upland habitats and can tolerate some saltwater intrusion. Many of the baygalls at Tyndall AFB suffered significant canopy loss from Hurricane Michael. Upper canopies of baygall communities are comprised of sweetbay, slash pine, and swamp bay. Scattered pond cypress (*Taxodium ascendens*) and swamp tupelo (*Nyssa biflora*) may also be present. The dense, shrubby mid-story contains many regenerating upper canopy species in addition to woody species such as sweetbay, titi, southern bayberry,

black titi, peelbark St. Johnswort, common buttonbush (*Cephalanthus occidentalis*), common persimmon (*Diospyros virginiana*), large gallberry, red bay, and American beautyberry. The understory of baygall communities consists of dense shrubs similar to the mid-story species, with additional herbaceous species including beaksedge, broomsedge bluestem, bushy bluestem (*Andropogon glomeratus*), wiregrass, Walter's sedge (*Carex striata*), needlepod rush, clustered sedge (*Carex glaucescens*), and woolly witchgrass (*Dichanthelium scabriusculum*). Neighboring flatwoods communities are subject to invasion of shrubby species from baygall communities in the absence of fire to control woody species encroachment.

Wet Prairie (including Restoration Wet Prairies)

Wet prairie communities at Tyndall AFB feature wet mucky soils that are permanently wet, although these areas are not always flooded. The landscape position is generally flat or gently sloping and situated between low-lying permanently flooded communities and uplands. The herbaceous layer is dominant in wet prairies, with few scattered woody species in the upper and shrub canopies. Herbaceous species commonly found include beaksedge, bluestem, wiregrass, witchgrass, yellow-eyed grass, flattened pipewort (*Eriocaulon compressum*), tenangle pipewort, pink sundew, spadeleaf, goldencrest, club-moss (*Lycopodiella* spp.), and yellow pitcherplant (*Sarracenia flava*). Wet prairies feature important habitat for many species of rare and listed plants and wildlife at Tyndall AFB. Post-hurricane salvage logging operations heavily impacted these communities, as the machinery deeply rutted and upturned the soils. When sufficiently dry, these communities can carry fires that limit woody species cover.

Hammock (Mesic/Xeric, including Restoration Hammocks)

Hammock communities are typically closed-canopy forests on slightly elevated landscapes. Soils are well-drained (especially xeric hammocks) in comparison to surrounding vegetative communities and may be considered an advanced successional stage of upland communities such as sandhill, scrub, and scrubby flatwoods (FNAI 2022*a*). These impacted communities suffered significant upper canopy loss following Hurricane Michael. Remnant oak species, including sand live oak, laurel oak, and sand live oak, are common dominants in hammock communities. Other canopy dominants may include southern magnolia, pignut hickory (*Carya glabra*), slash pine, and red cedar. Subcanopy and tall shrub layers may include younger assemblages of the upper canopy species, as well as red bay, Chapman's oak, American holly (*Ilex opaca*), southern bayberry, cabbage palm, myrtle oak, sparkleberry (*Vaccinium arboreum*), and saw palmetto. Low shrub and herbaceous layers may be sparse as a result of the dense upper layers blocking most of the light from above. Species in these layers include yaupon, southern bayberry, groundsel tree, saw palmetto, cabbage palm, longleaf woodoats (*Chasmanthium laxum* var. *sessiliflorum*), bluestem, bracken fern, variable witchgrass (*Dichanthelium commutatum*), and sandyfield beaksedge. Fires occurring in surrounding communities may naturally break around hammock communities. Mesic hammocks in particular serve as important habitat pockets for wildlife species, as they provide cover and acorn mast for forage (FNAI 2022*a*).

Unconsolidated Substrate

Unconsolidated substrate communities are mineral-derived communities such as bare sandy beaches and dunes, as well as tidal creeks. They feature an expansive, open area devoid of many plant species, although some low-density woody species such as yaupon, southern bayberry, saw palmetto, cabbage palm, and myrtle oak may be present. Where herbaceous species are present, they are often acclimated to dune environments and include species such as saltmeadow cordgrass, seaside goldenrod (*Solidago sempervirens*), bitter panicgrass (syn., bitter panicum, *Panicum amarum*), Gulf bluestem (*Schizachyrium maritimum*), Virginia wildrye (*Elymus virginicus*), and foxtails (*Setaria* spp.).

Beach Dunes

These herbaceous communities are dynamic communities that are well-adapted to natural disturbances. At Tyndall AFB, beach dunes form on barrier islands above unconsolidated beaches where grasses stabilize sand particles, resulting in the buildup of dunes. Sea oats (*Uniola paniculata*) is a dominant, well-adapted, rhizomatous species that is characteristic of beach dune communities. Other herbaceous species are Gulf bluestem, Godfrey's goldenaster (*Chrysopsis godfreyi*), narrowleaf sunflower (*Helianthus angustifolius*), bitter panicgrass, and squareflower (*Paronychia erecta*). Woody species rarely establish along beach dunes. Fires are rare, as fuel loads are sparse and unconnected. Wind and water are typical natural disturbances, and beach dune species are able to quickly recolonize following these disturbances (FNAI 2002*a*). The destructive force of Hurricane Michael illustrated the importance of beach dunes and other coastal buffer communities for the protection of inland natural habitats and infrastructure.

Coastal Grasslands

Coastal grasslands are herbaceous communities found on the barrier islands of Tyndall AFB. These transitional herbaceous communities aid in soil stabilization and can facilitate the establishment of woody species, albeit at low cover. Dominant graminoids such as sea oats, bitter panicgrass, and saltmeadow cordgrass are somewhat tolerant to saltwater intrusion. Other herbaceous species present include Gulf bluestem, Gulf cordgrass (*Spartina spartinae*), needlegrass rush, hairawn muhly (*Muhlenbergia capillaris*), marsh fimbry (*Fimbristylis spadicea*), wand goldenrod (*Solidago stricta*), squareflower, Godfrey's goldenaster, sawgrass, Le Conte's flatsedge (*Cyperus lecontei*), saltgrass (*Distichlis spicata*), Carolina fimbry (*Fimbristylis caroliniana*), Carolina sea lavender (*Limonium carolinianum*), switchgrass, saltmarsh cordgrass (*Spartina alterniflora*), needlepod rush, torpedo grass (*Panicum repens*), seashore dropseed (*Sporobolus virginicus*), and perennial saltmarsh aster (*Symphyotrichum tenuifolium*). Coastal grasslands are important communities because they protect inland habitats from storm surge. Natural fires are rare within coastal grasslands.

Coastal Interdunal Swale

These communities are characterized as marshes, grasslands, damp flats, or dense shrublands that form on barrier islands between dune ridges. Coastal interdunal swales may be flooded following storm events and can be inundated with saltwater. Sand deposition from wind favors species, such as saltmeadow cordgrass, that are well adapted to disturbance events. Trees and shrubs are sparse and subject to saltwater, which can result in die-off of established species. The diverse herbaceous layer at Tyndall AFB includes needlepod rush, spadeleaf, saltmeadow cordgrass, blue maidencane (syn., Muhlenberg maidencane, *Amphicarpum muehlenbergianum*), yellow-eyed grass, pink sundew, southern umbrellasedge (*Fuirena scirpoidea*), fascicled beaksedge (*Rhynchospora fascicularis*), sawgrass, needlegrass rush, bottlebrush threeawn (*Aristida spiciformis*), lovegrass (*Eragrostis* spp.), primrosewillow (*Ludwigia* spp.), smartweed (*Persicaria* spp.), Gulf bluestem, largeleaf marshpennywort (*Hydrocotyle bonariensis*), camphorweed (*Pluchea* spp.), turkey tangle fogfruit (*Phyla nodiflora*), combleaf mermaidweed (*Proserpinaca pectinata*), bulltongue arrowhead (*Sagittaria lancifolia*), woolgrass (*Scirpus cyperinus*), yellow hatpins (*Syngonanthus flavidulus*), southern cattail (*Typha domingensis*), and broadleaf cattail (*Typha latifolia*). Similarly to other barrier island vegetative communities at Tyndall AFB, coastal interdunal swales provide an important natural buffer against extreme storm events.

Coastal Dune Lake

Coastal Dune Lakes are depressions within coastal communities that feature permanent water bodies. They occur as part of the large dynamic coastal systems at Tyndall AFB and typically have no outflow, except

when impacted by coastal-altering storms or from groundwater seepage (FNAI 2002*a*). Little to no vegetation exists within these communities.

Salt Marsh

Salt marsh communities are herbaceous systems in areas that are influenced by tides and seawater but protected from large waves. Tyndall AFB's salt marsh communities may form a barrier between the gulf and upland areas on the bay portion of the base. Herbaceous vegetation dominates these communities, and notable salt-tolerant species include needlegrass rush, sawgrass, and saltmeadow cordgrass. Additional herbaceous species present in salt marshes are bluestem, saltgrass, marsh fimbry, Carolina sea lavender (*Limonium carolinianum*), wand goldenrod, wand loosestrife (*Lythrum lineare*), perennial glasswort (*Salicornia ambigua*), panicgrass (*Panicum* spp.), beaksedge, flattop goldenrod (*Euthamia graminifolia*), switchgrass, saltmarsh cordgrass, and broadleaf cattail (*Typha latifolia*). Woody species may be scattered throughout salt marshes but are not dominant. Such woody species rarely exceed 6 feet in height and may include yaupon, groundsel tree, southern bayberry, and slash pine (FNAI 2022*a*).

Depression Marsh

These communities are depression wetlands located within a larger area of upland, fire-adapted communities. Vegetation in depression marshes forms in rings dependent upon water depth and fire occurrence. Herbaceous species dominate, and there is typically little to no canopy and few shrubs. Many of these communities were heavily impacted by Hurricane Michael and salvage logging operations. At Tyndall AFB, big floatingheart (*Nymphoides aquatica*) grows in the deepest portions of depression marshes. Titi shrubs form thickets at the edges, and scattered pond cypress and myrtle-leaved holly may occur. Fires occurring through adjacent communities may burn through depression marshes, and growing-season fires, in particular, are more likely to reach the deep centers of these areas and control peat accumulation and woody species.

Basin Swamp (including Restoration Basin Swamps)

These lowland depressional communities at Tyndall AFB are often situated within mesic flatwoods or mesic hammock communities. Soils within basin swamps may be inundated for considerable periods of time, and vegetation is hydrophytic. Typical upper canopy trees are pond cypress and swamp tupelo. Many basin swamps were heavily impacted by the hurricane and will take a considerable number of years for the upper canopy to return to a natural, closed canopy. Where frequent fire has been present, a moderate to dense cover of herbaceous species is present as an ecotone perimeter around basin swamps. Areas of infrequent fire may feature more woody shrubs such as sweetbay, bayberry, and low-stature swamp tupelo. Basin swamps situated within fire-adapted communities (such as mesic flatwoods) will burn more regularly than those amongst less fire-adapted communities.

Dome Swamp (including Restoration Dome Swamps)

Dome swamps feature forested canopies of pond cypress in depression amongst large flatwoods communities. Many of these swamps at Tyndall AFB are in active restoration following Hurricane Michael, and the upper canopy will take many years to recover to a natural state. Slash pine, sweetbay, and swamp bay may be present along the drier edges of the canopy. These swamps often lack shrub strata due to growing-season fires carrying through the surrounding area. Where present, shrubs and subcanopy species may include swamp tupelo, myrtle-leaved holly (*Ilex cassine* var. *myrtifolia*), sweetbay, southern bayberry, large gallberry, saltwater falsewillow (*Baccharis angustifolia*), sawtooth blackberry (*Rubus pensilvanicus*), groundsel tree, sweet pepperbush (*Clethra alnifolia*), black titi, titi, and water toothleaf (*Stillingia*

aquatica). Epiphytes such as woolly witchgrass, narrowfruit horned beaksedge (*Rhynchospora inundata*), clustered sedge (*Carex glaucescens*), flattened pipewort (*Eriocaulon compressum*), maidencane, and common arrowhead (*Sagittaria latifolia*) may occupy the shallower edged of dome swamps. Growing-season fires (with a typical 3- to 5-year interval) will help maintain dome swamps and limit encroachment of woody species at Tyndall AFB.

Sandhill

Sandhill communities characteristically have widely spaced longleaf pine trees and a sparse midstory of deciduous oaks such as turkey oak. Groundcover in these communities consists of a moderate to dense assemblage of herbaceous species and low shrubs. Wiregrass is an indicator species within sandhill communities. These communities form on deep sand substrates within rolling topography. Many of the sandhill communities on Tyndall AFB are actively being restored following the hurricane damage and salvage logging operations that followed, and they currently have little canopy cover (FNAI 2022*a*). Groundcover species are regenerating, although the soil is deeply rutted and disturbed in many areas. Remnant canopy species include many standing dead slash pine trees and scattered longleaf pine and sand live oak. Species still occupying the midstory include many species of oak, saw palmetto, sand pine (*Pinus clausa*), woody goldenrod, Florida rosemary, false rosemary, yaupon, pricklypear (*Opuntia humifusa*), gallberry, and longleaf pine. Wiregrass can still be found, in addition to species of bluestem and witchgrass. Other herbaceous associates are sandyfield beaksedge, narrowleaf silkgrass (*Pityopsis graminifolia*), goldenaster (*Chrysopsis* spp.), oneflower honeycomb-head (*Balduina uniflora*), whip nutrush, bracken fern, and flatsedges. Fire is an important driver of composition in these communities, with frequent low-intensity ground fires reducing hardwoods and woody shrubs and favoring fire-adapted pines and grasses. Gopher tortoises (*Gopherus polyphemus*) are keystone species within sandhills, as their burrows support a host of other wildlife species (known as commensal species).

Sandhill Upland Lake

Depressions within upland communities featuring permanent water bodies are classified as sandhill upland lakes at Tyndall AFB. These lakes may exhibit fluctuating water levels and are formed on sandy soils that have organic deposits. Few vegetative species are present, but beaksedges, cattails (*Typha* sp.), sawgrass, starrush white-top (*Rhynchospora colorata*), and bulltongue arrowhead may be present along lake perimeters and may burn along with surrounding communities.

Clearing

Tyndall AFB's clearings are semi-altered areas where the natural character of the community has been impacted by maintenance activities such as mowing, grounds maintenance, or heavy salvage logging operations. Over 900 acres of Tyndall AFB are classified as clearing communities and often lie adjacent to airfields and other areas of ongoing, active maintenance.

2.3.2.3 Future Vegetation Cover

Within forested systems, there is a temperature below which the equilibrium state of the forest appears constant, but above which the equilibrium forest cover declines steadily. This threshold represents a point where some degree of forest loss is inevitable. As the threshold is exceeded, there is a gradual increase in the committed dieback, with changes that are more progressive than sudden. Forest vegetation at Tyndall AFB may experience some degree of dieback before impacts are observed due to changes in regional conditions in the last few decades.

The wetland and riparian areas of Tyndall AFB represent important and vulnerable ecosystems that are essential in linking aquatic and terrestrial ecosystems and creating thermal refugia for wildlife. These wetland characteristics contribute to their ecological adaptation to extreme weather. However, wetlands are expected to continue facing the recent trends of higher-than-average air and surface water temperatures, alterations in the magnitude and seasonality of precipitation and runoff, and shifts in the reproductive phenology and distribution of plants and animals. Each of these changes may ultimately reduce wetland cover on the installation.

Saltwater marshes and swamps also serve many crucial functions including water filtration; prevention of coastal erosion; coastal protection from storms; carbon storage, food, and livelihood provision; and biodiversity protection. These valuable ecosystems are vulnerable to degradation by land use change, exploitation, coastal development, and changes in regional weather conditions. Ongoing trends, including increased flooding, changing ocean currents, increased storm events, increased temperature, and changes in precipitation, may further degrade these coastal ecosystems and the services they provide.

The condition of vegetation around the installation is also important for maintaining services such as erosion control. The composition, distribution, richness, and abundance of species and the products and services that they provide are responsive to variables such as temperature and precipitation and disturbances such as fire.

2.3.2.4 Turf and Landscaped Areas

As a component of the Master Plan and Installation Facilities Standards, Tyndall AFB developed a Landscape Master Plan (Tyndall AFB 2020*c*). Its objectives are to provide design guidance to the rebuild efforts to the Architects and Engineering packages, ensure a consistent application of landscape solutions, define the approved planting pallet, revegetate to mitigate hurricane damage, define the performance standards for landscape communities, integrate with the INRMP strategies, and provide nature-based infrastructure solutions. The maintenance strategies distinguish between managed, maintained, and manicured land areas and provide the design intent for each of those maintenance zones. It provides clear guidance, restrictions, and approved planting strategies for the geographic districts at the base such as the Flightline District, Support District, and other functional areas. The plan's goal is to migrate historically mowed and highly maintained areas into more native, naturalistic vegetated land areas that are more resilient and sustainable and provide multiple benefits as green infrastructure.

The use of native plants also aids in meeting DAFMAN 32-7003, Section 3.58, recommendations to use regionally native plants in landscape designs. The University of Florida Institute of Food and Agricultural Sciences Extension (2022) has developed a guide for selecting native, water-efficient plants for landscaping.

Turf and landscaped areas on Tyndall AFB occur in improved and semi-improved areas of the installation, such as around office and residential buildings and on the airfield (Section 2.4.2). Maintaining the airfield grass height and surrounding landscape features IAW specifications in Tyndall AFB's BASH Plan (Tab 5) is an important mission requirement. DAFI 91-212 (relating to BASH Programs on DAF properties) provides guidelines for landscaped areas around airfields, stating that vegetation "must be maintained at a height between 7 to 14 inches and converted to a locally adapted vegetation species deemed unattractive to birds and other wildlife."

2.3.3 Fish and Wildlife

Tyndall AFB supports a large diversity of game and non-game fish and wildlife (Table 2-6), including many rare and sensitive species. As much of Tyndall AFB is undeveloped, these natural habitats contain wildlife that are native to the Florida Panhandle. Common game species found on the installation include white-tailed deer (*Odocoileus virginianus*) and mourning dove (*Zenaida macroura*). Wild turkey (*Meleagris gallopavo*) is also a game species found on the installation, but the species has experienced recent significant population declines and is not currently hunted at Tyndall AFB.

A variety of freshwater ecosystems common to the coastal plain region are found on Tyndall AFB and provide habitat to many aquatic wildlife species, including the American alligator (*Alligator mississippiensis*), alligator snapping turtle (*Macrochelys temminckii*), box turtle species (*Terrapene* spp.), and the Florida softshell turtle (*Apalone ferox*). The geographic location of Tyndall AFB supports warm-water (70 °F or higher), freshwater fisheries, including largemouth bass (*Micropterus salmoides*), channel catfish (*Ictalurus punctatus*), bluegill (*Lepomis macrochirus*), and other *Lepomis* species. Additionally, freshwater habitats provide refuge for many avian species, including the great blue heron (*Ardea Herodias*), great egret (*Ardea alba*), snowy egret (*Egretta thula*), and wood duck (*Aix sponsa*). Uplands provide habitat for many species that are commonly found in pine ecosystems, including the gopher tortoise, brown-headed nuthatch (*Sitta pusilla*), and downy woodpecker (*Picoides pubescens*). Gopher tortoises are a keystone species found in well-drained, sandy soils. Their burrows are used by a variety of species, including the state-threatened Florida pine snake (*Pituophis melanoleucus mugitus*).

The mixed seagrass beds, sand flats, and muddy bottom habitats in the waters surrounding Tyndall AFB (St. Andrews Sound and St. Andrews Bay) are significant areas for young sharks, diamondback terrapins (*Malaclemys terrapin*), and T&E sea turtles. Surveys in these waters have identified Atlantic sharpnose (*Rhizoprionodon terraenovae*) and bonnethead (*Sphyrna tiburo*) sharks as the dominant species (Bethea et al. 2014). Additional species included blacktip (*Carcharhinus limbatus*), scalloped hammerhead (*Sphyrna lewini*), spinner (*Carcharhinus brevipinna*), blacknose (*Carcharhinus acrontous*), and finetooth sharks (*Carcharhinus isodon*). Florida smoothhound (*Mustelus norrisi*), bull (*Carcharhinus leucas*), great hammerhead (*Sphyrna mokarran*), and sandbar (*Carcharhinus plumbeus*) sharks were found only in small numbers. T&E species are discussed in Sections 2.3.4 and 7.4.

Table 2-6. Representative fish, wildlife, and invertebrate species found or potentially found on Tyndall Air Force Base

Common Name	Scientific Name
American alligator	*Alligator mississippiensis*
Alligator snapping turtle	*Macrochelys temminckii*
Belted kingfisher	*Megaceryle alcyon*
Black racer	*Coluber constrictor*
Blue crab	*Callinectes sapidus*
Box turtle (multiple species)	*Terrapene* spp.
Brown-headed nuthatch	*Sitta pusilla*

Table 2-6. Representative fish, wildlife, and invertebrate species found or potentially found on Tyndall Air Force Base

Common Name	Scientific Name
Carolina wren	*Thryothorus ludovicianus*
Cotton deermouse	*Peromyscus gossypinus*
Cotton mouth snake	*Agkistrodon piscivorus*
Downy woodpecker	*Picoides pubescens*
Eastern diamondback rattlesnake	*Crotalus adamanteus*
Eastern mole	*Scalopus aquaticus*
Florida softshell turtle	*Apalone ferox*
Five-lined skink	*Plestiodon fasciatus*
Flycatchers	*Tyrannidae* spp.
Ghost crab	*Ocypode quadrata*
Gray fox	*Urocyon cinereoargenteus*
Garter snake	*Thamnophis sirtalis*
Gopher tortoise	*Gopherus polyphemus*
Great blue heron	*Ardea herodias*
Great egret	*Ardea alba*
Great horned owl	*Bubo virginianus*
Green anole	*Anolis carolinensis*
Hispid cotton rat	*Sigmodon hispidus*
House sparrow	*Passer domesticus*
Largemouth bass	*Micropterus salmoides*
Least shrew	*Cryptodus parva*
Little blue heron	*Egretta caerulea*
Long-nosed killifish	*Fundulus similis*
Nine-banded armadillo	*Dasypus novemcinctus*
Northern bobwhite	*Colinus virginianus*
Northern cardinal	*Cardinalis cardinalis*
Northern mockingbird	*Mimus polyglottos*

Table 2-6. Representative fish, wildlife, and invertebrate species found or potentially found on Tyndall Air Force Base

Common Name	Scientific Name
Opossum	*Didelphis virginiana*
Osprey	*Pandion haliaetus*
Ornate diamondback terrapin	*Malaclemys terrapin macrospilota*
Eastern oyster	*Crassostrea virginica*
Marsh periwinkles	*Littorina irrorata*
Red-bellied woodpecker	*Melanerpes carolinus*
Red-headed woodpecker	*Melanerpes erythrocepahlus*
Red-shouldered hawk	*Buteo lineatus*
Red-tailed hawk	*Buteo jamaicensis*
Red-winged blackbird	*Agelaius phoenceus*
Salt marsh rabbit*	*Sylvilagus aquaticus*
Sheepshead minnow	*Cyprinodon variegatus*
Six-lined racerunner	*Cnemidophorus sexlineatus*
Slender glass lizard	*Ophisaurus attenuatus*
Snowy egret	*Egretta thula*
Tricolor heron	*Egretta tricolor*
Tufted titmouse	*Parus bicolor*
Turkey vulture	*Cathartes aura*
White-tailed deer	*Odocoileus virginianus*
Wild turkey	*Meleagris gallopavo*
Wood duck	*Aix sponsa*

Note: This is a reference summary and not a comprehensive species occurrence list

* Potentially occurs at Tyndall AFB but has not been documented.

2.3.4 Threatened and Endangered Species and Species of Concern

The variety of natural communities, ranging from coastal systems to upland forests, on Tyndall AFB and its surrounding areas support many T&E species and species of concern. In this INRMP, T&E species are defined as those that are protected under federal or state laws or policies. Species of concern are defined as

those that warrant conservation action and are recognized by federal or state conservation lists. Federal and state laws, policies, and conservation lists are described below.

Endangered Species Act and Related Lists

The Endangered Species Act (ESA) is the primary legal driver for the protection and management of federally listed species. The ESA is intended to conserve the ecosystems upon which T&E species depend and to provide a program for the conservation of these species. Section 7 of the ESA outlines the obligations of federal agencies pertaining to the ESA, including the duties to conserve and refrain from jeopardizing species and their habitats. In preparation of a Biological Assessment, Section 7 requires agencies to determine if listed species are present within or in close proximity to an action area and if the action may potentially affect the listed species. Section 7(a)(2) of the ESA requires that each federal agency consult with the USFWS and/or NOAA Fisheries (a.k.a., National Marine Fisheries Service [NMFS]) on proposed actions that may affect federally listed terrestrial or marine species, respectively.

The ESA also protects "critical habitats", which are areas that "contain the physical or biological features that are essential to the conservation of endangered and threatened species and that may need special management or protection" (USFWS 2017). Critical habitats carry similar protections to endangered species and require federal agencies to consult with the USFWS and/or NOAA Fisheries on proposed actions that may affect those habitats.

To further stress and clarify the importance of conserving T&E species, the DoD, along with the Departments of Commerce, Interior, and Transportation; USDA; and the US Environmental Protection Agency (US EPA), signed a Memorandum of Understanding in 1994, agreeing to use their authority "to further the purposes of the ESA by carrying out programs for the conservation of federally listed species, including implementing appropriate recovery actions that are identified in recovery plans."

Candidate and National Listing Workplan Species

Candidate and USFWS National Listing Workplan (NLW) species are also considered within this INRMP to enable proactive management efforts for species with no formal protections. Candidate species are species that have sufficient information to be listed as T&E species under the ESA but whose listing is precluded by higher-priority actions. The NLW is a prioritization tool that the USFWS uses to plan listing determination evaluations for candidate or petitioned species. Species within the NLW are those with forthcoming listing decisions; if listed, these species could significantly impact mission operations. Species on the NLW are not protected or considered candidate species, but they are being reviewed for listing.

Information for Planning and Consultation Official Species List

Per Section 7 of the ESA, federal agencies are required to "request of the Secretary of Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action." If a federal project at Tyndall AFB requires USFWS review under the ESA, the Information for Planning and Consultation (IPaC) is the official mechanism that provides an official species list. The official species list can be requested as part of the ESA Review process and launched from the Project Home page or the Regulatory Review page (USFWS 2024*b*).

An official species list is an official letter from the local USFWS office that contains information to assist an agency in evaluating the potential impacts of their project(s). It includes a list of species and critical habitat that should be considered under ESA Section 7, as well as a project tracking number and other pertinent information from the local field office (USFWS 2024*b*).

Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) is a legal driver for the protection of marine mammals, and permits are required for operations that may affect these species. The MMPA prohibits take of marine mammals without an approved take permit. Incidental take is authorized for certain military readiness activities, scientific research, habitat enhancement, and other similar actions. The MMPA requires consultation with NOAA Fisheries, similarly to ESA consultations. When a federal action is likely to negatively impact a species protected under the MMPA, the federal agency is required to submit a Biological Assessment and a request for formal consultation from NOAA Fisheries. Formal consultation may result in a Biological Opinion with an incidental take permit that contains non-discretionary terms and conditions. Informal consultation may also be performed for actions that may affect but are not likely to adversely affect a marine mammal. An informal consultation request should include a description of the proposed federal action, list potential impacts to protected species, and explore methods to minimize potential impacts.

Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act)

The Magnuson-Stevens Act establishes guidance for the conservation and management of marine fisheries in US federal waters (NOAA Fisheries 2025*a*). The act requires federal agencies to promote the protection of Essential Fish Habitat (EFH) when conducting federal actions. Consultation with NOAA Fisheries "is required whenever a federal agency, including the military, works in an area that will affect EFH" (NOAA Fisheries 2025*b*). The EFH consultation process is further discussed in Section 7.4.

Florida Legal Requirements to Manage and Conserve T&E Species

State status categories include threatened and species of special concern (SSC). Florida state-threatened species are "any species, subspecies, or isolated population of fish or wildlife (including invertebrates) that is native to Florida and meets the criteria described in Rule 68A-27.0001(3), Florida Administrative Code (FAC) and is afforded the protections described in Chapter 68A-27.00, FAC" (FWC 2016). An SSC is defined as "a temporary category of protection for species determined to be data deficient during the Biological Status Review, and afforded the protection described in Rule 68A-27.005, FAC." That FAC declares that "no person shall take, possess, transport, or sell any species of special concern included in this subsection or parts thereof or their nests or eggs except as authorized by permit from the executive director, permits being issued upon reasonable conclusion that the permitted activity will not be detrimental to the survival potential of the species." For purposes of this section, the definition of "take" in Rule 68A-1.004, FAC, applies.

State-listed animal species are statutorily designated via FAC Rules 68-A27.003, 68-A27.004, and 68-A-27.005, and they are maintained by FWC as threatened or SSC. State-listed plant species are statutorily designated via the Preservation of Native Flora of Florida Act (s.581.185-187, Florida Statutes) and maintained by Florida Department of Agriculture and Consumer Services (FDACS) as endangered, threatened, or SSC.

The FWC's authority to regulate and manage most wildlife comes from the Florida Constitution. All federally listed species that occur in Florida are included on Florida's list as federally designated T&E species. Additionally, FWC has a state listing process to identify species that are not federally listed but at risk of extinction. These species are state T&E species.

State-listed plants, which are designated endangered, threatened, or commercially exploited, are administered and maintained by the FDACS. Per Chapter 5B-40, FAC, the FDACS maintains a list of regulated plants in Florida, including those that are federally listed.

Florida Black Bear Conservation Rule

The Florida Black Bear Conservation Rule (FAC 68A-4.009) prohibits take of the Florida black bear (*Ursus americanus floridanus*), except when authorized by FWC for specific reasons, including property damage, scientific or conservation purposes, human–bear conflict reduction and mitigation, or when an individual reasonably believes there is imminent threat to their life, the life of a pet, or to a dwelling, as per Florida Statute 379.40411. The FWC is required to assist landowners in minimizing both human–bear conflicts and adverse impacts to black bear conservation. Assistance provided by FWC is based on the Florida Black Bear Management Plan.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) prohibits the killing, capturing, selling, trading, and transporting of migratory bird species or any part, nest, or egg thereof, and federal activities must strive to minimize such take. Species considered migratory are listed under Title 50, Part 10.13, in the act. Prior authorization to take a migratory bird species may be obtained by the USFWS if a special need exists or certain criteria are met (16 USC §703–712).

The USFWS published a final ruling on 4 October 2021, stating that the implementation of the MBTA prohibits incidental take. However, the DAF is partially exempted from this prohibition. A Memorandum of Understanding between the DoD and the USFWS to promote the conservation of migratory birds was approved in 2005, which states that "readiness activities" by the Armed Forces are exempt from the incidental taking of migratory birds. Other activities by the military mission are not exempt and must follow the regulations of the MBTA.

EO 13186 also provides guidelines and responsibilities for federal agencies to protect migratory bird species.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA) prohibits capturing, trapping, molesting, disturbing, obtaining, selling, hunting, or transporting bald eagles (*Haliaeetus leucocephalus*), golden eagles (*Aquila chrysaetos*), or their nests, feathers, or eggs (16 USC § 668-668c). The installation's missions, training activity, and development cannot negatively impact or take these species without the proper permits. The USFWS published a final rule on incidental take permits in the Federal Register on February 2024 (89 FR 9920).

Pollinators

Compliance with existing laws, regulations, and policies related to pollinators is essential for sustaining the DAF mission. The pollinators with the highest level of protection are those listed under the ESA, MBTA, and/or state laws; however, all pollinators are afforded consideration under Presidential Memorandum 14946, *Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators*.

2.3.4.1 Species Present at Tyndall AFB

The numbers of T&E species and species of concern that occur on Tyndall AFB, by conservation category, are provided in Table 2-7. T&E species and species of concern associated with Tyndall AFB are listed in

Table 2-8. Locations of known federal or state protected species on Tyndall AFB are shown in Figure 10 in Tab 9. Piping plover and red knot data are not included within the map, but Figure 12 in Tab 9 contains piping plover critical habitat area. Piping plover critical habitat in Figure 12 of Tab 9 serves as a general proxy for red knot range on base, since the red knot has similar habitat requirements as the piping plover and is present during similar times.

Survey, monitoring, and/or management programs are in place for most of the federally protected species occurring on Tyndall AFB (Section 7.4), as well as for some species on the NLW (candidate and petitioned species), migratory birds, and some state-listed species. Management is discussed in Section 7.4. With the exception of the American alligator, all federally listed species known to occur on Tyndall AFB have federal recovery plans in place (USFWS 2024*b*). In addition to these species, there are 21 federally protected marine mammal species/species groups with potential occurrence within the Eglin Gulf Test and Training Range areas utilized by Tyndall AFB (Eglin AFB 2015).

Table 2-7. Conservation categories of threatened and endangered (T&E) species and species of concern at Tyndall Air Force Base

Conservation Category	Plants	Animals	Invertebrates
Federally-listed T&E species (including Gulf species)	3	12	—
Federal proposed T&E species	—	2	1
Federal candidate species	—	—	—
Other species on the National Listing Workplan	4	2	2
State-listed T&E species (Florida Fish and Wildlife Conservation Commission, Florida Department of Agriculture and Consumer Services)	27	26	—
Species protected by other regulatory mechanisms (Marine Mammal Protection Act, Bald and Golden Eagle Protection Act, Florida Black Bear Conservation Rule)	—	54	—
Total	**34**	**96**	**3**

Table 2-8. Protected species associated with Tyndall Air Force Base

Common Name	Scientific Name	Federal Status	State Status
Plants			
Apalachicola aster	*Eurybia spinulosa*	—	E
Apalachicola small spreading pogonia	*Cleistesiopsis bifaria*	—	E
Blackbract pipewort*	*Eriocaulon nigrobracteatum*	UR	E
Chapman's butterwort	*Pinguicula planifolia*	—	T
Chapman's crownbeard	*Verbesina chapmanii*	—	T
Giant water-dropwort	*Tiedemannia filiformis* ssp. *greenmanii*	—	E
Godfrey's butterwort	*Pinguicula ionantha*	T	E
Godfrey's false dragonhead	*Physostegia godfreyi*	—	T
Godfrey's goldenaster	*Chrysopsis godfreyi*	—	E
Gulf coast lupine	*Lupinus westianus*	—	T
Harper's yellow-eyed grass	*Xyris scabrifolia*	—	T
Henry's spiderlily	*Hymenocallis henryae*	UR	E
Kral's yelloweyed grass (Karst pond xyris)	*Xyris longisepala*	UR	E
Large-leaved jointweed	*Polygonella macrophylla*	—	T
Nightflowering wild petunia	*Ruellia noctiflora*	—	E
Parrot pitcherplant	*Sarracenia psittacina*	—	T
Pine lily	*Lilium catesbaei*	—	T
Pinewoods aster	*Eurybia spinulosa*	—	E
Pinewoods bluestem	*Andropogon arctatus*	—	T
Quillwort yellow-eyed grass	*Xyris isoetifolia*	—	E
Rose pogonia	*Pogonia ophioglossoides*	—	T
Small spreading pogonia	*Cleistes bifaria*	—	E
Smooth-barked St. Johnswort*	*Hypericum lissophloeus*	UR	E
Snakemouth orchid	*Pogonia ophioglossoides*	—	T
Southern milkweed	*Asclepias viridula*	—	T
Spoonleaf sundew	*Drosera intermedia*	—	T

Table 2-8. Protected species associated with Tyndall Air Force Base

Common Name	Scientific Name	Federal Status	State Status
Telephus spurge	*Euphorbia telephioides*	T	E
Thick-leaved water-willow	*Justicia crassifolia*	—	E
Threadleaf sundew	*Drosera filiformis*	—	E
Wiregrass gentian	*Gentiana pennelliana*	—	E
Yellow butterwort	*Pinguicula lutea*	—	T
Birds			
American oystercatcher	*Haematopus palliatus*	—	T
Bald eagle	*Haliaeetus leucocephalus*	BGEPA	—
Black rail (eastern ssp.)	*Laterallus jamaicensis* ssp. *jamaicensis*	T	—
Black skimmer	*Rynchops niger*	—	T
Least tern	*Sternula antillarum*	—	T
Little blue heron	*Egretta caerulea*	—	T
Marian's marsh wren	*Cistothorus palustris marianae*	—	T
Piping plover	*Charadrius melodus*	T	FT
Reddish egret	*Egretta rufescens*	—	T
Rufa red knot	*Calidris canutus rufa*	T/CH	FT
Snowy plover	*Charadrius nivosus*	—	T
Southeastern American kestrel	*Falco sparverius paulus*	—	T
Tricolor heron	*Egretta tricolor*	—	T
Reptiles			
Alligator snapping turtle	*Macrochelys temminckii*	PT	—
American alligator	*Alligator mississippiensis*	T (S/A)	T (S/A)
Eastern diamondback rattlesnake	*Crotalus adamanteus*	UR	—
Florida pine snake*	*Pituophis melanoleucus mugitus*	—	T
Gopher tortoise	*Gopherus polyphemus*	—	T
Green sea turtle	*Chelonia mydas*	T	FT
Kemp's ridley sea turtle	*Lepidochelys kempii*	E	FE
Leatherback sea turtle	*Dermochelys coriacea*	E	FE

Table 2-8. Protected species associated with Tyndall Air Force Base

Common Name	Scientific Name	Federal Status	State Status
Loggerhead sea turtle	*Caretta caretta*	T	FT
Land Mammals			
Choctawhatchee beach mouse	*Peromyscus polionotus allophrys*	E/CH	FE
Florida black bear	*Ursus americanus floridanus*	—	FBBCR
St. Andrew beach mouse	*Peromyscus polionotus peninsularis*	E/CH	FE
Marine Mammals			
Atlantic spotted dolphin	*Stenella frontalis*	MMPA	—
Beaked whales	*Mesoplodon* spp.	MMPA	—
Bottlenose dolphin	*Tursiops truncatus*	MMPA	—
Bryde's whale	*Balaenoptera edeni*	MMPA	—
Clymene dolphin	*Stenella clymene*	MMPA	—
Dwarf/pygmy sperm whale	*Kogia* spp.	MMPA	—
False killer whale	*Pseudorca crassidens*	MMPA	—
Florida manatee	*Trichechus manatus latirostris*	T	FT
Fraser's dolphin	*Lagenodelphis hosei*	MMPA	—
Killer whale	*Orcinus orca*	MMPA	—
Melon-headed whale	*Peponocephala electra*	MMPA	—
Pantropical spotted dolphin	*Stenella attenuata*	MMPA	—
Pygmy killer whale	*Feresa attenuate*	MMPA	—
Risso's dolphin	*Grampus griseus*	MMPA	—
Rough-toothed dolphin	*Steno bredanensis*	MMPA	—
Short-finned pilot whale	*Globicephalus* spp.	MMPA	—
Sperm whale	*Physeter macrocephalus*	E/MMPA	FE
Spinner dolphin	*Stenella longirostris*	MMPA	—
Striped dolphin	*Stenella coeruleoalba*	MMPA	—
Fish			
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	T/CH	FT
Smalltooth sawfish	*Pristis pectinate*	E	FE
Invertebrates			

Table 2-8. Protected species associated with Tyndall Air Force Base

Common Name	Scientific Name	Federal Status	State Status
Coastal flatwoods crayfish	*Procambarus apalachicolae*	UR	—
Monarch butterfly	*Danaus plexippus*	P	—

Definitions: BGEPA= Bald and Golden Eagle Protection Act; C= Candidate species; CH= Critical Habitat has been designated; E=Endangered; FBBCR=Florida Black Bear Conservation Rule; MMPA=Marine Mammal Protection Act; P=Proposed; S/A=Similarity of Appearance; T=Threatened; UR=Under Review for Federal ESA Protection.

*Not documented on Tyndall AFB although the species is known to occur in the region and/or appropriate habitat exists on Tyndall

2.3.5 Wetlands and Floodplains

Wetlands are transitional areas between terrestrial and aquatic systems, in which the water table is at or near the surface or the land is covered by shallow water (Cowardin et al. 1979). Abiotic and biotic environmental factors such as geomorphology, hydrology, water chemistry, soil characteristics, and vegetation contribute to the diversity of wetland community types. Local hydrology and soil saturation largely affect soil formation and development, as well as the plant and animal communities found in wetland areas (US EPA 1995). Wetlands are often categorized according to the frequency and duration of flooding and their location in relation to upland areas and water bodies. Wetland hydrology is considered one of the most important factors in establishing and maintaining wetland processes and is critical to groundwater recharge, floodwater storage, nutrient cycling, and wildlife habitat functions of wetland systems.

Wetlands are among the most productive ecosystems in the world, providing food and shelter for a diversity of species. Wetlands also provide a host of ecologically important functions such as groundwater recharge, flood control, shoreline protection, and watershed protection. The National Wetlands Inventory classification (Cowardin et al. 1979) categorizes wetlands into 5 types: marine, estuarine, riverine, lacustrine, and palustrine. These vary in terms of hydrologic and geomorphic features, chemical and biological characteristics, and salinity.

Salinity levels vary between marine and freshwater wetlands; marine wetlands typically exhibit high salinity levels, exceeding 30 parts per thousand, whereas freshwater-supplied wetlands generally maintain salinity levels below 0.5 parts per thousand due to upland water flow. Marine wetlands are found along open ocean coasts, whereas estuarine wetlands, which are semi-enclosed tidal habitats with some freshwater mixing, act as important buffers against ocean storm surge. Riverine wetlands (which contain flowing water within channels) and lacustrine wetlands (which are associated with larger still-water bodies) both occur in freshwater environments. Palustrine wetlands, the most common type on Tyndall AFB, encompass a variety of nontidal, vegetated habitats and may occur in tidal zones with low salinity levels.

Wetlands comprise nearly 38% of the area within Tyndall AFB. Estuarine and marine wetlands cover approximately 2,500 acres, whereas freshwater emergent wetlands encompass nearly 8,700 acres, within which palustrine wetlands are predominant. Figure 6 in Tab 9 depicts the wetland types on Tyndall AFB, and Figure 8 in Tab 9 depicts the 100-year floodplain in areas in and around Tyndall AFB.

Waters of the US and Executive Order 11990

The Clean Water Act of 1972 serves as the primary federal law to govern water pollution in the United States. The act protects “navigable waters”, defined as “waters of the United States, including the territorial seas.” Specifics for classification of “Waters of the US” (WOTUS), or federally regulated waters subject to Clean Water Act requirements and programs, are not explicitly defined in the act. Instead, the administering agencies, the Army Corps of Engineers (USACE) and the US EPA, have defined the term WOTUS within their regulations. The current definition is found at https://www.epa.gov/wotus/current-implementation-waters-united-states.

The Florida Department of Environmental Protection (FDEP) considers any wetlands or other surface waters delineated in accordance FAC 62 and regulated under Part IV of Chapter 373, Florida Statute, as WOTUS (FDEP 2023). However, an applicant can use the 2020 WOTUS Rule upon request for exemption or treatment under the federal standard (Diffenderfer and Hupp 2023).

Regardless of wetland protection status under the CWA or state law, EO 11990, *Protection of Wetlands*, requires federal agencies such as Tyndall AFB to avoid impacting wetlands unless there is no practicable alternative and all practicable measures to minimize harm to wetlands have been implemented.

2.3.6 Other Natural Resource Information

2.3.6.1 Coastal Resources

Coastal resources at Tyndall AFB include approximately 18 miles of undeveloped barrier islands situated on the GOA, consisting of coastal dunes and beaches, marine and estuarine wetlands, and adjacent seagrass meadows. Coastal areas are essential for protecting the installation from storm surges and inundation associated with extreme events. They also provide important habitat for nesting sea turtles, diamondback terrapins, beach mice, nesting and wintering shorebirds, and other fish and wildlife species, including species protected under the ESA and FAC.

The coastal dunes and beaches located on Tyndall AFB barrier islands are dynamic ecosystems that are influenced by coastal processes such as erosion, deposition, salt spray, tides, and storms. These physical processes maintain these ecosystems through cycles of destruction, alteration, and recovery of beaches and adjacent dune habitats (Dingler 2005). Hurricane Michael severely impacted the installation's barrier islands, causing dune destruction, vegetation loss, overwash, and breaching. Restoration activities are described in Section 7.13.

Marine wetlands occur along open coasts of the barrier islands, whereas estuarine wetlands are semi-protected and found along the edges of the bayous at Goose Point and Cedar Point and in low-energy areas along the shoreline on the bay side of the barrier islands (Section 2.3.5). Both marine and estuarine wetlands are unique areas that provide important ecosystem services, including carbon sequestration, water filtration, coastal protection, shoreline stabilization, and fish and wildlife habitat (Barbier et al. 2011, Sievers et al. 2019). Marine and estuarine wetlands also suffered during the hurricane, as increased wave action and inundation caused significant vegetation loss, erosion, and marsh degradation (Castagno et al. 2021).

Seagrass meadows are distributed in nearshore waters along the shoreline of St. Andrews Bay. They play an important ecological role in the coastal environment by providing physical structure, habitat, and protection for a variety of fish, crustaceans, and waterbirds, as well as shoreline stabilization and protection from extreme storm events (Duarte 1991, Orth et al. 2020). Turtlegrass (*Thalassia testudinum*) and shoalgrass (*Halodule wrightii*) are the most common seagrasses in St. Andrews Bay; manateegrass (*Syringodium filiforme*), stargrass (*Halophila engelmannii*), and widgeongrass (*Ruppia maritima*) occur infrequently and at low to very low densities (Yarbro and Carlson 2018, Yarbro et al. 2020). Monitoring by FWC's Seagrass Integrated Mapping and Monitoring Program showed stable trends in seagrass acreage across the region between 2003 and 2017, but these trends declined following Hurricane Michael. The declines were likely due to impaired water quality from runoff, as well as physical damage due to sand overwash and scouring near the barrier islands (Yarbro et al. 2020).

2.3.6.2 Ecosystem Services

The natural environments at Tyndall AFB provide numerous ecosystem services. It is difficult to assign a monetary value to the majority of these services, and therefore, they are often inadequately valued against other competing demands that provide clear economic benefits. For the cost of a general recreation permit, members of the public can enjoy many recreational activities, including hiking, biking, and canoeing. Hunting and fishing opportunities provide both recreational and provisioning services. The same forests and waters used by recreationists also provide supporting services such as nutrient cycling, water filtration,

and air purification. The activities detailed in this INRMP strive to maintain and improve these valuable ecosystem services.

Ecosystem research has only recently begun to assimilate individual studies on fire-maintained longleaf pine into integrated models that can evaluate net values for a range of different productivity classes (Starr et al. 2010). There is also a need to model a range of management scenarios, including use of prescribed fire versus its suppression and wildfire scenarios, as well as alternative utilization of wood products as biofuels under different regulatory policies. Managers will need to understand how to maximize the restoration and ecological value of biomass removal while minimizing the potential (in the near and distant future) of negative and unintended ecological impacts.

Management Responses

There are 2 primary categories of management strategies for reducing the impact of natural hazards on the mission: (1) increasing the resiliency of ecological systems and (2) providing areas for habitat and species migration. Because future habitat loss involves many uncertainties, an adaptive management approach is needed to guide the evaluation and implementation of effective responses. Some of the natural resource conditions that will need to be monitored to maintain no net loss in the mission include the following:

- Hydrologic regime, water temperature, water chemistry, sediment, and rare aquatic species in the wetlands and water bodies on and adjacent to Tyndall AFB
- Amount and proportion of beach habitat for nesting and foraging sea turtles, beach mice, piping plovers (*Charadrius melodus*), rufa red knots (*Calidris canutus rufa*), snowy plovers (*Charadrius nivosus*), and other coastal species
- Loss of foraging habitat for immature turtles through introduction of invasive species or die-off of seagrass species
- The shifting sex ratio of sea turtles (the proportion of males and females in in-water assemblages may be altered)
- Habitat and food sources for gopher tortoises and black bears
- Growth rates and mortality of longleaf pine
- Regeneration and restoration of longleaf pine
- Wildfires and application of prescribed fires
- Spread of invasive nonnative plant and animal species
- Threat of erosion due to changing vegetation cover

Below is a list of possible general adaptation approaches for natural resource management at Tyndall AFB in light of these trends:

- Reduce the impacts of current stressors to enhance ecosystem resilience in the near term. Current stressors include altered fire regimes (unnaturally high fuel loads, presence of off-site species), invasive species, and altered hydrology.
- Maximize connectivity of ecological systems, including maximizing within-ecosystem topographic and hydrologic variability and functional ecological processes within the landscape.
- To ensure there are migration corridors for rare plants and wildlife, encourage natural vegetation in areas of potential inland migration using prescribed fire and invasive species control. Dense vegetation and invasive species may interfere with the inland migration of marsh vegetation, for example.

- Monitor trends in ecological systems to assess changes in reference conditions, especially longleaf pine regeneration and ground cover responses. Use the dynamic reference condition approach to assess changes over time.

Identifying and adapting to trends in habitat condition require a proactive rather than reactive approach to maintain cost-effective programs and meet legal requirements to manage natural resources. Collaboration with other natural resources agencies will lead to more successful results for all stakeholders.

2.4 Mission and Natural Resources

2.4.1 Natural Resource Constraints to Mission and Mission Planning

A constraint is anything that restricts Tyndall AFB's military mission. In some instances, constraints may include the presence of T&E species, water resources, or sensitive habitats that may limit the types and degree of mission-related activities in an area. Rarely are mission activities completely restricted due to natural resource issues. Early consideration of these issues in planning (i.e., during the NEPA Environmental Impact Analysis Process [EIAP]) typically results in solutions that allow the mission to proceed unimpeded, either through slight modifications in the location or timing or by obtaining permits through the appropriate regulatory channels (i.e., ESA Section 7 consultations). Section 7 consultations previously completed by Tyndall AFB (formal and informal) are summarized in Table 2-9.

Tyndall AFB's missions require adequate air space and maintained vegetation types to support air training. Vegetation must be maintained and managed IAW BASH standards (Section 7.12). The use of specific habitats or plant community types is not required for the current mission. Wildland fires on and around Tyndall AFB are anticipated to increase if warming and drying trends persist. Additionally, while Tyndall AFB has done significant work to remove timber that was downed during Hurricane Michael, dead and downed woody debris in some areas may pose a smoke management concern. Hurricane Michael destroyed much of the infrastructure within the flood zone on the base, and the rebuild plan for Tyndall AFB is expected to accommodate projected future flood hazards (Tyndall AFB 2020*b*).

Habitat changes for the numerous federally or state-listed species known to occur on the installation (e.g., Choctawhatchee beach mouse [*Peromyscus polionotus allophrys*] and piping plover) could impact the military mission if these changes lead to operation restrictions during breeding periods or other sensitive periods in the future.

Table 2-9. Endangered Species Act Section 7 consultations affecting Tyndall Air Force Base

Consultation Title	Proponent	Location	Year	Affected Species
Combat Support Training Complex Tyndall Air Force Base (AFB), Florida	Tyndall AFB	Farmdale Site	1989	American alligator, eastern indigo snake, piping plover, and red-cockaded woodpecker (RCW)
Family Housing Project	Tyndall AFB	Wood manor Housing	1993	Eastern indigo snake

Table 2-9. Endangered Species Act Section 7 consultations affecting Tyndall Air Force Base

Consultation Title	Proponent	Location	Year	Affected Species
Increase in F-15 Fighter Aircraft Assets	Tyndall AFB	Installation wide	1994	Sea turtles, Gulf sturgeon, piping plover, bald eagle, least tern, and RCW
Armed Forces mission-related vehicle access and driving (US Fish and Wildlife Service [USFWS] 1998)*	Tyndall AFB	Gulf of America (GOA) beaches, except Shell Island	1998	Sea turtles and piping plovers
The Employment of Chaff and Flares in the Carrabelle and Compass Lake Overland Work Areas	Tyndall AFB	Airspace north and east of Tyndall AFB	1998	Sea turtles and RCW
Reopening of East Pass (USFWS 2001, 2002)*	Bay County Board of Commissioners and Tyndall AFB	East Pass between GOA and St. Andrews Bay on Shell Island	2001, amended in 2002	Choctawhatchee and St. Andrew beach mice, piping plover, and sea turtles
Tyndall Fiscal Year 2002 Integrated Pest Management Plan	Tyndall AFB	Installation wide	2002	Choctawhatchee and St. Andrew beach mice
Military Point Transmission Line Project*	Gulf Power	Transmission line over St. Andrews Bay extending from Parker to Tyndall AFB	2004	Bald eagle
Tyndall AFB Bald Eagle Monitoring Plan for New Nest within a Installation Restoration Program Site	Tyndall AFB	Drainage ditch 1 and 2 south of old Wastewater Treatment Plant site LF006	2004	Bald eagle
Military Family Housing Privatization	Tyndall AFB	Military Family Housing units in Shoal Point, Bay View, and Wood Manor	2005	Eastern indigo snake and bald eagle

Table 2-9. Endangered Species Act Section 7 consultations affecting Tyndall Air Force Base

Consultation Title	Proponent	Location	Year	Affected Species
Sky X Utilities	Tyndall AFB (Research Laboratory)	Farmdale 2 Road	2006	Bald eagle
325th Fighter Wing (325 FW) Integrated Natural Resources Management Plan	Tyndall AFB	Installation-wide	2006	Choctawhatchee and St. Andrew beach mice, piping plover, sea turtles, Gulf sturgeon, American alligator, Florida manatee (subspecies of the West Indian manatee), bald eagle, and Godfrey's butterwort
Construction of a Multi-Story Dormitory at Tyndall AFB	Tyndall AFB	Georgia Avenue, Tyndall AFB	2006	Sea turtles
Fitness Center	Tyndall AFB	Mississippi Road, Tyndall AFB	2007	Sea turtles
325 FW Construction and Operation of Air Force Research Laboratory Facilities in the 9700 Area of Tyndall AFB	Tyndall AFB	9700 Area of Tyndall AFB	2008	Sea turtles
Rebuild Bonita Bay dock	Tyndall AFB (82d Aerial Targets Squadron)	Pearl Bayou	2010	Florida manatee (subspecies of the West Indian manatee), Gulf sturgeon
F-22 Operational Squadron and T-38A Detachment Beddown at Tyndall AFB	Tyndall AFB	Installation wide	2011	Bald eagle, alligator snapping turtle (Petitioned species), American alligator, eastern indigo snake, and piping plover
East Boundary Fire Break	Natural Resources	East boundary line, south of Highway 98	2011	St. Andrew beach mouse

Table 2-9. Endangered Species Act Section 7 consultations affecting Tyndall Air Force Base

Consultation Title	Proponent	Location	Year	Affected Species
Silver Flag Environmental Assessment	823d RED HORSE**	Eastern part of Tyndall AFB along southern coast of East Bay	2013	Godfrey's butterwort
SR 30 (US 98) at Tyndall AFB, Highway Flyovers with Gate Reconfiguration	Florida Department of Transportation	Highway 98	2013	Sea turtles
Noncommissioned officer (NCO) Beach Access Road Maintenance Project (USFWS 2014)	Natural Resources	NCO beach access road	2014	Choctawhatchee and St. Andrew beach mice, piping plover, and sea turtles
Water Survival Training	325th Operations Group	St. Andrews Bay	2016	Choctawhatchee and St. Andrew beach mice, piping plover
Munitions Storage Complex and Facilities	Tyndall AFB	F-22 Munitions Storage Complex	2016	Godfrey's butterwort
Tyndall AFB Track-Field Lighting	Tyndall AFB	Outdoor running track	2019	Sea turtles, beach mice
MQ-9 Beddown	Tyndall AFB	West of Drone Runway	2020	Godfrey's butterwort
Construction of Commercial Gate—Tyndall AFB	Tyndall AFB	Proposed Commercial Gate for rebuild	2020	Telephus spurge
Commercial Gate Lighting—Tyndall AFB	Tyndall AFB	New commercial gate for rebuild	2023	Sea turtles, beach mice

*Indicates formal consultation
**RED HORSE=Rapid Engineer Deployable Heavy Operational Repair Squadron

2.4.2 Land Use

DAFMAN 32-7003 defines 3 categories of land use for DAF installations:

- **Improved Grounds**—Includes land occupied by buildings and other permanent structures as well as lawns and landscape plantings on which grounds maintenance personnel annually plan and perform intensive maintenance activities. Improved grounds include the cantonment area, parade

grounds, drill fields, athletic areas, golf courses (excluding roughs), cemeteries, and housing areas. Grass in these areas is normally maintained by regular mowing during the growing season.

- **Semi-Improved Grounds**—Land where periodic maintenance is performed primarily for operational reasons (such as erosion and dust control, bird control, and visual clear zones). This land use classification includes areas adjacent to runways, taxiways, aprons, runway clear zones, lateral safety zones, rifle and pistol ranges, weapons firing and bombing ranges, picnic areas, ammunition storage areas, antenna facilities, and golf course roughs. Semi-improved grounds are mowed less often than the maintained turf grass on improved grounds.
- **Unimproved Grounds**—Land that is not classified as improved or semi-improved grounds. Unimproved grounds include forest lands, croplands and grazing lands, lakes, ponds, wetlands, and any areas where natural vegetation is allowed to grow unimpeded by maintenance activities.

Although open space (unimproved grounds) is the predominant land use on the installation, environmental constraints limit the use of certain areas for development, and in some cases, for ground training. Portions of Tyndall AFB may be constrained by natural resources concerns such as T&E species and habitat, wetlands and floodplains, and coastal areas. On days with high fire danger, missions with potential to start wildfires may be restricted and other missions may be shut down or delayed due to smoke and/or fire suppression activities.

Seasonal natural resource considerations exist for some species such as sea turtles and shorebirds (e.g., piping plovers and red knots). For many species that require seasonal considerations, shifting the timing of a mission to outside of their nesting or foraging season results in few to no requirements. In other situations, the consideration may be the location; oftentimes, a simple shift of 100 feet or a modification in the extent of the activity will resolve location conflicts. Coordination with mission planners allows Tyndall AFB's Natural Resources Office to initiate ESA Section 7 consultations in a timely manner to prevent mission delays. Early planning is key to making these resources "considerations" as opposed to "constraints."

The environmental requirements developed through the EIAP or brought forward by other regulatory drivers are mandatory. Personnel and unit commanders may be held personally 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 these requirements helps maintain quality environments for future missions and ensures that Tyndall AFB remains in compliance with all applicable state and federal regulations. Natural resource requirements from Section 7 consultations, Environmental Impact Statements (EIS), Environmental Assessments (EAs), and other applicable regulatory permits are communicated to pertinent personnel and aid in ensuring that requirements are being implemented. One aspect of this process will be the briefing of incoming commanders by the Natural Resources Office. Examples of natural resources requirements include the following:

- Avoid activities that may damage dunes or shoreline vegetation.
- Beachfront activities occurring between 1 May and 31 October must follow numerous requirements to avoid impacts to sea turtles. Sea turtles are sensitive to noise, light, and ground-disturbing activities.
- Beach driving must be coordinated through the Tyndall AFB Natural Resources Office.
- Maintain 660-foot construction buffer around bald eagle nests.
- Avoid vehicles and heavy equipment use within a 25-foot radius of gopher tortoise burrow entrances.
- Require all contractors bringing vehicles onto the base to undergo inspection and decontamination to reduce the spread of invasive species.

FWC has designated all of the emergent lands known as CIE, CIW, and Shell Island as Critical Wildlife Areas (CWAs). Areas within the CWA may be posted and closed to access from 15 February to 1 September or until nesting activity is complete for the protection of nesting birds or year-round protection of migratory and resident wintering birds.

2.4.3 Current Major Mission Impacts on Natural Resources

This section describes current mission activities that affect or may potentially affect natural resources. The primary concerns for natural resources within the installation are associated with direct impacts to species and their habitats. Mission requirements mandate clear zones and airspace glide slopes (Figure 11 in Tab 9) around active airfields, thus resulting in the extension of non-forested areas and the harvest of areas every 25 years where trees are projected to penetrate certain air slope requirements (Tab 1). Runway clear zones are 3,000-square-foot areas at the end of a runway. These zones should be actively mowed so that no trees can grow. Several areas on Tyndall AFB are designated as explosive ordnance clear zones. These zones range in radius from 400 to 4,000 feet. These designated areas are restricted, allowing no hunting or public/recreational access. Airfield approaches are managed to reduce their attractiveness to birds to reduce collisions with aircraft. Osprey (*Pandion haliaetus*) nests are removed from towers, navigational and utility structures, and around the airfield. Recreational areas for hunting and fishing (Big Ammo Lake and Little Ammo Lake) near the Ammunition Storage facilities were closed in 2012 for safety concerns due to contamination.

There is also the potential for impacts from air and water pollution point sources, noise, hazardous waste, and Environmental Restoration Program (ERP) sites, but Tyndall AFB Compliance organizations maintain permits and monitor these, and there are currently no major concerns for natural resource impacts. Some freshwater fishing ponds are now restricted because of lead contamination (ERP site) or graywater reuse (Davis Pond at old golf course). Tyndall AFB manages potential environmental contamination sites through the ERP. Tyndall AFB addresses potential industrial point source water pollution problems through a Multi-Sector General Permit, which is described in the base's Storm Water Pollution Prevention Plan (Tyndall AFB 2024*b*). A stormwater management program for potential non-industrial discharges is addressed through Best Management Practices (BMPs) implemented under the base's Municipal Separate Storm Sewer System (MS4) permit.

Following Hurricane Michael, the Air Force developed a Master Plan to assist the 325 FW in recovering the installation. This plan included demolition, construction, and renovation of numerous facilities throughout the installation that were severely damaged. Under the proposed action, 28 individual projects spanning 6 planning areas throughout the installation have been or will be constructed. Approximately 134.9 acres of wetlands plus 120,300 linear feet of drainage features and 15.8 acres of other surface waters (e.g., stormwater ponds, open water) are located within the proposed project areas. Site preparation and construction activities would directly disturb approximately 1,164 acres of native and nonnative soils, over half of which (approximately 629 acres) would result from the flightline drainage improvement and utility-upgrade projects. Erosion from the construction sites could result in additional indirect effects; consequently, any soil disturbance that would expose the soils to wind, rain, and stormwater runoff must be stabilized by some means. Tyndall AFB would be required to obtain permits from state and federal agencies to mitigate any impacts associated with reconstruction of the base. The final EA for implementation of the Hurricane Michael Recovery Program (USAF 2020*a*) assessed the potential impacts of the program on natural resources, which included adverse effects on the telephus spurge and negligible to minor effects on air quality, ambient noise levels, soils, vegetation/wildlife habitat, ground and surface water supplies and quality, wildlife populations, and hazardous solid waste (USAF 2020*a*).

Ongoing environmental impacts from the F-35 beddown are currently occurring and expected for the future. These include impacts to noise, soils and geologic resources, water resources, biological resources, cultural resources, land use, and infrastructure (USAF 2020*b*). However, some of these environmental impacts would occur, regardless of the F-35 beddown, due to the cleanup and reconstruction of Tyndall AFB. The environmental impacts from base reconstruction are expected to "cumulatively interact with the F-35A Wing beddown at Tyndall AFB" (USAF 2020*a*). More information about the impacts of F-35 beddown can be found in the final EIS (USAF 2020*b*).

2.4.4 Potential Future Mission Impacts on Natural Resources

Land clearing, construction, and ground training are the main activities with the potential to affect natural resources on Tyndall AFB, primarily through stormwater issues and reduction in natural areas. Current and proposed construction projects may impact sensitive habitats for federally listed species, either directly through habitat destruction or indirectly through changes in management (e.g., by limiting the ability to conduct prescribed burns near new buildings). Proposed construction may also impact species indirectly by prohibiting their population growth or their connection to other populations through suitable habitat corridors. Developed areas may also attract predators and nuisance wildlife that are drawn to new sources of food (i.e., trash). Decontamination procedures for construction equipment will be needed to slow the spread of invasive plants.

Tyndall Installation Development Plan

Tyndall AFB completed its IDP in April 2015. The IDP was designed to meet DAF Comprehensive Planning instruction requirements (AFI 32-7062), which were substantially revised in 2013. This IDP was established to guide development decisions at Tyndall AFB for the next 20 to 30 years and to assist the installation in meeting DAF goals for mission capability, sustainability, readiness, and modernization.

Shortly after Hurricane Michael, a task force was assembled to assist the 325 FW with assessing damage to installation facilities and infrastructure, determining usability of these assets, and preserving future mission capability. The task force developed the Recovery Plan, which was intended to provide a way forward to repair, reshape, and rebuild Tyndall AFB to resume near-term mission operations and maximize mid- and long-term mission capabilities. Due to the extensive damage caused by the hurricane, Tyndall AFB has an opportunity to implement several long-range planning objectives from the Tyndall AFB IDP, as well as strategies from the 21st Century Installation concepts.

The reconstruction of Tyndall AFB provides the opportunity to achieve the following key objectives to support Tyndall AFB's vision as a 21st Century Installation:

- Size and locate facilities to improve organizational efficiencies and improve the resiliency, sustainability, and adaptability of Tyndall AFB.
- Meet current and proposed mission requirements well into the 21st century.
- Use the opportunity to improve mission efficiencies by realigning mission sets that would also influence short- and long-term redevelopment.
- Provide capacity for future growth.

Potential future impacts on natural resources from the IDP are not anticipated for the next 5 to 10 years due to the current Hurricane Michael rebuild strategy (USAF 2020*a*).

Ground Training Operations

Increased ground training operations may limit access for natural resource management; this may result in a reduced ability to conduct prescribed fires, forest restoration activities, and monitoring of protected species. Habitat alteration is the primary natural resources concern associated with increased ground training, as heavy ground training may cause erosion problems in areas where vegetation is trampled. In addition, increased human presence and noise may harass protected species (i.e., nesting sea turtles). Tyndall AFB's Natural Resources Office will need to address conflicts between military missions and protected species management through Section 7 consultations.

3.0 ENVIRONMENTAL MANAGEMENT SYSTEM

The DAF environmental program adheres to the Environmental Management System (EMS) framework and its "Plan, Do, Check, Act" cycle for ensuring mission success. EO 14057, *Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability*; DoDI 4715.17, *Environmental Management Systems*; DAFI 32-7001, *Environmental Management*; and International Organization for Standardization 14001 standard, *Environmental Management Systems—Requirements with guidance for use*, provide guidance on how environmental programs should be established, implemented, and maintained to operate under the EMS framework.

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

4.0 GENERAL ROLES AND RESPONSIBILITIES

General roles and responsibilities that are necessary to implement and support the Natural Resources Program are listed in Table 4-1 below. Specific natural resources management-related roles and responsibilities are described in appropriate sections of this plan.

Table 4-1. General roles and responsibilities

Office/Organization/Job Title*	Installation Role/Responsibility Description
Installation Commander	The Tyndall Air Force Base (AFB) Wing Commander, 325th Fighter Wing (325 FW), is responsible for the following aspects of the Tyndall AFB Integrated Natural Resources Management Plan (INRMP): • Approve the 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
Air Force Civil Engineer Center (AFCEC) Natural Resources Media Manager/Subject Matter Expert/Subject Matter Specialist	Provides guidance to the Installation Natural Resources Manager about specific programs outlined in the INRMP
Installation Natural Resources Manager/Point of Contact	Implements INRMP programs and attains goals of the INRMP
Installation Security Forces	Provides security for the installation
Installation Unit Environmental Coordinators	Provide guidance and adherence to environmental laws and regulations (See Department of the Air Force Instruction 32-7001 for role description)
Installation Wildland Fire Program Manager	The AFCEC Wildland Fire Branch (established in July 2012) is responsible for updating the Wildland Fire Management Plan, developing prescribed fire burn plans for each compartment and implementing prescribed fire.
Pest Manager	Implements the Integrated Pest Management Plan
Range Operating Agency	N/A
Conservation Law Enforcement Officer	Enforces installation laws, with emphasis on outdoor recreation

Table 4-1. General roles and responsibilities

Office/Organization/Job Title*	Installation Role/Responsibility Description
National Environmental Policy Act (NEPA)/ Environmental Impact Analysis Process (EIAP) Manager	The EIAP Program Manager will: • Act in accordance with 90 Federal Register 27857, Department of Defense Implementation of the National Environmental Policy Act • Attend the Facilities Review Board to ensure an AF Form 813 has been or will be submitted for proposed projects that have the potential to impact the environment • Collaborate with the Environmental Element Chief to ensure any activity that has the potential to negatively impact natural resources is reviewed and that potential impacts to federally listed species are assessed per Section 7 of the Endangered Species Act (ESA) • Manage NEPA documentation
National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS)	NOAA: • Southeast Fisheries Science Center in Panama City Beach conducts shark surveys, monitoring, and population assessments in nursery grounds once or twice a month since 2005 • Tracks Gulf sturgeon during winter months in marine waters since 2007 NMFS (NOAA Fisheries): • Regulatory agency that enforces the Marine Mammal Protection Act (MMPA) and the ESA for marine species; works with action proponents to prevent or minimize potential take or harassment of marine species and Essential Fish Habitats (EFH) protected under these laws.
US Department of Agriculture, Forest Service	Provides support for wildland fire and prescribed burning through Nationwide Memorandum of Understanding with DoD, 2000–2012
US Fish and Wildlife Service (USFWS)	The USFWS Ecological Services Office in Panama City, Florida, has worked cooperatively with Tyndall AFB's Natural Resources Office for several years. The USFWS's primary role on Tyndall AFB has been to support the Natural Resources Program with the conservation and management of federally listed T&E species that occur on the installation, wetland restoration, and the forestry program in a manner that sustains and supports Tyndall AFB's military mission. The USFWS currently provides 4 full-time employees (GS12-Biologist, 2 GS-9 Biologists, and a WG-8 Heavy Equipment Operator) to Tyndall AFB through an interagency agreement. Tyndall coordinates annually with the USFWS regarding INRMP updates and adjustments made to goals and objectives.

Table 4-1. General roles and responsibilities

Office/Organization/Job Title*	Installation Role/Responsibility Description
US Army Corps of Engineers (USACE)	The USACE provides the following services to Tyndall AFB: • Cooperative agreements (projects) • Dredge and fill permitting • Regulatory, wetlands delineation

*Listing is not in order of hierarchical responsibility

5.0 TRAINING

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

Installation Supplement

- NRMs at Category I installations must take the DoD Natural Resources Compliance course that is endorsed by the DoD Interservice Environmental Education Review Board and offered for all DoD Components by the Naval Civil Engineer Corps Officers School. See https://www.denix.osd.mil/cecos/conservation/nrc/ for 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 (https://www.blm.gov/learn/national-training-center).
- Natural resource management personnel shall be encouraged to attain professional registration, certification, or licensing for their related fields, and they 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 DAF 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 flightline 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* (Leslie et al. 1996), provides guidance, case studies, and other information regarding the management of natural resources on DoD installations.

Natural resources management training is provided to ensure that installation personnel, contractors, and visitors are aware of their role in the program and the importance of their participation to its success. Training records are maintained IAW Section 6.0 of this plan. Below are key natural resources management-related training requirements and programs:

1. FWC Wildlife Incident Response Training
2. All-terrain vehicle (ATV) certification through the National ATV Safety Institute
3. Sea Turtle Permit Holder Meeting (annual) and volunteer training
4. Wildland Fire Fighter Training
5. Florida Sea Turtle Stranding and Salvage Network training
6. Statewide Nesting Beach Survey training
7. Chemical immobilization training

6.0 RECORDKEEPING AND REPORTING

6.1 Recordkeeping

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

Installation Supplement—Recordkeeping

Not applicable.

6.2 Reporting

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

Installation Supplement—Reporting

Not applicable.

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.

7.1 Fish and Wildlife Management

Installation Supplement

Applicability Statement

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

Program Overview/Current Management Practices

As described in Section 1.2, fish and wildlife management at Tyndall AFB is based on ecosystem management (IAW DAFMAN 32-7003, Section 3.10) and adaptive management. However, certain areas of Tyndall AFB are managed cooperatively with FWC and have a different management focus. These areas include CWAs and Wildlife Management Areas (WMAs), which are described below.

Critical Wildlife Area

CWAs are specific sites designated by the FWC to protect places in which wildlife congregate to nest, roost, and feed (FAC 68A-19.005, 68A-14.001, and 68A-14.0011). Important wildlife areas that can be impacted by human-related activities may be designated as CWAs through an establishment order. Tyndall AFB CWAs include all of the emergent lands known as CIE, CIW, and Shell Island. Areas within the CWA boundary may be posted and closed to dogs, vehicles, and people from 15 February to 1 September to protect nesting shorebirds, or they may be closed year-round to protect migratory and resident wintering shorebirds. Areas that are not posted are open to public access. The CWA boundary at Tyndall AFB was revised in 2014 using Global Positioning System (GPS) coordinates to more accurately define the shorebird habitat on the barrier islands. The redesignation document was signed by FWC in March 2015.

Wildlife Management Area

Tyndall AFB's East Hunt Unit (described in Section 7.2.1) is designated as a Florida WMA. This designation enables Tyndall AFB-specific rules and regulations to be codified into FAC 68A-15.063(18). Under this program, the Tyndall AFB Natural Resources Office serves as the lead management agency, and it collects fees from the sale of hunting and fishing permits to manage fish and wildlife resources under state jurisdiction. In exchange, Tyndall AFB permits public hunting and fishing opportunities and FWC provides fish and wildlife law enforcement support. These actions enable FWC Wildlife Officers to enforce Tyndall AFB-specific rules such as hunting prohibitions in closed areas and unique management unit regulations.

Other Considerations for Fish and Wildlife Management

Many current fish and wildlife management issues have been exacerbated due to natural hazards such as severe storms and drought. Large storm surges could inundate almost half of the installation, making it difficult for species with low dispersal abilities to migrate landward. Powerful hurricanes such as Hurricane

Michael not only pose direct mortality risk but also destroy or severely damage habitats such as forests, shorelines, and sand dunes. More extreme flooding could contribute to habitat loss by inundating coastal uplands and eroding shorelines and sand dunes. Additionally, increased severe wildfire risk from drought may cause forest ecosystems to be less resilient, challenging the persistence of wildlife populations. Although native ecosystems are adapted to fire, some invasive plant species such as cogongrass (*Imperata cylindrica*) benefit from high wildfire intensity, which creates disturbed environments that are favorable to their spread.

Tyndall AFB conducts several management actions that mitigate habitat loss, thereby supporting fish and wildlife species and preventing mission impacts. Frequent (2- to 3-year fire return interval) prescribed fire helps reduce the wildfire hazard risk at Tyndall AFB by reducing fuel loading. The replacement of sand pine and slash pine with longleaf pine following Hurricane Michael supports forest resilience in the face of strong winds, as longleaf pine has a deeper root system and is thus more resistant to strong wind, although losses can still be severe (Zampieri et al. 2020). Natural Resources Office personnel are restoring sand dunes destroyed by Hurricane Michael by planting native vegetation. It could become important to initiate mechanisms to nourish and stabilize sandy shorelines (Kutiel 2001). Foot traffic or vehicular travel over vegetation on sandy shorelines should be restricted to protect vegetation and sand dune stability (Nordstrom and Arens 1998). Furthermore, routine surveys help alert NRMs to population declines and provide needed information to support taking effective management actions.

7.2 Outdoor Recreation and Public Access to Natural Resources

Installation Supplement

Applicability Statement

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

Program Overview/Current Management Practices

The Tyndall AFB Natural Resources Office strives to promote and develop sustainable recreational opportunities, which include hunting, fishing, and nonconsumptive uses, in a manner compatible with the military mission and subject to safety and security requirements. Tyndall AFB entered into Cooperative Agreements with the USFWS and FWC for technical data and assistance in developing the installation's Outdoor Recreation Component Plan (Tyndall AFB, draft report, 2020), which guides recreation on the installation. This plan provides installation-level policy and guidance to implement an effective, legal, safe, and enjoyable outdoor recreation program on base. This section provides a general overview of the Tyndall AFB outdoor recreation program; detailed information is provided in the Tyndall AFB Outdoor Recreation Component Plan (Tyndall AFB, draft report, 2020) and the Hunting, Fishing, and General Recreation Regulations (Tyndall AFB 2024*a*). Goals, objectives, and projects for future outdoor recreation management are listed in Section 8.0.

Outdoor recreation is managed by the 325th Force Support Squadron (325 FSS) and Natural Resources Office Table 7-1). The 325 FSS provides recreational equipment rental, boat rental, and an archery range; these activities must either be self-sustaining or receive marginal cross funding from profits generated by the Base Exchange. The 325 CES/CEIEA hosts activities that qualify for Sikes Act and other public funding, including hunting, camp sites, hiking trails, beach oversight, and other property management related to recreation. These 2 offices currently operate with separate information access systems and under

separate commanders. An online permit system was implemented in Fiscal Year 2015 (FY15), and iSportsman (https://tyndall.isportsman.net) is now used at Tyndall AFB to manage permit sales.

The FWC is also partially responsible for hunting and recreation area management on Tyndall AFB. The FWC established approximately 12,000 acres on the East Side of Tyndall AFB as a Florida WMA. A WMA is a public hunting and recreation area operated by the landowner in cooperation with the FWC. Specific responsibilities of FWC's management role of the East Side Tyndall AFB WMA are discussed in the Outdoor Recreation Component Plan (Tyndall AFB, draft report, 2020). Public access implications are discussed below in the Public Access Classifications subsection.

Table 7-1. Recreational activities and responsible entities at Tyndall Air Force Base

Activity	Responsible Organization	
	325 CES/CEIEA* (Natural Resources)	**325 FSS** (Force Support)**
Hunting	X	—
Freshwater fishing	X	—
Archery range	—	X
RV park (Fam Camp)	—	X
Tent camping	X	X
Boat rental	—	X
Hiking trails	X	—
Nonconsumptive use (hiking, biking, bird watching, etc.) of beaches, woodlands	X	—

*325 CES/CEIEA=325th Civil Engineer Squadron, Environmental Element, Natural Resources Section
**325 FSS=325th Force Support Squadron; 325 FSS maintains a website (https://www.tyndallfss.com/) that lists recreational activities and contact information.

The Tyndall AFB Outdoor Recreation Component Plan ensures that the outdoor recreation program follows all federal and state regulations. Additional Tyndall AFB-specific restrictions on off-road vehicle use, after-dark access, weapon type, and weekday access are detailed in the Tyndall AFB Hunting, Fishing, and General Recreation Regulations (Tyndall AFB 2024*a*). Pertinent outdoor recreation rules from these regulations include the following:

- All DoD and non-DoD personnel participating in hunting and fishing (except DoD personnel while saltwater fishing from shore) must have a current permit and a picture ID with them at all times and provide them to Law Enforcement upon request.
- Non-DoD members (except DoD contractors with a current DoD identification card with basewide access [DBIDS]) wishing to participate in recreational activities on Tyndall AFB (outside of the fenceline) must have a current recreational permit.
- Non-DoD hunters are not allowed in the West or Flightline Hunt Units (inside the fenceline), which are described in Section 7.2.1; violators will be considered trespassing and will be banned for the remainder of the season.
- Off-road vehicles, motorcycles, and bicycles (including electric bicycles) are restricted to established named roads. Unauthorized "trail busting" is aggressively discouraged. Violators risk losing installation-driving privileges. Electric bicycles of all types are prohibited on all barrier island beaches.

- To prevent accidental interaction between hunters and ground forces performing exercises, public access is prohibited during the hours of full darkness (1.5 hours after sunset and before sunrise). Weapons are limited to shotguns, black powder rifles, bows, and cross-bows. Pistols and rifles are excluded to prevent over-travel across roads or inhabited areas.
- Weekday access is restricted to ensure a safety buffer around military working areas during high-activity periods.

The Tyndall AFB Hunting and Fishing Map provides critical hunting and fishing information to outdoor recreation participants (Figure 7-1). Tyndall AFB's hunting and fishing regulations and map are reviewed and updated annually by the Natural Resources Office, including any modifications requested by mission groups (i.e., Silver Flag, Security Forces). They are then submitted to the Base Commander, Civil Engineer Commander, and the Legal Office for approval. A pamphlet containing hunting and fishing rules and regulations and the map is provided to persons purchasing permits. This product contains federal, state, and installation fish, wildlife, and natural resources laws; defines hunting areas; and establishes legal hunting days and methods. User fees are collected to offset costs incurred for the protection, conservation, and management of fish and wildlife programs, including habitat improvement. The Tyndall AFB Natural Resources Office generates approximately $53,000 annually from permits sales, the majority of which goes to pay for check station operators and wildlife habitat improvement projects.

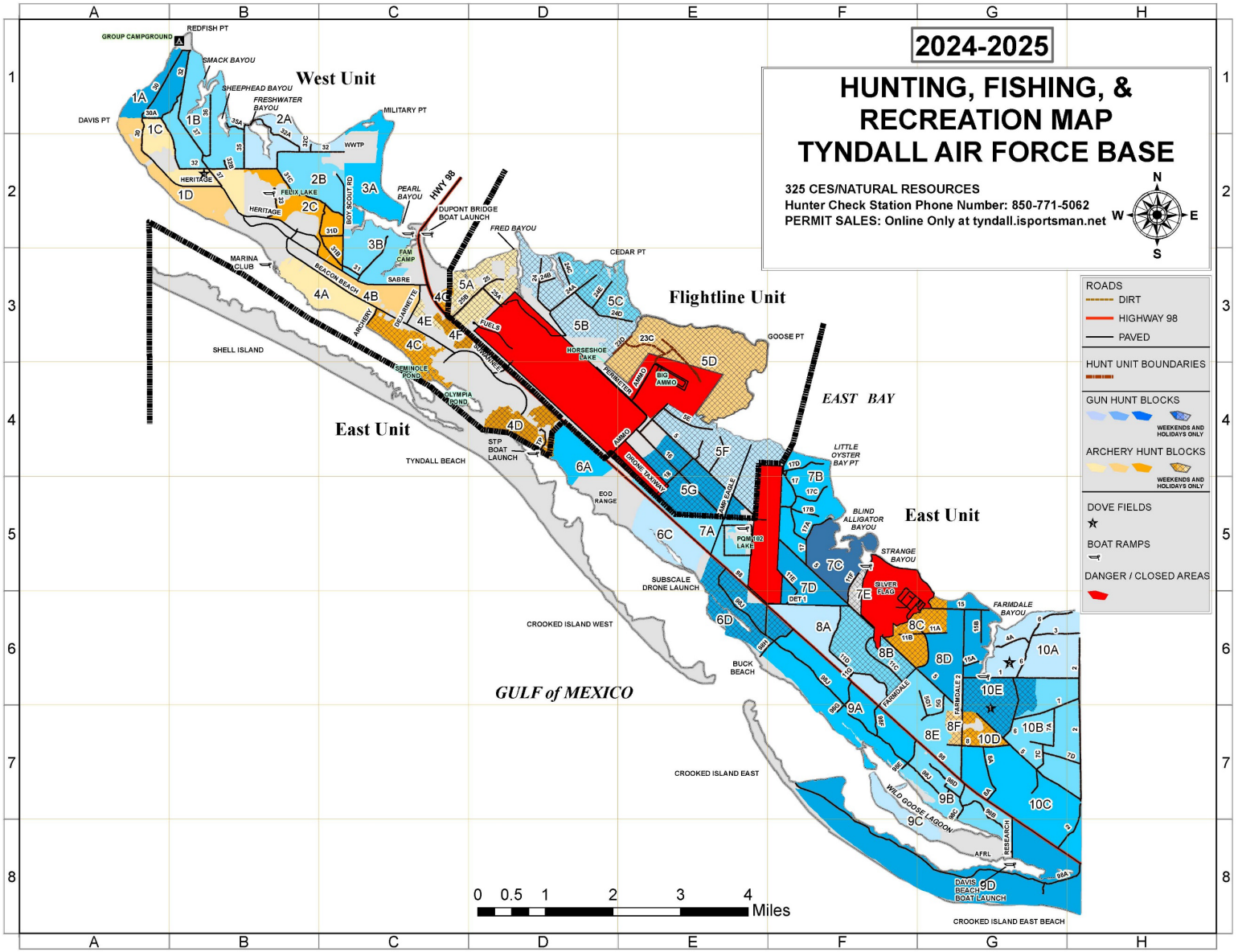

Figure 7-1. Tyndall Air Force Base 2024–2025 hunting and fishing map

Public Access Classifications

DAFMAN 32-7003 requires classification of DAF-managed lands into categories that describe the degree of public access for all areas that are identified as suitable for outdoor recreation. Tyndall AFB classifies its property into open, restricted, and prohibited areas for public access purposes:

- **Open Areas**—DoD and non-DoD personnel are permitted to enjoy many recreational activities on the installation, including beach activities, boating, canoeing, fishing, hunting, and trail-walking. Note: DoD personnel are defined as Active-Duty Military, Reserve, National Guard, DoD Civilians, Retired Military, Retired DoD Civilians, their dependents, and DoD Contractors with a current DoD Common Access Card (CAC). Individuals not meeting the DoD Personnel category who are members of the public (must be US citizens) not affiliated with the DoD are herein referred to as Non-DoD.
- **Restricted Areas**—DoD personnel are afforded additional recreational opportunities on Tyndall AFB under the authority of AFI 34-262.
- **Prohibited Areas**—Certain areas of Tyndall AFB are prohibited for recreational activities for force protection, public safety, operations, or ecological protection.

However, access to Tyndall AFB for recreational purposes is in part determined by the force protection level of the base. The Base Commander may restrict recreation access and privileges to any area of the base at any time. Closed areas are typically fenced or posted; however, with over 120 miles of shoreline, Tyndall AFB does not post all shoreline areas.

IAW the public access classifications and pertinent outdoor recreation rules listed above, the public can enjoy many recreation activities on the installation. The East Side Tyndall AFB WMA is generally open to public recreation, despite some restrictions for force protection, public safety, operations, and ecological protection. If recreational use restrictions (due to higher force protection levels) remain in effect for a significant period of time, the Natural Resources Office will contact FWC to explain the situation. The West Hunt Unit (described in the following section) is not incorporated into the WMA system because background checks are required and immediate access is not available to the public.

Enforcement of recreational access and other Tyndall AFB-specific regulations is discussed in Section 7.3.

7.2.1 Recreational Hunting Program

Tyndall AFB's hunting program is popular and includes the following hunting seasons: archery (antlered and antlerless deer, small game, feral hogs [*Sus scrofa*], coyotes [*Canis latrans*]), small game, muzzle-loader (antlered deer, small game, feral hogs, coyotes), general gun (antlered deer, antlerless deer on specific weekends, small game, feral hogs, coyotes), American alligator, and migratory bird season (as defined in the State of Florida Hunting Regulations). Antlerless deer tags may be provided throughout each big game hunting season (archery, muzzleloader, and general gun) to allow antlerless harvest until the quota is met. Hunting programs at Tyndall AFB are managed to ensure wildlife resources are conserved and sustainably used. Specific regulations are provided in the Tyndall AFB Hunting, Fishing, and General Recreation Regulations (Tyndall AFB 2024*a*) and the Tyndall AFB Outdoor Recreation Component Plan (Tyndall AFB, draft report, 2020). All hunters must also follow general state laws and regulations relating to wildlife, unless specifically noted otherwise.

All hunters must hold a current and valid hunting permit. Hunting permits may be obtained online from iSportsman. Hunters must check in at the check station prior to their hunt and check out when leaving. The check station updates hunters about which hunting areas are open or closed on a daily basis. The check

station is typically open only on Fridays, Saturdays, Sundays, and holidays. It is staffed only as appropriated funds are available.

The hunting program has the following notable components:

- Three dove fields are planted (contingent upon funding) and maintained as needed by mowing, burning, and disking. These fields tend to attract mourning doves away from the airfields, thus reducing BASH potential.
- Disabled persons' hunting and fishing is available, along with viewing points.
- Disabled persons' fishing access is available on the dock and in designated areas.
- Food plots may be planted (contingent upon funding) to provide supplemental nutrition to deer and other game throughout the year.
- The hunting program ensures that carcasses from hunting program are removed from the base to prevent attracting scavenger animals such as vultures that could increase BASH threat.

White-tailed Deer

The greatest public demand for Tyndall AFB's land is for deer hunting. Deer herd management is divided into 3 zones on Tyndall AFB, the West Hunt Unit, East Hunt Unit, and the Flightline Hunt Unit:

- **West Hunt Unit (DoD Personnel only)**—This unit comprises the areas around main base and housing. It has the highest hunter pressure.
- **East Hunt Unit**—This unit encompasses the areas to the east surrounding the drone runway and Silver Flag. This unit has fewer hardwoods in comparison to the West Hunt Unit; habitat in this unit is expected to improve as prescribed burning increases.
- **Flightline Hunt Unit (DoD Personnel Only)**—This unit is located behind the flightline in the vicinity of the alert area. Unlike the white-tailed deer management goal in the East and West Hunt Units, the management goal in the Flightline Hunt Unit is to harvest enough deer to keep the population low. By controlling the population size, the possibility of a deer strike on the airfield is reduced. There is no quota on the Flightline Unit and antler restrictions follow the regional state rules.

Tyndall AFB has an excellent deer herd in terms of numbers, body weights, and antler development. A picture of two white-tailed deer is shown in Figure 7-2. This is largely a result of hunting regulations and deer bag limits enacted by Tyndall AFB. An example of Tyndall AFB's regulations was the mature buck definition, which was introduced in the 1995 Hunting and Fishing Regulations. Since that time, the definition has changed slightly but maintains the same premise. A mature buck is currently defined as an antlered deer with at least 4 antler points on one side, with each point at least 1 inch in length (East and West Hunt Units), or at least 2 antler points on one side, at least 1 inch in length (Flightline Hunt Unit only). Currently, the Tyndall AFB bag limit is 4 deer per hunter, 2 of which may be antlerless.

Figure 7-2. White-tailed deer at Tyndall Air Force Base

The National Deer Association (2012) states that 3 mature bucks should be harvested for every 500 acres of good-quality habitat. The Tyndall AFB Natural Resources Office has adapted those guidelines based on installation-specific factors. Because Tyndall AFB has poor-quality habitat for deer, the deer harvest quota is currently 1 mature buck for every 500 acres. This lower quota helps maintain deer recruitment and a sustainable, healthy herd.

Hunters are required to obtain a tag for the specific tree stand or hunt block at which they are hunting that day. Currently, deer hunting is restricted to the pre-placed ladder stands belonging to the Natural Resources Office and the pre-approved mobile stands/ground blinds.

Wild Turkey

Tyndall AFB hosted turkey hunting seasons from the mid-1990s to 2023, following a successful turkey restoration program. Turkey restoration began in 1993, when 23 turkeys were released on the West Hunt Unit. Seven additional turkeys were introduced in 1997 to the East Hunt Unit. A sighting index is used to monitor populations on both hunt units. Spring turkey hunting began on the West Hunt Unit in 1998.

Despite the successful reintroduction, the turkey hunting season was cancelled in 2024 due to a steady decline in the turkey population. This is likely due to the loss and lack of roosting trees and reduced ground cover from Hurricane Michael in 2018. The Tyndall AFB Natural Resources Office has determined that the hunting season will remain closed until the turkey population increases.

Turkey habitat is expected to increase in area and quality as forestry restoration efforts continue. Expansion of the prescribed fire program is expected to improve marginal turkey habitat.

Wood Duck

Wood duck management on Tyndall AFB has historically been sporadic. Several small water holes were dug on the West Hunt Unit to serve as temporary feeding and roosting areas. During dry periods of the year, these ponds evaporate and the resident wood ducks congregate in Lake Yvonne and the freshwater swamp adjacent to Warbler's Way.

Mourning Dove

There is high demand for managed dove hunting on Tyndall AFB, possibly due to the fact that there is very little agriculture and other quality dove habitat in Bay County. Due to Tyndall AFB's proximity to Panama City, many hunters would rather drive to the base than to the northernmost counties in the Panhandle.

Three dove fields are currently managed and maintained by Natural Resources Office staff, contingent upon funding. The fields provide forage and cover for residential and migratory doves alike. Hunters may hunt for dove only within these fields during Phase 1 of the dove hunting season but can hunt in any gun block during Phases 2 and 3.

Other Game Species

Tyndall AFB has hunting seasons for other small game species (i.e., gray squirrel [*Sciurus carolinensis*]), but habitat is not actively managed for these species. General land management such as prescribed fire is typically beneficial to these species.

American Alligator

Hunting of American alligator is allowed on Tyndall AFB. However, hunters must have a Tyndall AFB Recreation permit (Non-DoD only) and meet all the access requirements stated in the access section of the hunting and fishing regulations. Additionally, hunters must have a Bay County Alligator Harvest Permit, as required by the State of Florida to hunt alligator on Tyndall AFB. Hunters must follow all Florida hunting regulations. Hunting is allowed in all open gun hunt blocks and PQM Lake (DoD and Non-DoD). Non-DoD hunters are not allowed in hunt blocks, lakes, or ponds in the West or Flightline Hunt Units unless escorted by a DoD hunter. The Natural Resources Office may identify other areas as needed. The use of gig-equipped bang sticks is authorized for taking alligators attached to a restraining liner, IAW state regulation.

7.2.2 Recreational Fisheries Program

Tyndall offers freshwater and saltwater fishing options. Freshwater fishing areas include Felix Lake, Horseshoe Lake, PQM-102, and Olympia and Seminole ponds (Figure 7-1). Saltwater fishing is allowed for DoD personnel at designated boat ramps and along shorelines, unless otherwise posted.

A Tyndall AFB recreation permit is required for all types of fishing, with the exception of DoD personnel saltwater fishing from shore. Tyndall AFB fishing permits may be obtained at the hunter check station or at iSportsman. All State of Florida rules apply to fishing on the installation (including required state recreational fishing license). The Tyndall AFB Hunting, Fishing, and General Recreation Regulations (Tyndall AFB 2024*a*) provide detail for permitting requirements and access restrictions.

The fish species in Tyndall AFB ponds/lakes include largemouth bass, bluegill, redear sunfish (*Lepomis microlophus*), crappie (*Pomoxis* spp.), channel catfish, threadfin shad (*Dorosoma petenense*), and grass carp (*Ctenopharyngodon idella*). Good water quality and adequate habitat are necessary for largemouth bass reproduction, and with proper management, the population is generally self-sustaining, with little to no restocking. Bluegill are managed in the fisheries program because they provide a source of food for largemouth bass, are prolific spawners, usually do not require restocking, and populations can withstand intense fishing pressure. Small ponds on Tyndall AFB are managed for channel catfish; these fish are utilized by visiting anglers, special event groups, and outreach groups as a put-grow-and-take-fishery and are restocked as needed and as funding allows. Additional information on the specific management requirements and access categories for the managed ponds and lakes is available in the Tyndall AFB Outdoor Recreation Component Plan (Tyndall AFB, draft report, 2020).

Beaches at Tyndall AFB provide saltwater fishing opportunities for authorized DoD personnel and do not require a Tyndall AFB permit, unless otherwise posted. Non-DoD personnel are required to have a recreation permit to access the East Hunt Unit and Bonita Bay/Shoal Point, further described in the access section of the 2024–2025 Hunting, Fishing and Recreation Regulations (Tyndall AFB 2024*a*). Foot traffic and access to sand dunes and sea oats for all reasons, including fishing access, is prohibited due to their sensitive nature. All State of Florida saltwater rules, regulations and required state fishing permits apply to fishing activities on Tyndall AFB. Common saltwater fish include redfish (*Sciaenops ocellatus*); tarpon (*Megalops atlanticus*); barracuda (*Sphyraena barracuda*); Atlantic bonito (*Sarda sarda*); sheepshead (*Archosargus probatocephalus*); and various sharks, drum, and mackerel species.

7.2.3 Other Recreational Activities

In addition to hunting and fishing, many other recreational opportunities are provided on Tyndall AFB, including access to boating, swimming, diving, waterskiing, canoeing, camping, picnicking, and trail walking. A general recreation permit is required by Non-DoD members for such activities and may be obtained through the online permit system. Applicable regulations are provided in the Tyndall AFB Hunting, Fishing, and General Recreation Regulations (Tyndall AFB 2024*a*).

Off-Road Vehicle and Mountain Bike Use

Tyndall AFB has 120 miles of existing roads and trails that are designated for off-road vehicle and mountain bike use. The use of off-road vehicles and mountain bikes on the beach or on undesignated areas and trails is prohibited. The Tyndall AFB Natural Resources Office provides oversight for all maintenance and rehabilitation of off-road vehicle roads and trails.

7.2.4 Other Considerations for Outdoor Recreation Management

Sandy shoreline habitats are important for outdoor recreation, and in the absence of conservation efforts, these habitats could be severely reduced by flooding. Intensive beach use may need to be limited in order to improve efficiency of beach nourishment and stabilization projects. Without restrictions on intensive beach use, foot traffic, and human activity, the installation risks complete erosion of its sandy shores and related recreational opportunities. Game species surveys should be conducted frequently to assess the status of hunting opportunities. Game species numbers may decrease in response to some of the trends in regional conditions, including extreme weather and flooding. Other activities such as camping, boating, hiking, and nature viewing will also rely on ongoing efforts to ensure that infrastructure and facilities remain resilient to floods.

7.3 Conservation Law Enforcement

Installation Supplement

Applicability Statement

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

Program Overview/Current Management Practices

The Natural Resources Conservation Law Enforcement Officer (CLEO) and FWC officers enforce the laws pertaining to natural resources at Tyndall AFB. Tyndall AFB game regulations are state law and enforceable by the base Conservation Officer and FWC through FACs 68A-15.004 and 68A-15.063 (20) and 16 USC § 670 (Uniform Code of Military Justice).

The Tyndall AFB CLEO enforces state, federal, and Tyndall AFB-specific regulations, whereas FWC officers enforce only state and federal laws. Tyndall AFB Security Forces focus on traditional law enforcement activities and do not typically check for compliance with natural resources regulations. The Conservation Law Enforcement Program Operations Plan (CLEP-OP, Tab 8) ensures effective enforcement of all applicable federal and State of Florida conservation laws and regulations, including DoD and DAF regulations, for the management and protection of natural and cultural resources at Tyndall AFB. This CLEP-OP shall be used as the standard operating procedure to guide the federal CLEO stationed at Tyndall AFB.

Hunting and fishing regulations and a corresponding map are published annually and are provided online and to persons purchasing permits. Hunting and fishing regulations contain federal, state, and installation fish, wildlife, and natural resources laws. Installation personnel are encouraged to report violations to the commander, who can bar or otherwise discipline violators outside of formal law enforcement channels.

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

Installation Supplement

Applicability Statement

This section applies to DAF installations that have T&E species on their property. This section is applicable to this installation.

Program Overview/Current Management Practices

The Tyndall AFB Natural Resources Office cooperates with the USFWS to protect, recover, and manage T&E species in a manner that provides maximum mission flexibility while ensuring regulatory compliance. The mission poses few threats to protected species on base, which are generally found either on the barrier islands, in upland forests, or within wetlands, where interactions with the military mission are minimal. With proper management, Tyndall AFB can practice good stewardship without compromising its military mission.

Tyndall AFB's general strategy for T&E species management is described below. Goals, objectives, and projects for future management of T&E species and habitats are listed in Section 8.0, and additional details on management activities are provided in the Threatened and Endangered Species Component Plan (Tab 3).

Management and Recovery of Threatened & Endangered Species for Mission Support

A combination of habitat and species management is used to sustain T&E species populations on Tyndall AFB. The Natural Resources Office conducts a variety of management activities to conserve and manage T&E species habitat, including prescribed burning, longleaf pine ecosystem restoration, native groundcover restoration, barrier island dune restoration, and wetland restoration. Species-specific management may include population monitoring, habitat management, and species translocation. When progress is made toward species recovery, mission flexibility is increased.

Endangered Species Act Section 7, Marine Mammal Protection Act, and Magnuson-Stevens Fishery Conservation and Management Act Consultations for Mission Support

Projects or activities that may impact federally protected species must go through EIAP review. During this process, required ESA and MMPA consultations and permits are identified and protective measures are developed to avoid or minimize impacts. Tyndall AFB's Natural Resources Office conducts consultations

with the USFWS and NOAA Fisheries regarding potential impacts to T&E species associated with the installation's missions. The Natural Resources Office works closely with mission personnel in preparing Biological Assessments, coordinating permit details with regulators, and briefing mission proponents on binding Terms and Conditions. Maintaining good working relationships with regulators is vital to the expedient processing of consultations.

Some of Tyndall AFB's missions occur over the GOA and have the potential to impact marine mammals. In these instances, an MMPA permit is required. These permits are granted by NOAA Fisheries. Most of Tyndall AFB's overwater missions are currently included in a Programmatic EA and an associated Biological Assessment and MMPA permit prepared by Eglin AFB. However, it is possible that Tyndall AFB will need to prepare MMPA permit applications in the future.

Tyndall AFB must conduct a consultation with NOAA Fisheries for any project or activity that may impact EFH surrounding or directly adjacent to Tyndall AFB. The consultation process includes 4 steps: (1) Tyndall AFB must provide notification of the action to NOAA Fisheries, (2) Tyndall AFB must submit an EFH assessment to NOAA Fisheries, (3) NOAA Fisheries will issue EFH conservation recommendations to Tyndall AFB, and (4) Tyndall AFB will provide NOAA Fisheries with a plan for implementing its project or activity. Numerous EFHs surround Tyndall AFB and are subject to consultation. Tyndall AFB will use the NOAA EFH Mapper to identify EFHs during planning efforts.

Natural Resources Compliance

After Tyndall AFB conducts ESA Section 7 consultations with the USFWS and/or NOAA Fisheries, a concurrence letter for informal consultations or a Biological Opinion, including an Incidental Take Statement (excluding plant species), is sent to Tyndall AFB. The concurrence letter or Biological Opinion outlines the conservation measures and Terms and Conditions that must be completed for the exemption in Section 7 of the ESA to apply; these are legally binding and non-discretionary. If Tyndall AFB fails to assume and assure implementation of the Terms and Conditions or fails to require the participants in the activities to adhere to the Terms and Conditions of the Incidental Take Statement through enforceable terms, the protective coverage of Section 7(a)(2) may lapse. Tyndall AFB works in coordination with the USFWS to streamline Section 7 consultations, EIS, EAs, and other applicable regulatory permits and facilitates communication with pertinent personnel to implement legal requirements. As part of this process, the Natural Resources Office will brief incoming commanders.

The INRMP as a Substitute for Critical Habitat Designation

Unless it is determined to not be prudent or determinable, designation of critical habitat is intended to occur simultaneously with the listing of a T&E species. Areas designated as critical habitat are constrained with respect to the types of activities that can occur in those areas. Per Section 7(a) of the ESA, federal agencies must ensure that their actions do not jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. Designation of critical habitat uses the best available scientific data and considers the economic and other impacts of such designation. The Secretary of the Interior (USFWS) or the Secretary of Commerce (NOAA Fisheries) is responsible for designating critical habitat for T&E species.

National Defense Authorization Act for Fiscal Year 2004 (House Resolution 1588)

The passage of the National Defense Authorization Act for FY04 further emphasized the importance of the INRMP by allowing the INRMP to substitute for critical habitat designation under the ESA as long as implementation of the INRMP provides a benefit to the particular species. Significant changes to the ESA

and the MMPA are identified in the National Defense Authorization Act for FY04 (House Resolution 1588), including the following:

Section 318. Military Readiness and Conservation of Protected Species

- Critical habitat will not be designated on any lands or geographical areas owned or controlled by DoD if an approved INRMP is in place (16 USC § 1533((1)(3)(B)(i))).
- Section 7 consultations will still be required for activities affecting listed species.
- National security must be considered when designating critical habitat.

Section 319. Military Readiness and Marine Mammal Protection

- The Secretary of Defense, after conferring with the Secretary of Commerce/Interior, may exempt any action from compliance with any MMPA requirement, if it is necessary for national defense.
- "Harassment" definitions are modified for military readiness activities.
    - Level A—any act that injures or has the significant potential to injure
    - Level B—any act that disrupts behavioral patterns such that they are abandoned or significantly altered
- For incidental take authorizations (1- or 5-year), determination of "least practicable adverse impact" must take into consideration military personnel safety, practicality of implementation, and impact on the effectiveness of a military readiness activity.
- Incidental take authorizations affecting military readiness activities will not be subject to "geographical region" or "small numbers" restrictions.

This INRMP and the associated Threatened and Endangered Species Component Plan (Tab 3) serves as the substitute for critical habitat designation under the ESA special management criteria. The INRMP must provide a conservation benefit to the species, provide certainty that the management plan will be implemented, and provide certainty that the conservation effort will be effective. This is particularly important, given the candidate and other NLW species occurring in the vicinity of Tyndall AFB that could become listed. Tyndall AFB's INRMP and Threatened and Endangered Species Component Plan clearly show how management actions adequately protect and benefit species, and thus, they should preclude any future critical habitat designation on the installation.

Critical habitats were designated for the piping plover, Gulf sturgeon (*Acipenser oxyrinchus desotoi*), Choctawhatchee beach mouse, and St. Andrew beach mouse (*Peromyscus polionotus peninsularis*) prior to finalization of Tyndall AFB's INRMP in 2006 (USFWS and NOAA Fisheries 2003, USFWS 2006). Thus, Tyndall AFB did not qualify for exemption from designation (Figure 12 in Tab 9). Critical habitat for the loggerhead sea turtle (*Caretta caretta*) is located directly adjacent to the southeast of Tyndall AFB but is not overlapping with the base.

7.4.1 Management and Monitoring of Federally Listed Species

Tyndall AFB's management and monitoring activities are conducted IAW applicable species recovery plans and permits and are coordinated with the USFWS and FWC through INRMP reviews and additional discussions, as necessary. In situations where recovery plans are not available or where specific guidance is not provided in the recovery plan, Tyndall AFB confers with the USFWS and species experts to determine acceptable methods.

Federally listed species, federal candidate and other NLW species, and species protected by other federal laws are described below. Summaries of their status, monitoring, and management activities are provided as applicable. The Threatened and Endangered Species Component Plan (Tab 3) includes additional information about T&E species and their management on the base.

In 2024, the USFWS completed an informal consultation, conference opinion, and Biological Opinion based on its review of the DAF's proposed activities related to flight operations at 32 installations across the contiguous United States, including Tyndall AFB (USFWS 2024*a*). The document includes non-discretionary Terms and Conditions of the Incidental Take Statement provided in the Biological Opinion (USFWS 2024*a*). Measures designed to reduce the impacts to each species within the range of Tyndall AFB are provided below.

Red-cockaded Woodpecker

The red-cockaded woodpecker (RCW; *Dryobates borealis*) is a federally threatened bird that is endemic to open, frequently burned pine ecosystems in the southeastern United States (USFWS 2003). The RCW is the only woodpecker species in the southeast to excavate cavities in live pine trees. RCWs prefer fire-maintained, mature longleaf pine forests that are at least 80 to 100 years old (although they use trees as young as 60 years old), as older longleaf pines have a greater incidence of red heart disease, which makes cavity excavation easier. Habitat loss is a primary threat to this species.

Prior to Hurricane Michael, RCWs did not occur on the installation, but they did nest and forage in areas near Tyndall AFB (approximately 1.5 miles away, at Lathrop Island). Severe damage to timber from Hurricane Michael on Lathrop Island destroyed most of the cavity trees. However, during surveys on the island prior to a prescribed burn in 2024, 3 active cavity trees and 2 inactive trees were discovered, along with 2 RCWs, and a third RCW was suspected to be in the area. Severe wind damage to mature slash pine trees from the hurricane resulted in 9,432 acres being clearcut across Tyndall AFB, which significantly reduced habitat area on base. Tyndall AFB has planted 7,611,977 longleaf pine seedlings on 7,870 acres from 2020 to 2025. Restoration has the potential to support RCWs in the future by providing additional habitat once the trees have matured.

Elevated temperatures and shifting seasonality have been correlated with changes in reproductive success for the RCW (Neal et al. 1993). Warmer temperatures have caused some females to respond by laying eggs earlier in the season, which has been linked to increased reproductive success. However, this shift was not observed in less experienced females, females that changed mates, or inbred females (USFWS 2019).

The 2024 Biological Opinion (USFWS 2024*a*) states that little to no impact to the RCW is expected from air activities at Tyndall AFB. However, the Biological Opinion requires that Tyndall AFB continue to implement its BASH Program to minimize potential RCW strikes. Pertinent measures include the following:

- Whenever possible, DAF will avoid scheduling takeoffs, landings, and low-level flights on the airfield from 1 hour before sunrise to 1 hour after sunset, as peak bird/wildlife activity occurs during these times, as well as during nighttime hours and in marginal weather conditions.
- En route altitudes will be altered to avoid birds when sighted.
- Minimal transition training will occur in the local pattern (low-level flights near the airfield), and this training will only be conducted during low or moderate Bird Watch Conditions (fewer than 15 to 30 small birds or 5 to 15 large birds sited in the vicinity of the airfield).
- The land immediately surrounding the airfield should be managed to reduce its attractiveness to birds and other animals.

Piping Plover and Critical Habitat

The piping plover is a federally and state-threatened migratory shorebird that is present at Tyndall AFB during its non-breeding (wintering and migrating) season (15 July through 15 May). In Florida, piping plovers utilize sandy beaches and tidal flats on barrier islands and bay shoreline (USFWS 1996). All the barrier islands within Tyndall AFB are identified as critical habitat for non-breeding piping plovers; these areas are also designated as a CWA by FWC (Figure 12 in Tab 9). Critical habitat on the installation includes Shell Island, CIW, and CIE. The boundaries of the designated critical habitat are subject to change due to the changing morphology of the shoreline.

Piping plovers consistently winter along Tyndall AFB's shoreline during their non-breeding season. Their concentration is highest in areas containing pools and low-elevation beach sites that are washed over and exposed by tidal fluctuations. These include, but are not limited to, the tidal salt pools on CIE, both sand spits adjacent to Hurricane Cut (currently closed), and the area known as East Pass on Shell Island, which has been a closed pass since 2004. During Hurricane Michael, a half-mile section of the tip of CIE was cut off from the main island and is now separated by approximately 0.75 mile of water. This island has become a preferred area for nesting and overwintering shorebirds, partly due to the lack of predators on this newly formed island.

Tyndall AFB manages for the piping plover by maintaining suitable habitat and preventing or minimizing disturbance. Restoration of beach dune environments through debris capture and sea grass plantings comprise the majority of habitat management efforts. Dune restoration efforts are further discussed in Section 7.13. Signs and fencing are used to protect foraging areas within piping plover critical habitat from human disturbance. Disturbance due to dogs and beach driving is minimized through implementation of applicable Tyndall AFB Instructions and enforcement of CWA provisions. Predator control, including feral cat (*Felis catus*) control, is conducted as detailed in the Invasive and Nuisance Species Component Plan (Tab 2). Detailed management practices are provided in the Threatened and Endangered Species Component Plan (Tab 3). Surveys are currently conducted in partnership with FWC and Audubon. Data are entered into the Florida Shorebird Database. FWC and Audubon also conduct the annual winter shorebird count.

Piping plovers are particularly susceptible to flooding during severe storms due to their habitat preferences. Throughout their migration and wintering period (July to February), they rely on open sandy beaches and tidal flats for foraging and resting. If habitat loss occurs faster than new habitat can be created, population declines may be exacerbated. Because migration routes are concentrated and provide limited space, even small habitat losses can have a significant impact on shorebird populations (USFWS 2020).

The 2024 Biological Opinion (USFWS 2024*a*) states that little to no impact to the piping plover is expected from air activities at Tyndall AFB. However, the Biological Opinion requires that Tyndall AFB continue to implement its BASH Program, and describes several additional measures that are designed protect piping plovers on Tyndall AFB. These specific measures are detailed below:

- Ensure bird activity data is readily available for briefing aircrews. The supervising officer will advise each unit of the daily Bird Watch Condition. Each unit will post the Bird Watch Condition on a status board and inform all aircrews of any change in status.
- Maintain suitable habitat for piping plover foraging, sheltering, and roosting through:
    - Predator removal
    - Implementing and enforcing beach driving restrictions (Driving on dunes or dune vegetation is prohibited and beach access requires prior authorization; all vehicles will be

operated at speeds less than 10 mph; all authorized beach driving will occur landward of the wrack line from 1 November through 30 April)
- Construction and maintenance of boardwalks to eliminate pedestrian traffic in and around dunes and prevent erosion, and installation of fences to protect dunes
- Prohibiting pets on beaches at all times and ensuring pedestrians access the beach via marked roads or boardwalks only and stay out of sand dunes

Rufa Red Knot

The rufa red knot is a federally threatened species that occurs in small numbers at Tyndall AFB during its migration. It has similar habitat requirements as the piping plover and is present during similar times. Therefore, Tyndall AFB's management for the piping plover provides benefits to red knots as well. The red knot is included in bimonthly shorebird monitoring surveys conducted in cooperation with FWC, Audubon, and the FDEP, and the species is observed annually along the shorelines of Tyndall AFB.

The red knot population has declined by more than 90% in recent decades, with significant reductions observed at migratory stopover sites, including the Tyndall AFB area. These declines are largely driven by human activities such as habitat destruction and overharvesting of its prey. However, the species is also vulnerable to environmental changes, including high temperatures and solar radiation, which can elevate evaporative water loss (Gutiérrez et al. 2012). Additionally, shifts in tidal patterns may reduce the availability of intertidal habitat, potentially reducing both foraging areas and prey abundance.

The 2024 Biological Opinion (USFWS 2024*a*) states that little to no impact to the red knot is expected from air activities at Tyndall AFB. However, the Biological Opinion requires that Tyndall AFB continue to implement its BASH Program to minimize potential red knot strikes. Additionally, the implementation of Tyndall AFB-specific measures designed protect piping plovers will also benefit the red knot.

Bald Eagle

The bald eagle has been removed from federal listing but remains protected at the federal level under the BGEPA and the MBTA. FWC removed the bald eagle from the state's list of threatened species in 2008 and simultaneously passed an eagle-specific rule (FAC 68a-16.002). The bald eagle is seldom seen far from water, typically occurring along coastal and bay shorelines, rivers, and lakes. Bald eagles are regularly observed on the installation during winter.

Although bald eagle populations have recovered, they continue to face various threats such as habitat loss, human disturbance, and poisoning (Buehler 2020, NatureServe 2025*a*). Although they consume a wide range of prey, fishing and scavenging remain their primary feeding strategies. Their range is influenced by the availability of suitable nesting and perching sites near open bodies of water, especially areas with abundant water-to-land edges (Buehler 2020). Their prey, which is primarily aquatic, is closely tied to seasonal fluctuations, meaning changes in precipitation can affect prey habitats, altering the availability and distribution of food sources (Kelble et al. 2007, Montague and Ley 1993)

Tyndall AFB must comply with the BGEPA and the MBTA while maintaining mission readiness. Specific bald eagle management goals include restoring or maintaining suitable habitat, providing year-round protection of nest trees, maintaining a buffer around nesting trees to minimize impacts from disturbances, and minimizing BASH impacts. Detailed management practices are provided in the Threatened and Endangered Species Component Plan (Tab 3).

Additionally, Tyndall AFB follows the National Bald Eagle Management Guidelines, which recommend land management actions to benefit bald eagles and mitigate their disturbance. Bald eagle nest surveys are

conducted annually to record nest status (active/inactive) and presence of juveniles. After 2 aircraft collisions with bald eagles in 2013, a GPS tracking/monitoring project was proposed but never funded. If a BASH conflict with bald eagles is identified, relocation of a nest may be needed (once proper permits have been obtained); however, this approach is not likely to succeed without constant harassment of the birds, as nesting habitat is available throughout the installation. In addition, to avoid attracting birds of prey, Airfield Management and Flight Safety are actively engaged in habitat modification to discourage prey species presence on the airfield.

Black Rail

The eastern black rail (*Laterallus jamaicensis* ssp. *jamaicensis*) is a federally threatened subspecies. Black rails are highly secretive birds that can be found in freshwater to saltwater marshes (Schwarzer et al. 2024). Florida supports year-round resident and wintering birds. Their habitats typically contain cordgrass (*Spartina* spp.), needlegrass rush and, often, eastern baccharis bushes (FWC 2003). They require sites with a mixture of shallow-water wetlands and dry uplands (Atlantic Coast Joint Venture 2020). Because detectability of this species is very low, 9 to 15 repeat surveys may be needed to attain a 90 to 95% detection probability (Schwarzer et al. 2024). Management activities can support black rails by maintaining shallow-water conditions throughout the breeding season, limiting encroachment of woody vegetation, maintaining herbaceous vegetation coverage, providing patches above the high water mark, and for tidal marshes, assisting marsh migration to mitigate flooding impacts (Watts 2022). Tyndall AFB has tidal marsh and freshwater marsh areas that may be suitable for black rails. The 325 CES/CEIE conducted black rail habitat assessments in March 2025 and plans to conduct call surveys during spring 2026 or 2027. Survey results will be integrated into the INRMP during the annual review and update. Currently, it is unknown whether black rails are present at Tyndall AFB.

Alligator Snapping Turtle

The alligator snapping turtle was proposed for listing as threatened under the ESA in 2021. The alligator snapping turtle is North America's largest freshwater turtle species. This species is distributed from Florida to Texas and north to Illinois (FNAI 2001). In Florida, this species is found in the Panhandle and Big Bend regions, from the Escambia River to the Suwannee River (Ewert et al. 2006). Alligator snapping turtles are generally found in deeper waters of large rivers or their major tributaries, although they can also be found in other water bodies, including swamps, lakes, small streams, and brackish waters. The species is usually bottom dwelling, surfacing periodically to breath. It prefers sites with numerous aquatic structures such as woody debris and submerged vegetation versus sites with more open water. Sexual maturity is reached at 11 to 21 years. In Florida, gravid females leave the water in spring (from late April to mid-May) and travel 2 to 200 (typically up to 20) yards inland to lay eggs in nests that they dig in sandy soil (Ewert and Jackson 1994, DoD Partners in Amphibian and Reptile Conservation [DoD PARC] 2021, USFWS 2021). After 100 to 110 days of incubation, hatchlings emerge in mid-August (Ewert and Jackson 1994).

Threats to this species include pollution to waterways; draining of wetlands; collection; harm from fishing, particularly on lines set for catfish; removal of submerged woody debris; and nest depredation by mammals and birds (Ewert et al. 2006, Pritchard 2006, DoD PARC 2021). Elevated temperatures produce populations with a strong female bias due to the species' temperature-dependent sex determination, i.e., females develop at higher incubation temperatures (USFWS 2021). A skewed sex ratio may reduce population viability over time.

The alligator snapping turtle will be considered during the EIAP process for mission actions and will be provided protections and management when consistent and not in conflict with the mission. DoD PARC

(2021) provides BMPs for alligator snapping turtle management on DoD installations, and would provide an effective guide for management on base.

American Alligator

The American alligator (Figure 7-3) is federally threatened due to its similarity of appearance to the American crocodile and is additionally protected as a federally-designated threatened species under Florida's Endangered and Threatened Species Rule. However, there are generally no Section 7 requirements under the ESA for this species. Alligators are abundant on the installation, having been observed in nearly all bodies of water, including freshwater ponds, wetlands, and brackish and saltwater areas. No specific monitoring or management activities for the American alligator are in place on Tyndall AFB. However, nuisance alligators are relocated or removed, depending on their size (Tab 2).

Extreme weather events, such as tropical storms and resulting storm surges, may negatively impact American alligator populations by reducing the extent of coastal wetlands used for feeding and nesting (Wanless et al. 1994). Years with abnormal temperatures could influence the sex ratio of offspring, as sex determination in this species is temperature-dependent during embryo development (Ferguson and Joanen 1982).

Figure 7-3. American alligator at Tyndall Air Force Base

Loggerhead, Green, Kemp's Ridley, and Leatherback Sea Turtles

Status

The threatened loggerhead and green sea turtles (*Chelonia mydas*) and the endangered Kemp's ridley (*Lepidochelys kempii*) and leatherback sea turtles (*Dermochelys coriacea*) occur in the nearshore GOA waters off Tyndall AFB (FWC 2025*a*, 2025*b*, 2025*c*, 2025*d*). The beaches of Tyndall AFB are among the 10 densest sea turtle nesting beaches in northwest Florida (Lamont et al. 2020). Each year, between 44

(2014) and 131 (2023) sea turtle nests have been found on Tyndall AFB's beaches, including Shell Island, CIE, and CIW, and nests are sporadically found on Buck Beach. The loggerhead is the most common species, representing between 63% (2023) and 100% (2014) of the nests in a given year. Green sea turtles represent 0% (2014 and 2016) to 37% (2023) of the nests. There have been 2 recorded leatherback nests (2015 and 2024) and 1 recorded Kemp's ridley nest (2016) at Tyndall AFB. The peak nesting season for all 4 species of sea turtles occurs in June and July. By October 2014, 14 turtles (Kemp's ridleys, greens and loggerheads) had been caught in waters surrounding Tyndall AFB and 7 have been tracked with satellite tags (Lamont et al. 2015). These turtles are abundant in the waters around Tyndall AFB and data suggest that they show fidelity to these habitats (Lamont et al. 2015).

Threats

Sea turtle populations face a number of environmental stressors that may affect their reproductive success and long-term viability. Tropical storms and associated storm surges can inundate coastlines, leading to the loss of established nests and erode nesting beaches, reducing the availability of suitable breeding habitat (Wanless et al. 1994, Wallace at al. 2013). Prolonged exposure to abnormal temperatures presents additional challenges, particularly during the incubation stage. For loggerhead turtles, temperatures around 84 °F produce a mix of sexes, but incubation at sustained temperatures above 91 °F can result in embryo mortality (Hamann et al. 2010). Similar temperature thresholds exist for green sea turtles, where temperatures under 78 °F favor male hatchlings and those above 89 °F produce mostly females, with embryo death occurring above 91 °F (Gomuttpong et al. 2013). These imbalances may contribute to skewed sex ratios and reduced hatchling viability. Extreme weather and altered ocean conditions, such as shifts in currents and changes in prey distribution, may interfere with migration routes and foraging efficiency. These cumulative hazards emphasize the importance of monitoring nest success, habitat quality, and demographic trends for at-risk sea turtle populations.

Monitoring

A Marine Turtle Permit (FAC Rule 68E-1) issued by FWC is required for conducting activities involving sea turtles in Florida. Under Section 6 of the ESA, a cooperative agreement between the USFWS and FWC granted the State of Florida the authority to issue permits and monitor activities involving sea turtles. Tyndall AFB conducts sea turtle surveying and monitoring IAW the specific protocols detailed in the state permit.

Tyndall AFB's Natural Resources Office conducts early-morning sea turtle surveys 7 days per week on 18 miles of Shell Island, CIE, and CIW from 1 May to 31 August. These surveys are intended to locate crawls (tracks in the sand) of nesting female turtles (Figure 7-4), identify them to species, determine whether the crawls lead to a nest or do not result in a nest (i.e., false crawls), place protective screening over any nest to deter predators, and mark nest locations. Nests are monitored at least 3 times per week (or until the last nest hatches) from September through November to check for potential storm damage, hatching activity, and predation. The objective of the sea turtle monitoring program on Tyndall AFB is to provide location information for mission avoidance and annual data on the distribution and abundance of sea turtle nesting activity on the installation's beaches.

Additional information on monitoring is available in the Threatened and Endangered Species Component Plan (Tab 3). A newly hatched sea turtle is shown in Figure 7-5.

Figure 7-4. Sea turtle nesting tracks (crawl) at Tyndall Air Force Base

Figure 7-5. A newly hatched sea turtle at Tyndall Air Force Base

Management

The primary goal of sea turtle management on Tyndall AFB is to provide the highest level of capability and flexibility to the military operations while meeting the legal requirements of the ESA. Tyndall AFB's

Natural Resources Office conducts sea turtle conservation and management activities, including locating, marking, and protecting sea turtle nests. Additionally, Tyndall AFB's Natural Resources Offices assesses potential impacts to sea turtles from proposed mission activity; recommends conservation measures to avoid impacts to nesting sea turtles, their nests, and emerging hatchlings; and relocates turtle nests only if necessary and under specifically permitted conditions.

In addition to the actions identified above, Tyndall AFB implements the following management measures:

- Strandings
    - Responds to and investigates all sea turtle stranding reports
    - Collects appropriate data and reports to the Florida Sea Turtle Stranding and Salvage Network within 24 hours of investigating the report
- Disturbance
    - Controls predators by contracting USDA–Animal and Plant Health Inspection Service–Wildlife Services (USDA–APHIS–WS) personnel
    - Prohibits lights (Tyndall AFB 2024*a*), fires, and camping on beaches
    - Monitors light pollution and its impacts
    - Requires wildlife-friendly lighting on the Support Side of the installation as part of the Installation Facility Standards and Lighting Management Plan (Tyndall AFB 2020*b*), developed in relation to the post-hurricane infrastructure rebuild
    - Follow FWC's (2018) Sea Turtle Lighting Guidelines to the extent possible while meeting Tyndall AFB's mission safety requirements
    - Prohibits off-road vehicle use during nesting season
    - Constructs and maintains elevated boardwalks to eliminate pedestrian traffic in and around dunes and prevent erosion
- Habitat
    - Plants native vegetation, including native pine trees, to reduce light pollution
    - Protects, enhances, and restores dunes
- Research
    - Supports US Geological Survey and University of Florida sea turtle tagging and tracking project
    - Supports ongoing research across the Florida Panhandle, including at Tyndall AFB, to determine best methods to standardize sand temperature loggers; this research monitors sand temperature differences among beaches because sand temperature is a determining factor in the sex ratio of sea turtle hatchlings (the Panhandle is known to produce more males, whereas the Atlantic coast primarily produces females)

Choctawhatchee Beach Mouse and Critical Habitat

The federally endangered Choctawhatchee beach mouse occurs in Bay, Okaloosa, and Walton counties. Beach mice inhabit coastal dune ecosystems, including primary, secondary, and tertiary dunes, and prefer well-developed dunes vegetated with sea oats, Gulf bluestem, and other herbaceous plant species, as well as live oak, Florida rosemary, and other scrubby species associated with secondary and tertiary dunes (USFWS 2006). Critical Habitat Unit 5 for the Choctawhatchee beach mouse consists of more than 1,700 acres in Bay County that contain essential habitat features and includes portions of Shell Island, CIW, and the bay shoreline of the main peninsula.

The Choctawhatchee beach mouse, which primarily inhabits vegetated coastal dunes and has a limited range, is vulnerable to the direct and indirect impacts of tropical storms and tidal surges (Holler 1992). Variations in the frequency and intensity of these storms could have adverse effects on populations. While such changes cannot be solely attributed to any single factor, the species exhibits sensitivity to environmental fluctuations associated with storm activity. However, increases in precipitation and temperature may provide some indirect benefits. Additionally, the habitat alterations caused by tropical storms and hurricanes can enhance vegetation diversity, potentially benefiting the species, and may also facilitate greater genetic mixing by disrupting isolated population subgroups (Holler et al. 1999). Habitat loss from human disturbance may have contributed to the decline of beach mice.

Tyndall AFB conducts beach mouse conservation and management using several methods. The primary goals of beach mouse conservation and management at Tyndall AFB consists of 1) dune protection and restoration, 2) predator removal, 3) use of wildlife friendly shielded amber lighting on the Support side of the installation as required for the rebuild of Tyndall in the aftermath of Hurricane Michael, and 4) beach driving restrictions. Continued monitoring is essential to inform population estimates, inform future management actions, and contribute to the regional recovery effort for the mouse. USFWS conducts monthly track-tube surveys to monitor for the Choctawhatchee beach mouse on Tyndall AFB. Tyndall AFB has translocated individuals to St. Andrews State Park to support their efforts to reestablish populations. Management actions conducted for other species may also benefit the beach mouse. These actions include protection of dune habitat (i.e., boardwalk installation), dune habitat enhancement and restoration, and predator control (Tab 3).

St. Andrew Beach Mouse and Critical Habitat

The federally endangered St. Andrew beach mouse inhabits Bay and Gulf counties (USFWS 2010). The species currently consists of 2 distinct populations, with the majority of Critical Habitat Unit 1 occurring on Tyndall AFB's CIE property. Similar to their efforts to monitor the Choctawhatchee beach mouse, the USFWS conducts monthly track-tube surveys to monitor for the St. Andrew beach mouse along 6 miles of dune habitat on CIE. Continued monitoring is essential to inform population estimates, inform future management actions, and contributed to the regional recovery effort for the mouse

The St. Andrew beach mouse, which has a limited range and resides in vegetated coastal dunes, is vulnerable to both direct and indirect impacts of tropical storms and tidal surges. Hurricanes, in particular, are a recognized threat to this species (USFWS 1998). Shifts in the frequency and intensity of these storms could negatively impact populations. These changes cannot be solely attributed to any single factor, but the species exhibits sensitivity to environmental variations associated with storm activity.

Actions beneficial to the St. Andrew beach mouse include protection of dune habitat (i.e., boardwalk installation), dune habitat enhancement and restoration, and predator control (Tab 3).

Tricolored Bat

The tricolored bat (*Perimyotis subflavus*) was proposed for listing as endangered under the ESA in 2022. It is unknown whether tricolored bats are present on base. White-nose syndrome is the primary threat to this species, with population declines of 90 to 100% in areas affected by this fungal disease. Tricolored bats are widely distributed throughout the eastern half of the United States. Most reside in the same area all year, whereas others migrate north from Florida in the fall to hibernation sites (FWC 2024). In summer, they roost in live and dead leaf clusters of living or recently dead deciduous trees, Spanish moss (*Tillandsia usneoides*), and human-made structures such as bridges (USFWS 2022). Small maternity colonies inhabit palm fronds or tree foliage in summer. Forest habitat is not considered limiting for this species and would

not be designated as critical habitat (USFWS 2022). In winter, tricolored bats hibernate predominantly in caves and mines, although in the southern United States, they may hibernate in culverts (USFWS 2022).

Studies indicate that bat reproductive success tends to be lower during hotter and drier years (Cappelli et al. 2021). Warmer conditions within hibernation sites can contribute to increased fungal growth and higher infection rates of white-nose syndrome (Langwig et al. 2016). Elevated temperatures may also cause bats to rouse from hibernation more frequently, leading to higher energy expenditure and increased mortality risk. Years with warmer temperatures and high precipitation could support bat populations by enhancing food availability and accelerating juvenile development, but these benefits would likely be outweighed by the potential for disrupted hibernation, more frequent extreme weather events, and disease spread (Cappelli et al. 2021). Any weather patterns that drive a mismatch between insect emergence and bat activity would further threaten their survival (Center for Biological Diversity and Defenders of Wildlife 2016, Cappelli et al. 2021).

The 2024 Biological Opinion states that little to no impact to the tricolored bat is expected from air activities at Tyndall AFB (USFWS 2024*a*). However, the Biological Opinion requires that Tyndall AFB continue to implement its BASH Program to minimize potential tricolored bat strikes.

Florida Manatee

The Florida manatee (*Trichechus manatus latirostris*), a subspecies of the West Indian manatee, is a federally threatened marine mammal. Manatees are generally restricted to peninsular Florida in winter, but they disperse throughout the GOA and Atlantic Ocean coastlines during warm months and during migration, moving freely between freshwater and nearshore marine environments. Manatees are occasionally observed during the summer in the bays and GOA adjacent to Tyndall AFB. Manatee strandings have occurred as recently as winter 2020, and these incidents may increase as ocean water temperatures increase. Tyndall AFB provides educational materials for outreach. Additionally, Tyndall AFB may close portions of base-controlled marinas if manatees are present. The marina is maintained as a clean harbor, with strict refueling and waste disposal protocols in place.

Manatees are vulnerable to several environmental stressors that impact their survival and distribution. Harmful algal blooms, such as red tide (*Karena brevis*) events, have been responsible for substantial manatee mortality (Landsberg 2002). Increased hurricane activity in Florida has also been associated with decreased survival rates due to both direct and indirect causes of death, as well as displacement from storm-affected regions (Langtimm and Beck 2003). Since manatees depend on warm-water refuges to avoid cold stress, the loss of these habitats poses a significant threat to their viability, with cold-related mortality and declines in local populations observed when such refuges are eliminated (Laist and Reynolds 2005). Furthermore, manatee population dynamics and habitat use may be influenced by the condition and availability of seagrass beds, as seagrass is a critical food source for the species (Allen et al. 2024).

Sperm Whale

The sperm whale (*Physeter macrocephalus*) is a large, federally listed endangered species. Sperm whales are generally found in offshore waters, beyond the 656 feet isobath. Due to their wide distribution in the GOA, there are no active management measures in place for Tyndall AFB. Many of the overwater training activities originating from Tyndall AFB that may potentially affect sperm whales are included in the Eglin Gulf Test and Training EA (Eglin AFB 2015), Biological Assessment, and associated MMPA permit.

Gulf Sturgeon and Critical Habitat

The federally threatened Gulf sturgeon is an anadromous fish occurring in most major river systems from the Pearl River, Louisiana, to the Suwannee River, Florida, and in marine waters from the central and eastern GOA to offshore Florida Bay (USFWS and Gulf States Marine Fisheries Commission 1995). This large fish occurs predominately in the northeastern GOA, feeding in offshore areas and inland bays during the winter months and moving into freshwater rivers during the spring to spawn. Migration into freshwater generally occurs from March to May, and migration into the GOA starts in the fall. Sturgeon from multiple river systems have been detected overwintering in marine nearshore waters off Tyndall AFB. At Tyndall AFB, critical habitat extends from the Gulf coastal shoreline to 1 nautical mile offshore. Tyndall AFB does not conduct active management for Gulf sturgeon; however, stormwater is managed to reduce or eliminate sediments, nutrients, and other forms of pollution as part of operational BMPs.

Smalltooth Sawfish and Critical Habitat

The federally endangered smalltooth sawfish (*Pristis pectinate*) is an elasmobranch that currently inhabits warm, shallow coastal and estuarine waters of southern peninsular Florida. In the United States, this species has historically occurred in the GOA (from southern Florida to Texas) and along the Atlantic coast, from Florida to Cape Hatteras. Its range has contracted dramatically due primarily to bycatch mortality and habitat loss. Critical habitat consists of 2 areas along the southwestern coast of Florida between Charlotte Harbor and Florida Bay. Due to the unlikelihood of occurrence, Tyndall AFB Natural Resources Office does not conduct active management for smalltooth sawfish. However, stormwater is managed to reduce or eliminate sediments, nutrients, and other forms of pollution as part of operational BMPs.

Monarch Butterfly

The monarch butterfly is proposed as threatened under the ESA (USFWS 2024*c*). Tyndall AFB is within the range of the spring breeding areas for the eastern population of the species, which overwinters in a small region in Mexico (NatureServe 2024). The 325 CES/CEIE has documented 9 species of native milkweed, the monarch's larval host plant, on the installation. The DoD's Section 7(a)(1) Conservation Strategy for the Monarch (Natural Resources Institute 2024) instructs NRMs on installations that contain monarch habitat to continue implementing any current BMPs for monarch conservation, to the greatest extent practicable, as well as adopt the BMPs and conservation practices recommended by USFWS within the conservation strategy. The strategy further directs NRMs to use the screening criteria appended to the document to minimize or avoid impacts to monarch from activities that occur within individual installations and further improve habitat conditions.

The DoD Pollinator Conservation Reference Guide (Armed Forces Pest Management Board 2018) provides additional information about monarch butterflies. It includes the following conservation actions to support the monarch butterfly:

- Assessing monarch habitat conditions to determine priority areas for conservation on DAF lands
- Maintaining native milkweed and other native flowering plants in monarch breeding areas
- Increasing native flowering plants along migration routes
- Eliminating or reducing pesticides in areas that support monarchs
- Eliminating invasive plants and nonnative tropical milkweed species
- Adjusting management activities to avoid interfering with breeding

Managers of DoD lands should coordinate with the local USFWS field office, state fish and wildlife agencies, and other partners such as the Monarch Joint Venture for assistance in developing and implementing site-specific monarch conservation priorities (Armed Forces Pest Management Board 2018, Natural Resources Institute 2024).

Coastal Flatwoods Crayfish

The coastal flatwoods crayfish is a small, brown crayfish that is under review for federal listing under the ESA. It is found in seasonally flooded flatwoods depressions and constructs a burrow when the flooded flatwoods depressions dry up. Its range is limited to Apalachicola flatwoods habitat in the Florida panhandle (NatureServe 2025*b*). Threats primarily include development of coastal flatwoods near within its habitat, and drainage of the seasonally flooded flatwoods depressions (NatureServe 2025*b*).

Management of the crayfish at Tyndall AFB includes determining the presence and range of the crayfish on base to inform future management actions. The crayfish will be considered during the EIAP process and will be provided protections and management when consistent and not in conflict with the mission. Existing wetland protections implemented by Tyndall AFB will simultaneously benefit the crayfish.

Godfrey's Butterwort

Godfrey's butterwort is a federally threatened and state-endangered carnivorous plant that is endemic to the Florida Panhandle (USFWS 1994). Typical habitat includes open, acidic, seepage bog soils on gentle slopes, deep quagmire bogs, ditches, and depressions in grassy pine flatwoods and grassy savannas, often occurring in shallow, standing water.

Primary threats include successional changes to habitat resulting from extended fire return intervals and habitat alteration due to timber harvesting and development. Godfrey's butterwort can withstand temporary flooding events, but it is vulnerable to prolonged inundation and shifts in salinity levels (USFWS 2009, US Forest Service 2014). Alterations in tidal conditions may flood areas where this species is found, increasing exposure to higher salinity. Additionally, hurricanes and storm surges may reduce or modify the habitat available for the establishment of Godfrey's butterwort.

Godfrey's butterwort is known to occur at 8 locations on Tyndall AFB. In February 2016, surveys located a population at the F-22 Munitions Storage Complex. At the time, Tyndall AFB requested a formal consultation with the Panama City Field office of the USFWS regarding the impact of construction on the Godfrey's butterwort population within the construction zone. The USFWS developed a Biological Opinion, and the population of 240 plants was subsequently removed from the construction site and transplanted within the Drone Recovery Field, which contained suitable habitat and an existing population. In 2024, the USFWS staff on Tyndall AFB completed 8 years of bi-monthly monitoring of the translocated population of Godfrey's Butterwort.

In addition to rare plant surveys, Tyndall AFB conducts prescribed fire in cooperation with the Wildland Fire Branch to manage these areas; however, more growing season burns and burning through wetlands are necessary to promote habitat and conditions for Godfrey's butterwort. Additionally, wetland restoration involving a combination of hand and mechanical removal of the dense shrub layer is being conducted to enhance wetland habitat.

Annual surveys will aid in monitoring the existing populations of Godfrey's butterwort and in mapping and documenting new populations. Surveys can also be used to facilitate further management actions to aid the species, supporting an adaptive approach for increasing its establishment and survival at Tyndall AFB.

Telephus Spurge

Telephus spurge is a federally threatened and state-endangered perennial herbaceous plant that is endemic to coastal (within 4 miles of the coast) areas of Bay, Franklin, and Gulf counties (FNAI 2022*b*). This species occurs in a variety of habitats, ranging from xeric scrub to mesic pine flatwoods, along disturbed sandy

roads, and less commonly, in wetlands with seepage slope species. Within pine flatwoods or upland pine communities, telephus spurge is associated with a longleaf pine and/or slash pine overstory and an herbaceous understory dominated by wiregrass, other native warm-season grasses, sedges, and forbs that have historically been burned on a 2- to 3-year fire return interval. This species is characterized as ephemeral, as it can appear suddenly and be abundant at newly disturbed sites but may not be there a few years later. Large tuberous roots allow this species to survive below ground when subjected to suboptimal or poor habitat or environmental conditions.

In August 2015, the first population of telephus spurge was found on Tyndall AFB, located along an open, sandy road adjacent to the explosive ordinance disposal (EOD) range. Large clusters of plants were detected during surveys in August 2017 in close proximity to the original EOD range population and in March 2018 near PQM Lake. Specific monitoring objectives for telephus spurge at Tyndall AFB include the following:

- Monitor the known population annually to determine changes in growth or decline over time relating to habitat enhancement or degradation
- Survey previously unsurveyed areas to detect new populations
- Map the distribution of telephus spurge on Tyndall AFB as new sites are detected
- Map population boundaries annually to assess expansion or contraction of the populations at each site
- Survey telephus spurge site(s) for invasive species and conduct invasive species treatments

As part of the Programmatic EA for Hurricane Recovery and Installation Development at Tyndall AFB, surveys for federally listed and candidate species occurred and a Biological Evaluation was prepared. Surveys of the action area (proposed commercial gate location) documented a newly found population of telephus spurge. Formal consultation began on 24 January 2020 and a Biological Opinion was developed and submitted to Tyndall AFB on 24 March 2020, outlining proposed mitigation efforts for impacts to this population. In April 2022, a total of 250 telephus spurge plants were translocated to a donor site. As a part of the Biological Opinion, future monitoring will occur on a monthly or bi-monthly basis for a minimum of 5 years.

Prescribed fire is the most important management tool for improving or maintaining habitat conditions for telephus spurge at Tyndall AFB, as this species is known to respond prolifically to fire and other disturbance.

Henry's Spiderlily

Henry's spiderlily is a state-endangered plant currently under review for federal listing. The species is endemic to the Florida Panhandle and typically occurs in wet pine flatwoods and along edges of cypress wetlands and ponds. Primary threats for Henry's spiderlily include habitat degradation and/or destruction and fire suppression. The species is present in the hydric flatwoods on Tyndall AFB. Tyndall AFB has conducted 2 years (2023 and 2024) of population counts and boundary mapping, starting with known locations of the species and expanding outward. Management objectives described for the federally threatened Godfrey's butterwort (described above) will directly benefit Henry's spiderlily. Frequent prescribed burns during the growing season, including fires that are allowed to burn through wetlands, are the most important management tools for improving or maintaining optimal habitat conditions for Henry's spiderlily. Additionally, avoidance of soil-disturbing activities such as plowing fire lines and bedding pine plantations will benefit this species.

Species Under Review

Tyndall AFB proactively manages for species under USFWS review for federal listing under the ESA when practical and consistent with the military mission. These species are listed in the NLW (Section 2.3.4) and may contain petitioned and candidate species. NLW species that occur or may occur on Tyndall AFB are listed in Table 7-2.

Table 7-2. National Listing Workplan species known or potentially occurring on Tyndall Air Force Base

Species	Scientific Name	Habitat	Management
Henry's spiderlily*	*Hymenocallis henryae*	Endemic to Florida Panhandle. Found in wet flatwoods and along edges of cypress stringers and ponds. Populations on Tyndall are in wet prairie habitats.	Prescribed fire and avoidance of soil-disturbing activities
Kral's yelloweyed grass	*Xyris longisepala*	Found in moist to wet margins of sinkhole lakes and sandhill upland lakes, seepage slopes and bogs, and wet prairies.	Not confirmed on Tyndall AFB, but potential habitat exists
Blackbract pipewort	*Eriocaulon nigrobracteatum*	Found in open, wet, mucky bogs at stream heads or in open, grassy seepage	
Smooth barked St. Johnswort	*Hypericum lissophloeus*	Occurs along shorelines and in shallow waters of sandhill upland lakes, typically within longleaf pine–deciduous scrub oak sandhills.	
Eastern diamondback rattlesnake*	*Crotalus adamanteus*	Inhabits sandy woodlands, pine flatwoods, and coastal scrub habitats. Utilizes gopher tortoise burrows, mammal burrows, and stumpholes for winter refugia, birthing habitat, thermal refuge, and shelter during ecdysis (shedding).	Prescribed fire and avoidance of soil-disturbing activities, particularly near gopher tortoise burrows; Where appropriate, retain stumps, logs, and other structural elements that serve as important thermal refuges and birthing sites for the species
Coastal flatwoods crayfish*	*Procambarus apalachicolae*	Found in seasonal ponds and may inhabit wet depressions in flatwoods. Constructs a burrow when ponds/depressions dry.	Wetlands protections apply

Table 7-2. National Listing Workplan species known or potentially occurring on Tyndall Air Force Base

Species	Scientific Name	Habitat	Management
Monarch butterfly (Eastern population)	*Danaus plexippus*	Inhabits a variety of habitats, including grasslands, shrublands, and open forests that support flower nectar sources. Requires milkweed to support reproduction.	Longleaf pine ecosystem management, including prescribed fire and native groundcover restoration to support wildflowers and milkweed

*Known to occur on Tyndall Air Force Base

7.4.2 Management of State-Listed Species and Other Species of Special Concern

There are numerous state-listed T&E species and SSC occurring seasonally or year-round on Tyndall AFB (Table 2-8). DAFMAN 32-7003 encourages the conservation of state-listed and other rare species, when practicable and not in direct conflict with the military mission. In addition, INRMPs are developed in cooperation with state wildlife agencies, which are the primary management agencies for state-protected species. Protection of state-listed, candidate, or other NLW species on Tyndall AFB could help reduce the likelihood of listing under the federal ESA. However, biodiversity management is not a DAF mandate, and as such, it is not considered a "must fund" area in the DAF budgetary system (DAFMAN 32-7003, Section 3.10.2).

Management operations for federally listed species and their ecosystems provide direct and indirect benefits to state-listed, candidate, or other NLW species. For example, Tyndall AFB's habitat management of the flatwoods ecosystem, which includes prescribed fire, longleaf pine restoration, and invasive species control, will benefit many state-listed species. Other beneficial management operations include coastal habitat enhancement and restoration, wetlands protection, and improvement through use of prescribed fire, public education, and limiting public access to sensitive habitat areas. Protective measures for state-listed species are recommended during the NEPA process. One important state-listed species that is managed directly on the base is the gopher tortoise, described below.

Gopher Tortoise

The gopher tortoise is a state-threatened species that provides habitat for more than 350 species that utilize its burrows. Thus, the conservation of gopher tortoises has a wide reach, providing benefits to the Florida pine snake and other species. Gopher tortoises prefer sandy soils, an open forest structure, and herbaceous groundcover, and they were historically associated with the longleaf pine ecosystem (USFWS et al. 2013). At Tyndall AFB, gopher tortoises occupy former sand pine sites that have been clearcut and roadways near degraded flatwoods and sand pine sites (Tab 3). Tyndall AFB staff conduct annual burrow surveys by walking transects and visually locating and scoping burrows in all suitable habitat. Burrows are marked to provide enhanced visibility to forestry equipment operators. Tyndall AFB manages gopher tortoises by removing predators such as coyotes and raccoons (*Procyon lotor*) near burrows; restoring the longleaf pine ecosystem; conducting prescribed burns; conducting outreach, including posting road signs and briefing heavy-equipment operators; and maintaining a 25-foot buffer around burrow entrances.

As with many reptiles, gopher tortoises have temperature-dependent sex determination. The pivotal temperature is approximately 84.2 °F, producing around 75% male hatchlings (Lazzari 2017). At an average of 78.8 °F, clutches are entirely male, while 89.6 °F yields only females. Shifts in temperature can

negatively impact habitat conditions, incubation success, and the ability of individuals to regulate body temperature. Additionally, high precipitation and intense storms can force tortoises to abandon burrows or become trapped inside (Mendonça et al. 2007).

7.4.3 Other Considerations for Threatened and Endangered Species Management

Many current management activities are appropriate for increasing resilience or facilitating adaptation to shifts in habitat availability over time. An ecosystem approach that prioritizes functional diversity, maintenance of habitat, habitat variability, and connectivity can help support genetic diversity that may be important for adaptation, and it can help species migrate to more favorable habitats. However, when approaching the uncertainty that is inherent with managing species under shifting environmental conditions, additional analysis and planning is required. Proactive approaches that anticipate change can help extend the period over which species can adapt to habitat loss and avoid catastrophic declines associated with stochastic events that act on an already stressed ecosystem.

7.5 Water Resource Protection

Installation Supplement

Applicability Statement

This section applies to DAF installations that have water resources. This section is applicable to this installation.

Program Overview/Current Management Practices

Water resources include groundwater and surface waters such as ponds, lakes, bays, bayous, and wetlands. Tyndall AFB is surrounded on 3 sides by East Bay to the north, St. Andrews Bay and Sound to the west and south, and the GOA to the south. Primary threats to these water resources are excess sedimentation, bacterial contamination, and high water demand for consumptive use.

Water Supply

Three groundwater aquifers underlie Tyndall AFB. These include the surficial aquifer, the Intermediate Confining Unit, and the Floridan Aquifer. Tyndall has 3 permitted drinking water wells that pump from the Floridan Aquifer. Other wells on base pump from the surficial aquifer, and this water is used primarily for irrigation. Tyndall AFB purchases potable water from Bay County. Bay County's water supply comes from Deer Point Lake, a 5,000-acre impoundment on the St. Andrews Bay system, located northwest of Tyndall AFB.

Wastewater and Stormwater Management

Almost all wastewater on Tyndall AFB is collected and sent to the Bay County Advanced Wastewater Treatment Plant. A slip line and pipe-bursting project updated much of the wastewater piping throughout the base. Due to the large available on-site storage, system overflow rarely occurs. Several areas are still on septic tanks, including the 9700 area, AFCEC (formerly, the Air Force Research Lab), the 9300 area (Full Scale Drone launch and recovery), the 8500 area (Sub-Scale Drone Launch), and several buildings in the 9400 area (Silver Flag). A major portion of the latter is connected to a sanitary sewer, with waste being sent to Bay County Wastewater Treatment Plant since 2012. During the rebuild of Tyndall AFB following Hurricane Michael, the base planned various wastewater infrastructure improvements and/or modifications.

Stormwater rapidly percolates into sand and surface drainage is adequate in most parts of the base. Tyndall AFB currently operates under a Multi-Sector Generic Permit issued by the FDEP and is permitted under the Industrial Sector "S", Air Transportation Facilities, of the National Pollutant Discharge Elimination System (NPDES) to operate facilities and discharge industrial stormwater from the flightline side of the base to surface waters. Tyndall AFB also has an MS4 permit from FDEP to discharge stormwater to surface waters. The NPDES stormwater permitting program is separate from Florida's stormwater/environmental resource permitting programs and local stormwater/water quality programs, which maintain their own regulations and permitting requirements.

Effective stormwater pollution prevention relies on BMPs such as preventative maintenance; prevention and response to spills; sediment and erosion control; structural runoff controls; hazardous material and waste management; petroleum, oil, and lubricant management; pesticide management; shoreline cleanups; and industrial and domestic wastewater management. Tyndall AFB's stormwater system consists primarily of open ditches in undeveloped areas and underground piping in developed areas.

Tyndall AFB has 7 permitted stormwater discharge points from the airfield and industrial areas. Drainage outfalls receive waters off-base, including some into Shoal Point Bayou, which is located northwest of the base and is the major receiving water to the north. Other outfalls discharge into Little Cedar Bayou (northeast of the base), Saint Andrew Sound (south of the base), and East Bay (northeast of the base).

To accommodate the rebuild of Tyndall AFB, various stormwater improvements were constructed throughout the flightline, support side, and Silver Flag. Regional systems were constructed where possible.

7.6 Wetland Protection

Installation Supplement

Applicability Statement

This section applies to DAF installations that have existing wetlands on their property. This section is applicable to this installation.

Program Overview/Current Management Practices

With approximately 40% of the installation classified as wetlands (Section 2.3.5), wetland protection is vital to the maintenance of natural systems within the installation. Wetlands on Tyndall AFB are protected to the greatest extent possible, but they are still vulnerable to threats such as nonnative invasive species, loss of plant species diversity due to inadequate fire frequency, fire seasonality (i.e., dormant-season vs. growing-season burning) and non-point source pollution in the form of sediment, nutrients, pesticides, oil, grease, and debris (see Wastewater and Stormwater Management section above). Ground disturbance and hydrologic alteration (primarily from past practices) are also concerns for Tyndall AFB's wetlands. Within Tyndall AFB, wetland protection measures include wetlands restoration via invasive species control, control of hardwoods and other encroaching vegetation, prescribed fire implementation with appropriate seasonality and frequency considerations, protection of wetlands from vehicle and equipment damage, and mitigation of wetland losses associated with construction or military activities.

In protecting wetlands within the installation, Tyndall AFB complies with the following regulations:

- Clean Water Act (1972)
- Rivers and Harbors Act (1899)
- EO 11990, *Protection of Wetlands* (1977)

- EO 11988, *Floodplain Management* (1977)
- Safe Drinking Water Act (1974)
- Watershed Protection and Flood Prevention Act (1954)
- North American Wetlands Conservation Act (1989)
- Coastal Wetlands Protection Act (1972)

Projects or activities with the potential to impact wetlands must go through EIAP review. During this process, required permits are identified and other protective measures are developed to avoid or minimize impacts. The 325 CES/CEIE, Compliance (325 CES/CEIEC), is responsible for ensuring any wetland/dredge and fill permits are obtained through the FDEP and the USACE Regulatory Division. Ground-disturbing activities such as off-road driving and digging are restricted in wetlands unless the proper permits have been obtained.

The Tyndall AFB Natural Resources Office manages wetlands with prescribed fire (to promote native plant community composition and structure) and through control of nonnative plants and animals that may alter these fragile systems. Prescribed fire and forest management activities are conducted IAW silviculture BMPs (FDACS 2008). Efforts are taken to avoid fire suppression and/or exclusion activities within wetlands except in emergencies (i.e., if the fire threatens human-made structures or other fire-sensitive areas); any damage caused to wetlands during wildfire support activities is rehabilitated to restore natural conditions.

While prescribed fire is the preferred tool for management, restoration, and enhancement of wetlands on the installation, in areas where prescribed fire has not been effective, alternative management methods may be used. Tyndall AFB will consider management techniques such as selective herbicide treatments, thinning, mowing, roller chopping, and/or hand removal of vegetation in combination with fire as part of an integrated approach to wetlands management within the installation.

Wetland Restoration, Enhancement, and Mitigation

Tyndall AFB has implemented multiple phases of wetland restoration and enhancement projects over time. Wetland enhancement at a high-priority wetland site began in June 2018. Enhancement methods involved a combination of hand and mechanical removal of the dense shrub layer from the wetland in and around the population of Godfrey's butterwort at that site. Restoration in this area will continue using programmed DAF funding. From 2018 to early 2025, the installation restored 2 parcels totaling 47.8 acres southeast of the eastern runway, north of Det One Drive. Medium and heavy cover reduction are planned for 6.5 additional acres (Southern Site & Utility Design, Inc. 2025).

Several areas on the installation are serving as wetland mitigation areas, permitted by the USACE to mitigate impacts from installation infrastructure development. Mitigation areas are being managed with prescribed fire on a 2- to 3-year fire return interval to reduce the unnaturally dense midstory shrub layer at some sites and/or promote the reestablishment of the native herbaceous understory.

The USACE maintains a hierarchical preference for mitigation bank credits, in-lieu fee programs, and permittee-responsible compensatory mitigation. Given the costs associated with some forms of mitigation, Tyndall AFB has conducted permittee-responsible mitigation to offset wetland impacts associated with installation projects. Details regarding specific projects are included in Table 7-3.

Table 7-3. Wetland mitigation projects on Tyndall Air Force Base

Project Year	Project Name	Impact Acres Wetland	Mitigation Acres	Associated Permitting
2011	Runway Drainage Improvements—Airfield Phase I	15.8	32	US Army Corps of Engineers (USACE) SAJ-2011-02326
2014	F-22 Complex Project	3.85	7.4	Florida Department of Environmental Protection (FDEP) 03-0327261-001; USACE SAJ-2014-01746
2015	Repair Airfield Drainage—Airfield Phase III	9.7	37.9	USACE SAJ-2011-02326
2016	Runway Drainage Improvements—Airfield Phase IV	19.9	38	USACE SAJ-2016-01484

As of 2025, Tyndall AFB Runway Drainage Improvements Phases I, III, and IV have mitigated 45.5 acres approximately 8 miles southeast of the impact sites within the Tyndall AFB Natural Resource Management Area. Historical conditions for each phase included wet prairie, bog, shrub bog, basin swamp, and mesic pine flatwoods. Fire suppression, silvicultural activities, and hydrologic changes have altered the natural successional patterns of plant species and hydroperiods in these wetlands. To mitigate the impacts of the airfield drainage project, native groundcover will be restored by reducing the shrub understory through at least 2 prescribed burns within the first 5 years, and thereafter, scheduled every 2 or more years based on fuel load and environmental conditions, as determined by the Tyndall AFB fire program manager. Afterward, the rotational burn schedule outlined in the Tyndall AFB WFMP is followed. Post-burn monitoring indicates a general trend toward achieving the 80% coverage mitigation success criterion for all 3 mitigation areas, with a final annual monitoring event scheduled for 2025 (Northern Gulf Environmental 2024).

Following the devastation from Hurricane Michael, a Coastal Resiliency Implementation Plan (CRIP) was proposed in 2022 to increase the resilience of Tyndall AFB to future coastal flooding impacts using traditional and nature-based solutions (Tyndall AFB 2022). As of 2025, the proposal is undergoing an EA, with multiple suggested alternatives being evaluated. Potential options for the installation include relocation, elevation and/or floodproofing installation infrastructure, as well as possible levee or floodwall construction. The incorporation of comprehensive nature-based solutions into all projects would enhance coastal landforms, which would protect both installation infrastructure and natural resources on Tyndall AFB. Depending on the alternatives chosen, implementing CRIP options would impact wetlands and floodplains of up to 16.7 and 20.50 acres, respectively, with mostly palustrine wetlands being affected. Some of the proposed wetland areas have lower quality and functionality, which would reduce the amount of compensatory mitigation that could be required for those sites. Impacts to WOTUS from the construction of levees or floodwalls require permits by both USACE and FDEP, whereas impacts to state-jurisdictional but non-WOTUS wetlands would be permitted through the state ERP. Levee and floodwall construction impacts to groundwater, including dewatering operations, require an FDEP NPDES stormwater

construction permit and the use of BMPs such as sediment traps and basins, weir and dewatering tanks, filters, and chemical treatment IAW all applicable environmental compliance regulations.

Other Considerations for Wetland Protection

Wetlands account for approximately 40% of the land cover on Tyndall AFB. This estimation represents the percentage of area covered by wetlands, swamps, saltwater marshes, estuarine, open water, and freshwater marsh habitats. Historically, the installation has implemented management and restoration activities to ensure the protection and perpetuation of wetland systems.

Future flooding could compromise these wetlands, and the ability of salt marsh and other types of coastal ecosystems to migrate to higher elevation will depend on local connectivity, barriers, topography, and coastal flooding patterns. With more flooding, salt marsh will undoubtedly be converted to estuarine habitat, which also has high ecological value. Facilitating (active conversion) or allowing (passive transition) a portion of the current palustrine wetlands at Tyndall AFB to shift to salt marsh habitat could alleviate some loss, providing that saltwater intrusion of current freshwater systems can be avoided.

7.7 Grounds Maintenance

Installation Supplement

Applicability Statement

This section applies to DAF installations that perform ground maintenance activities that could impact natural resources. This section is applicable to this installation.

Program Overview/Current Management Practices

Routine land management and grounds maintenance activities on Tyndall AFB include mowing, fertilization, pest management, urban landscape management, and related activities. These actions are accomplished under contract for both the main base and the areas surrounding the installation. The Natural Resources staff works with Grounds Maintenance-contracted personnel to ensure that BMPs are used near wetlands (FDACS 2008, 2014). Grounds Maintenance at Tyndall AFB also supports the INRMP by providing ecologically sound landscaping practices IAW the IPMP (Tab 7) and BASH Plan (Tab 5), including specifications for vegetation maintenance such as airfield vegetation height, pruning, fertilization, and planting. These specifications are also detailed and required by the Installation Facilities Standards (Tyndall AFB 2020b). The Tyndall AFB Natural Resources Office is responsible for nonnative invasive plant species control efforts (Section 7.11).

7.8 Forest Management

Installation Supplement

Applicability Statement

This section applies to DAF installations that maintain forested land on their property. This section is applicable to this installation.

Program Overview/Current Management Practices

The principal focus of forest management on DAF installations is to support the military mission while remaining consistent with long-term, ecosystem-based management goals that prioritize ecological sustainability over revenue optimization, per DoDI 4715.03. Under the principles of ecosystem

management, forest treatments may be used to achieve installation goals for forest enhancement and restoration, T&E species and wildlife habitat improvement, wildfire protection, recreational development, military training requirements, and airfield safety compliance. As explained in Section 2.3.2.1, Tyndall AFB shifted from commercial forestry practices to an ecological forestry program in 2006.

The severe destruction caused by Hurricane Michael accelerated Tyndall AFB's existing longleaf pine restoration program. Tyndall AFB received $12 million in funding from the DAF to restore native longleaf pine forest communities through initial salvage and post-hurricane cleanup, followed by replanting containerized longleaf pine seedlings. Initial hurricane cleanup efforts on 9,432 acres involved traditional timber salvage in the early stages and shifted to cutting, chipping, and hauling tree debris from the installation in the later stages. The cleanup was completed in March 2020. Reforestation of the salvaged forest areas began in 2020, with additional native groundcover restoration (in the understory of pine communities) starting in 2021. Reforestation efforts on Tyndall AFB were largely completed in 2025. The loss of merchantable standing timber caused by Hurricane Michael created a large budget deficit for Tyndall AFB's Forestry Program, with an estimated loss of approximately $19 million in timber revenue.

Current timber management is discussed below. Objectives for future forest management are provided in Section 8.0, and additional details on management activities are provided in the Forest Management Component Plan (Tab 1).

Current Timber Management

Military Mission Support

Most timber management activities result in benefits to both the military mission and to native ecosystems. Direct mission support includes cuts of merchantable timber from areas that interfere with military mission capabilities (i.e., glide slope) and clearing of new areas in support of missions. Activities may also include manipulation of forest structure for a specific mission need or to create a security buffer, visual screen, or noise buffer.

Forest Inventory

During Tyndall AFB's last forest inventory in 2006, all pine plantations were sampled. An installation-wide inventory of merchantable timber on 13,793 acres was scheduled for FY19 but was not accomplished due to catastrophic damage to the forests from Hurricane Michael in 2018. In longleaf pine restoration areas, 1-year post-planting survival checks are conducted to determine first year survival of planted seedlings, and 3- to 5-year post-planting survival checks are conducted to determine survivorship of the planted longleaf pine seedlings and assess the need for replanting.

Sand Pine Removal

Tyndall AFB aims to remove sand pine plantations and replace them with longleaf pine communities. Sand pine stand management begins with clearcutting to remove all standing sand pine and hardwood trees of up to 10 inches diameter at breast height, with larger hardwoods left standing to benefit wildlife. Clearcut stands are then site-prepped using herbicides, mowing, and/or prescribed fire prior to planting containerized longleaf pine seedlings. In 2013, approximately 700 acres of sand pine were removed, and around 350 acres were subsequently planted with longleaf pine. Starting in 2021, the Tyndall forester and the USFWS ecologist applied a new native groundcover restoration and reforestation approach on the former sand pine plantations, involving a combination of chemical and mechanical treatments to prepare sites for direct seeding of native seeds. With this new approach, longleaf pine seedlings are planted on the direct seeding

sites subsequent to seeding. Other sites are mowed in advance of planting wiregrass plugs where longleaf pine trees are already present, as detailed in the Forest Management Component Plan (Tab 1).

Slash Pine Plantation Management

Prior to Hurricane Michael, Tyndall AFB was working to convert slash pine plantations to uneven-aged pine forests with a mixed composition of artificially regenerated longleaf pine and naturally regenerated slash pine. Conversion was planned to occur in two 20-year phases. The first phase created 40- to 50-foot gaps through selective row harvesting, which were subsequently roller chopped and hand-planted (when possible) with containerized longleaf pine seedlings. The second phase removed the remaining slash pine rows, with the exception of legacy trees. Legacy trees are old trees that have been spared during harvest or have survived stand-replacing natural disturbances. Legacy trees have achieved near-maximum size and age and are significantly larger and older than the average trees on the landscape. Remnant legacy trees are typically spaced at 2 to 4 trees per acre, and prescribed fire is used to maintain these areas.

However, many areas that were planned for restoration sustained severe or catastrophic damage from Hurricane Michael. Subsequently, the management focus of these areas switched to direct longleaf restoration.

Commercial Forestry Areas

The active flightlines have areas with glide slope restrictions that dictate maximum tree height, as specified in DAFI 91-212. These areas are planted with slash pine and are designated for a 25-year rotation for commercial forestry.

Fuelwood

Fuelwood operations at Tyndall AFB are another tool to create regeneration gaps for Timber Stand Improvement (TSI) and to reduce urban interface wildfire hazards. Sand pine and hardwood encroachment in longleaf pine restoration areas is considered a threat to longleaf pine seedlings. Contracts for selective removal of sand pine and hardwoods can facilitate TSI of otherwise unmerchantable timber. Large-scale operations may involve sales of biomass as fuelwood for use at local mills.

Best Management Practices

Tyndall AFB follows the silviculture BMPs (FDACS 2008) to minimize environmental impacts from forest restoration activities. These BMPs include specific guidance for timber harvests, site preparation, planting, working around wetlands and streams, stream crossings, construction, and maintenance of forest roads. Before any work begins on a timber sale, the contract inspector conducts a briefing with the contract logging crew, emphasizing expectations and the crew's responsibility to follow the BMPs. The timber management contract inspector will conduct inspections as frequently as once a day to ensure that the crews are following the BMPs. If the inspector finds an infraction, the logging crew must immediately correct it. If it is not corrected in a timely manner, the crew may face a monetary penalty or lose the privilege of conducting business on the installation.

Restoration and Reforestation Program

The restoration/reforestation program promotes artificial reforestation and natural regeneration of longleaf pine in support of ecosystem management and T&E species recovery. Longleaf pine forests are part of the native ecosystem at Tyndall AFB, and they promote a floristically diverse, fire-adapted community that provides necessary habitat and functions for endemic flora and fauna.

Prior to Hurricane Michael, restoration consisted of a gradual conversion of slash pine plantations back to longleaf pine by creating regeneration gaps through 2 phases of 20-year harvests, planting all gaps with longleaf pine, and maintaining them with frequent fire (with 2- to 3-year return interval, depending on objectives). Site preparation in harvested gaps involved using a single drum roller chopper (to mulch stumps, improve hydrology, and reduce the abundance of saw palmetto), followed by prescribed fire when possible. Gaps were then hand-planted with containerized longleaf pine seedlings using a random orientation to mimic natural regeneration patterns. One-year post-planting survival checks were conducted to determine first year survival of planted seedlings and 5-year post-planting stocking checks were conducted to determine survivorship of the planted longleaf pine seedlings and assess the need for replanting.

Post-hurricane reforestation of Tyndall AFB began in 2020 and was largely completed by January 2025. A total of 7,611,977 containerized longleaf pine seedlings were planted across the installation in formerly cleared and site-prepped areas. Trees were planted at a rate of 726 trees per acre on 7,871 acres and at a rate of 350 trees per acre on 4,668 acres (in low-survival areas). Tyndall AFB collaborated with Eglin AFB to receive locally sourced longleaf pine seed that was contracted out and grown at a local nursery. Achievable future forest conditions on Tyndall AFB include a longleaf pine forest that is thinned to a target basal area of 50 to 70 square feet per acre, with little to no shrub component in the midstory and a floristically diverse understory composed of native grasses, sedges, and forbs. Restoration of the structure and function of the ecosystem will be achieved using low-intensity, frequent fire (2- to 3-year fire return interval), with an emphasis on growing-season burning to promote floristic diversity and control undesirable shrubs. Where fire is not achieving desirable results, mechanical and/or chemical TSI activities may be necessary to manage undesirable vegetation, as described in in the Forest Management Component Plan (Tab 1). In addition to reforestation, native groundcover restoration occurred from 2022 to 2024 on 647 acres. These restoration efforts aimed to reintroduce native warm-season grasses (such as wiregrass), legumes, and other forbs that serve as fuel for prescribed fire, improve wildlife and T&E species habitat, and provide a food source for Tyndall AFB's wildlife.

Future management actions following Hurricane Michael and subsequent longleaf pine restoration efforts should facilitate the establishment and maintenance of healthy longleaf pine ecosystems. These actions should align with the Forest Management Component Plan (Tab 1), Threatened and Endangered Species Component Plan (Tab 3), and WFMP (Tab 4).

Tyndall AFB Forest Management actions include the following:

- Conduct a forestry inventory of Tyndall AFB to establish baseline forestry data
- Perform first-year survival checks for planted longleaf pine seedlings
- Perform stocking checks 3 to 5 years after initial longleaf pine plantings
- Install long-term monitoring plots in areas reseeded with native groundcover (used to assess groundcover restoration success over time)
- Use prescribed fire (ideally, with a 2- to 3-year return interval) for the restoration/maintenance of natural communities and disturbance regimes

Timber Stand Improvement

Mechanical and chemical TSI methods have been used at Tyndall AFB to control non-merchantable hardwoods and sand pine that compete with planted longleaf pine seedlings in restoration areas. The primary goal of TSI is to restore the longleaf pine ecosystem by promoting the survival of planted longleaf pine seedlings and desirable longleaf pine ecosystem structure and plant community composition. Removal

of competing sand pine and hardwoods helps facilitate reestablishment of desirable native ground cover, thereby improving ecosystem structure and enabling frequent low-intensity prescribed fire to maintain ecosystem structure and function.

7.9 Wildland Fire Management

Installation Supplement

Applicability Statement

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

Program Overview/Current Management Practices

Mission support, ecosystem management, and protection of life and property all depend on a professionally managed wildland fire program. In 2014, Tyndall AFB began receiving support from the Air Force Wildland Fire Branch (AFWFB) Eglin Wildland Support Module (WSM) for all fire management activities on the installation. The Tyndall AFB Fire and Emergency Services supports the Eglin WSM with water support during prescribed burns, but it is only able to support wildfire suppression through structure protection from the urban interface. Fire and Emergency Services is neither funded nor trained to handle wildfire operations. DAFMAN 32-7003 states that wildland fire management personnel "must meet the applicable National Fire Protection Association (NFPA) standards for wildland fire activities [and] may use training criteria in the National Wildland Fire Coordinating Group Wildland Fire Qualification Subsystem Guide (PMS 310-1/NFES 1414) to attain equivalent NFPA certifications." Objectives for future fire management are provided in Sections 8.0 and 10.0, and additional detail on management activities is provided in the WFMP (Tab 4).

Prescribed Fire

Prescribed fire (Figure 7-6) is the most important ecosystem management tool for Tyndall AFB and is vital to reducing hazardous fuels that could negatively impact the mission. An aggressive prescribed fire program is essential for meeting ecosystem management goals; maintenance/restoration of natural communities, including enhancement of T&E species habitat; and control of nonnative invasive plant species. In addition to improving habitat for numerous fire-dependent plants and animals, prescribed fire is used to minimize damage and costs from wildfires, reduce mission interference from wildfire smoke and wildfire suppression efforts, eliminate Brown Spot Needle Blight disease from longleaf pine seedlings, prepare areas for longleaf pine restoration, create conditions that promote a diverse native understory plant community by suppressing hardwoods and other undesirable plant species, and manipulate vegetation for mission requirements. Prescribed fire requires close coordination with military mission personnel, as well as state and federal cooperators/regulators. The complexities of smoke management, military mission coordination, and airspace restrictions pose significant challenges to the prescribed fire program. Smoke management is a priority for all prescribed burns, and a burn authorization is requested from the Florida Forest Service (Chipola District) for every burn. Wind and atmospheric conditions that result in smoke on Highway 98, the Tyndall AFB runway, or other sensitive areas will be avoided when possible.

Figure 7-6. Prescribed fire at Tyndall Air Force Base

Prior to Hurricane Michael, the Eglin WSM, in consultation with the Tyndall AFB Natural Resources Office, set an objective of burning 6,000 acres/year to meet ecosystem management and protected species goals. The prescribed burn history is detailed in Figure 13 in Tab 9. The desired fire return interval is every 2 to 3 years, with a combination of growing- and dormant-season burns. Factors considered in the prioritization of areas for prescribed burning included the time elapsed since the last burn, fire frequency, silvicultural treatments (particularly sand pine TSI), and multiple floral and faunal elements (e.g., presence of T&E species). Details for prescribed fire planning, policy, smoke management, and implementation on Tyndall AFB are covered in the WFMP (Tab 4).

Due to uncertainties and constraints posed by the dramatic change in fuel structure and loading associated with Hurricane Michael, the annual prescribed fire objective for FY20 to FY24 was reduced to 4,500 acres/year. However, consistent burning during that time period successfully lowered the hazardous fuel level deposited from Hurricane Michael to a manageable level. As such, Tyndall AFB aims to return to the pre-hurricane target of burning 6,000 acres/year during the operational period of this INRMP. This acreage objective will be reviewed annually for feasibility.

The absence of pine trees over much of the chipped stands will likely affect fuels and fire behavior in a number of ways, for example, by reducing fine fuel loading from pine litter inputs, reducing loading of coarse woody debris (except in chipping deck and loading areas), and changing the microclimate due to the

absence of trees and its associated effects on fuel-drying rates and wind-speed attenuation. Prior to Hurricane Michael, fuels in most of the bedded slash pine plantations on Tyndall AFB were shrub-dominated, lacked a grassy groundcover component, and exhibited excessive duff accumulation due to lack of fire. The dominant shrub layer, coupled with the fact that many of the chipped areas had been recently burned (within 1 to 2 years) prior to the storm, created novel fuel beds that lack a fine fuel component and may pose challenges to burning and fire spread under low to moderate wind speeds. Smoke management has also become more challenging following Hurricane Michael due to the massive increase in coarse woody debris and associated potential for prolonged smoldering.

Salvage operations from Hurricane Michael damage included traditional timber salvage of long poles until product degradation occurred, then shifted to a chipping and grinding operation, in which all damaged timber was cut, chipped, and hauled to a local mill. The chipping operations leave most sites relatively clean, aside from chipping decks and scattered debris, so in areas that have been chipped, fuels are similar to what they were prior to the storm, minus the large trees. A detailed description of damage from Hurricane Michael is included in Section 7.8.

Wildfire Support

Wildfire support includes all aspects of fire prevention, detection, suppression, readiness, fireline rehabilitation, and training. Tyndall AFB experiences approximately 3 to 5 wildfires per year, but the challenges to wildfire suppression in the aftermath of Hurricane Michael have increased. In areas in which hurricane debris has not been removed through salvage logging/chipping, equipment access will likely be hindered, suppression will likely take longer, and firefighter safety will remain a concern. More fuel will be available to burn, and fireline intensities are expected to increase due to higher fuel loadings and more ladder fuels. Smoke from wildfires will likely smolder longer due to more woody material. Mop-up will be constrained by access to the fires and will likely take longer than it used to take before the storm. The Wildland Fire Program Coordinator designated in the Tyndall AFB WFMP (Tab 4) ultimately has authority over wildfire suppression plans and decisions, but suppression decisions are typically made in partnership with the Tyndall AFB Natural Resources Chief, Tyndall AFB Fire and Emergency Services, and the Eglin WSM. The Eglin WSM lead at Tyndall AFB, or another qualified Eglin WSM firefighter, typically serves as the Incident Commander for wildfires on Tyndall AFB when available, but in his/her absence, the Florida Forest Service (Chipola District) may serve as Incident Commander on Tyndall AFB. The Chipola District currently honors a Mutual Aid Agreement between Eglin AFB and the Florida Forest Service that provides for 24-hour wildfire suppression response on Tyndall AFB at no cost. Pertinent installation personnel create an annually updated map of internal and external values at risk from wildfire. At all times, for all wildfires, the safety of firefighting personnel will be the governing consideration.

Equipment is maintained on a daily basis and personnel maintain a state of readiness for possible wildfires. When fire danger or occurrence is high, pre-positioning of equipment and personnel may be required. When wildfire risk and/or occurrence is very high to extreme, additional resources may be ordered through the Florida Forest Service. Additional detail on wildfire control activities for Tyndall AFB is provided in the WFMP (Tab 4).

Other Considerations for Wildland Fire Management

Tyndall AFB is not expected to experience wholesale vegetation changes. With carbon dioxide fertilization, southern pine forests are expected to become denser and shift away from the more open savannas that are predominant in many areas (Bond and Midgley 2000). Additionally, increased rainfall and temperatures will push the saw palmetto beyond the known bioclimatic envelope in the United States (Van Deelen 1991), with unknown effects. If saw palmetto becomes more dominant in the understory, fires may become more

intense as understory fuels shift from grass- and litter-dominated fuels to saw palmetto-dominated fuels. Whether this will increase the fire intensity will depend on the current understory, with areas shifting from low- or moderate-load grasses to saw palmetto and areas shifting from heavy grass-load areas generally experiencing a reduction in fire behavior, except under the highest intensity fire conditions. A shift to saw palmetto would represent an increase in fire intensity and rate of spread under most circumstances (CEMML 2019).

As it is unknown how saw palmetto may respond to the increasingly wet and warm conditions; it is possible that grass may become more dominant at the expense of saw palmetto. However, woody plants are generally favored in high carbon dioxide conditions and may outcompete the grasses in some locales (Bond and Midgley 2000).

7.10 Agricultural Outleasing

Installation Supplement

Applicability Statement

This section applies to DAF installations that lease eligible land for agricultural purposes. This section is not applicable to this installation.

Program Overview/Current Management Practices

Currently, there are no agricultural outleasing activities on the installation and none are under consideration. Any changes to this program would be reflected in future revisions of this document.

7.11 Integrated Pest Management Program

Installation Supplement

Applicability Statement

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

Program Overview/Current Management Practices

An invasive species is defined in EO 13112, *Invasive Species*, as a species that is not native to an ecosystem and whose intentional or accidental introduction causes or is likely to cause environmental and/or economic damage or harm to human health. Once established, invasive species may reduce biological diversity and disrupt the natural community integrity and function by altering habitat and outcompeting native species. The introduction and spread of nonnative invasive species may also create negative issues for military training or for other anthropogenic land uses. Objectives for future management of invasive species are in Section 8.0, and additional detail on management activities are provided in the Invasive and Nuisance Species Component Plan (Tab 2), which is implemented annually.

EO 13112 requires federal agencies to identify actions that may affect the status of invasive species and to use appropriate programs and authorities to do the following:

- Prevent invasive species introductions
- Detect populations of invasive species and rapidly institute cost-effective and environmentally sound control measures
- Monitor invasive species populations

- Restore native species and habitat conditions in areas that have been invaded
- Conduct research and develop technologies to prevent the introduction and control the spread of invasive species
- Promote public awareness of invasive species and the means to address them

The EO also states that federal agencies are not to authorize, fund, or carry out actions that are likely to promote the introduction or spread of invasive species unless the agency has made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species and that all reasonable measures to minimize the risk of harm will be taken in conjunction with the actions. Tyndall AFB's Invasive and Nuisance Species Component Plan (Tab 2) describes the management of nonnative invasive, pest, and nuisance species.

Invasive Nonnative Plant Species

Tyndall AFB is committed to the identification, control, and eradication of invasive nonnative plant species. The overall goal is to restore ecological communities to their natural conditions, prevent new introductions, and protect imperiled species and their habitats in compliance with EO 13112, the Sikes Act, and the ESA. The primary invasive plants of concern for Tyndall AFB are cogongrass, torpedo grass, and Chinese tallow; a complete list of invasive plant species documented on Tyndall AFB is provided in the Invasive and Nuisance Species Component Plan (Tab 2).

Primary objectives for nonnative invasive plant management include the following:

- Treating and controlling infestations
- Preventing new infestations
- Restoring infested areas to the natural ecological community type
- Providing protection to T&E species and habitats

Control of invasive plants is necessary to inhibit the establishment and proliferation of nonnative plant species and is an integral component in the maintenance and restoration of natural communities at Tyndall AFB. Table 7-4 summarizes the units treated since 2010.

Table 7-4. Acres of invasive species treated at Tyndall Air Force Base, by year and unit

Year	Unit	Acres	Target Species
2010	Compartment 10	80	Cogongrass
2010	West End	15	Japanese climbing fern
2012	Compartment 10	70	Cogongrass
2012	West End	15	Japanese climbing fern
2014	Compartment 10	58	Cogongrass
2014	West End	15	Japanese climbing fern
2015	West End	15	Japanese climbing fern
2017	West End	15	Japanese climbing fern

Table 7-4. Acres of invasive species treated at Tyndall Air Force Base, by year and unit

Year	Unit	Acres	Target Species
2017	Compartment 10	70	Cogongrass
2018	Compartment 10	182	Cogongrass
2018	Noncommissioned officer (NCO) Beach	878	Chinese tallow, Japanese climbing fern, cogongrass
2019	Compartment 10	182	Cogongrass
2020	West End	473	Chinese tallow, cogongrass
2021	Big Ammo/West End	726	Chinese tallow, cogongrass, Japanese honeysuckle
2021	Across the Installation	100	Chinese tallow, cogongrass
2022	West End	1,214	Chinese tallow, mimosa tree, lantana, camphor tree
2024	Davis Point/West End	449	Cogongrass, Chinese tallow, lantana, Japanese honeysuckle

Disturbances associated with events such as Hurricane Michael provide an opportunity for the introduction and subsequent establishment of invasive plants through wind and water dispersal of plant propagules and the transport of propagules on vehicles and machinery used in cleanup and recovery (Hodkinson and Thompson 1997). Early detection and eradication are key in preventing the establishment and spread of invasive species. In effort to limit potential impacts of invasive species on Tyndall AFB, a comprehensive installation-wide inventory with continued monitoring is necessary to locate, identify, and assess the level of infestation to assist in developing and prioritizing treatment plans.

Nonnative and Nuisance Animal Species

Nonnative and nuisance animals can prey on rare and sensitive species, compete with native species for resources, damage desirable/managed habitats, and carry rabies and other infectious diseases that may affect wildlife populations. The presence of nonnative animals may also cause nuisance issues on the installation. Nuisance species are defined as wild animals that cause annoyance, health hazard, safety hazard, landscape or property damage, or compromise mission objectives; they may be native or nonnative. Control of nuisance animals is the responsibility of the Pest Management Shop and Tyndall AFB Natural Resources Office. The Pest Management Shop responds to complaints of nuisance animals in and around buildings and other structures, with the exception of Base Housing. The Military Housing Contractor responds to all Base Housing complaints. The Natural Resources Office removes nuisance wildlife upon request.

Nonnative and/or nuisance animal species present on the base include black bears (Figure 7-7), alligators, osprey, deer, bats, coyotes, gray foxes (*Urocyon cinereoargenteus*), fire ants, cats, snakes, raccoons, and nine-banded armadillos (*Dasypus novemcinctus*). Tyndall AFB has the ability to use lethal and non-lethal methods to control wildlife. Applicable federal and state permits are obtained prior to implementation of any wildlife control. Required permits include, but are not limited to, black bear hazing/capture, MBTA depredation, bald eagle harassment, and DoD pesticide certification. Tyndall AFB also conducts

preventative nuisance animal control by securing or removing attractants (i.e., trash, pet food, bird feeders) and providing education to base residents, as resources allow.

Figure 7-7. Florida black bear at Tyndall Air Force Base

Nuisance animals that impact T&E species, particularly on the barrier islands, are removed by a full-time USDA–APHIS–WS contractor. Target predators include coyotes, gray fox, raccoons, armadillos, opossum (*Didelphis virginiana*), and feral cats. Early Restoration funding from the Deepwater Horizons oil spill of 2010 created supplemental funding for shorebird protection through USDA predator removal from 2013 to 2017. A contract with the USDA and 325 CES began in 2017 and is still in place for predator control. Additional information is provided in the Nuisance and Invasive Species Component Plan (Tab 2). Details on bird control, including incidental and intentional take, during military readiness activities are described in the Tyndall AFB BASH Plan (Tab 5).

7.12 Bird/Wildlife Aircraft Strike Hazard (BASH)

Installation Supplement

Applicability Statement

This section applies to DAF installations that maintain a BASH Program to prevent and reduce wildlife-related hazards to aircraft operations. This section is applicable to this installation.

Program Overview/Current Management Practices

Birds and wildlife have the potential to cause millions of dollars in damage to aircraft and the loss of human life during aircraft strikes. Tyndall AFB implements a BASH Plan (Tab 5) consistent with DAFI 91-202, *The Department of the Air Force (DAF) Mishap Prevention Program*, and DAFI 91-212, *Bird/Wildlife Aircraft Strike Hazard (BASH) Management Program*. The 325 FW/SEF is the office of primary responsibility for monitoring and implementation of the BASH Plan. DAFMAN 32-7003 and DAFI 91-202/Air Combat Command Supplement 1, *The USAF Mishap Prevention Program*, mandate that Tyndall AFB's Natural Resources Office participates in the development, review, approval, and implementation of the Tyndall AFB BASH Plan. Additionally, DAFMAN 32-7003, Section 3.61.1, requires that the INRMP and BASH Plan be mutually supportive and consistent and that the INRMP addresses habitat management techniques that support BASH objectives.

The BASH and Natural Resources programs at Tyndall AFB have significant overlap within their management purviews and often have conflicting management needs. Thus, continued communication between these programs is essential to promote mutually beneficial management. Examples of key management issues that fall under both programs and associated cooperative solutions are listed in Table 7-5. These programs will continue to work closely to ensure that issues are resolved in a mutually beneficial manner.

Table 7-5. Current management issues for Bird/Wildlife Aircraft Strike Hazard (BASH) and Natural Resources (NR) programs at Tyndall Air Force Base

Issue	BASH Management Focus	NR Management Focus	BASH and NR Cooperative Strategy
Bird nesting activity	Remove all nests that pose a BASH hazard.	Protect bird nesting activity.	NR and BASH coordinate to remove problematic/hazard bird nests outside of the active nesting season.
Prescribed burning on airfield	Promote cost-effective, sustainable, and environmentally sensitive airfield vegetation management strategies.	Support airfield vegetation management strategies that promote health and resilience of flora and fauna.	NR and BASH coordinate and communicate with Flight Safety and other installation offices to establish prescribed burning with normal frequency on the airfield.
Airfield wildlife exclusion (fencing)	Support deer-resistant (8-foot) fencing.	Support normal movement patterns of wildlife and forestry program initiatives/actions, which fencing inhibits.	NR and BASH coordinate and communicate with Flight Safety and other installation offices to determine appropriate, mutually beneficial exclusion strategy.
Clear zones	Maintain clear zone standards, per Air Force Instruction 91-212.	Promote early-succession wildlife-friendly habitat where possible.	NR and BASH periodically evaluate clear zone mowing strategy to ensure adequacy for both programs.

Table 7-5. Current management issues for Bird/Wildlife Aircraft Strike Hazard (BASH) and Natural Resources (NR) programs at Tyndall Air Force Base

Issue	BASH Management Focus	NR Management Focus	BASH and NR Cooperative Strategy
Installation Facilities Standards (IFS) landscaping guidelines	Promote landscaping that minimizes BASH hazards.	Promote landscaping that maximizes wildlife habitat.	NR and BASH periodically evaluate IFS guidelines to ensure adequacy for both programs.
Dove field management	Minimize BASH hazard.	Maintain dove fields to promote hunting opportunities and sustain valuable early successional wildlife habitat.	NR and BASH periodically evaluate dove field location and activity status to ensure adequacy for both programs.
Hunting management in areas adjacent to airfield	Minimize or eliminate deer and their attractants in the areas adjacent to airfield.	Maintain quality hunting opportunities.	NR and BASH periodically evaluate airfield-adjacent area hunting regulations to ensure adequacy for both programs.

However, certain BASH Program objectives and specifications must be implemented to minimize BASH hazards (DAFI 91-212), which supersede Natural Resources Program objectives. Passive control measures such as landscape design, elimination of food and roost sources, turf/water management, and forest management are the most permanent ways of reducing the attractiveness of airfields to birds and other wildlife. Active control measures may incorporate trained working dogs, pyrotechnics, bioacoustics, and depredation (lethal control). Depredation is implemented only as a last resort when other scare tactics prove unsuccessful. The 325 FW/SEF maintains 2 depredation permits for intentional take of protected species. The first is a federal MBTA depredation permit that authorizes a predetermined number of intentional takes of migratory birds in support of the BASH Program. The second permit authorizes intentional take of bald eagles for 5 years, but it is limited to harassment only.

Specific types of management strategies and actions incorporated into the BASH Program include the following:

- Bird harassment techniques
- Promptly remove dead animals (carrion) from airfields to avoid attracting scavenger animals
- Auditory bird dispersal unit
- Sirens/horns/lights
- Pyrotechnics (shell crackers)
- Maintain drainage ditches in areas that have potential to hold water
- Maintain grass heights at 11 inches
- Spray insects with pesticides
- Conduct tree and scrub vegetation management
- Control broadleaf seed and berry-producing vegetation with herbicide treatment
- Keep main installation dumpsters secure when not in use to prevent wildlife access, and maintain sanitary conditions around dumpsters

- Conduct lethal control measures, as necessary (depredation permits are acquired and annual reports are submitted to the USFWS by the 325 FW/SEF Office)

The USDA–APHIS–WS is responsible for observing wildlife hazard conditions on Tyndall AFB; they coordinate with Base Operation and maintenance personnel to collect bird remains after strikes, submit reports, ship salvaged bird remains for analysis, and provide wildlife harassment and dispersal services. They conduct wildlife surveys, maintain a database of wildlife activities to identify long-term trends, trap animals (raccoons, coyotes, etc.) when necessary, and train airfield management personnel on proper BASH response. USDA–APHIS–WS also prevents other animal hazards to aircraft by using trapping and exclusion methods for animals such as feral hogs. Fencing may control deer, and the deer hunting program is considered part of the BASH Program. Some animals may be removed by shooting. The Tyndall AFB BASH Plan (Tab 5) provides additional information. The DAF's ESA consultation for flight operations at 32 installations, including Tyndall AFB, resulted in specific alterations to BASH operations to minimize impacts on natural resources. Alterations are partly discussed in Section 7.4.1 and in the Biological Opinion that resulted from that consultation, 09E30000-2023-0090495-S7 (USFWS 2024*a*).

7.13 Coastal Zone and Marine Resources Management

Installation Supplement

Applicability Statement

This section applies to DAF installations that are located along coasts and/or within coastal management zones. This section is applicable to this installation.

Program Overview/Current Management Practices

Under the Coastal Management Act, the Florida Coastal Management Program (FCMP) was established to determine federal consistency under the federal Coastal Zone Management Act (CZMA). Approved by NOAA in 1981, the FCMP is based on 24 statutes that are administered by a network of 9 state agencies and 5 water management districts. Federal agency activities that have the potential to impact Florida's coastal resources are required to be consistent with the FCMP.

Federal agencies, such as Tyndall AFB, make determinations as to whether their actions are consistent with the 24 statutes of the FCMP. Determinations are submitted to the FDEP State Clearinghouse for review and concurrence. The Clearinghouse enables state agencies to review federal activities. If a reviewing agency determines that a project is not consistent with Florida's statutes, the FCMP requires the applicant to revise its plans. In this way, the Florida State Clearinghouse and the federal agency work together to ensure projects are consistent with Florida's statutes, thus protecting coastal resources. Tyndall AFB's Natural Resources Office coordinates planned construction activities through the use of the CZMA as part of the EIAP review. Projects do not proceed until all clearances and approvals are in place.

The DoD acknowledges the increasing risk that natural hazards pose to US military installations and their missions globally. Tyndall AFB, which was heavily impacted by wind and storm surges from Hurricane Michael, provided a prime example of this risk. Nearly 6 years after the storm, Tyndall AFB continues to recover. Cleanup of storm impacts to infrastructure and natural systems is ongoing, and planning efforts for rebuilding Tyndall as a "Base of the Future" are well underway. The rebuild of Tyndall AFB has been mandated to align with DoD and DAF directives to promote coastal resiliency.

The rebuild stresses a reliance on resilient structures that are constructed to withstand major hurricane-force winds, as well as on natural and nature-based features (nature-based solutions) that absorb the impacts of

catastrophic flooding. Over the past several decades, the barrier islands of Shell Island, CIW, and CIE have provided Tyndall AFB with a measure of natural defense against wave action and coastal flooding impacts associated with storm events. Shell Island, CIW, and CIE also provide 18 miles of critical habitat for beach mice, nesting sea turtles, and shorebird species that are protected by the ESA and FAC. However, Hurricane Michael demonstrated the vulnerability of these barrier islands to extreme storm events, flattening dunes, denuding sections of vegetation, and completely breaching portions of the islands.

The CRIP was created to support the ongoing rebuild efforts and future planning, design, and implementation activities that will enhance Tyndall AFB's overall long-term coastal resilience (Tyndall AFB 2022). In association with the CRIP, 3 scalable, nature-based solution projects were designed to restore coastal defenses and increase coastal resilience on Tyndall AFB: Living Shoreline, Oyster Reef Breakwater, and Shoreline Stabilization. These projects are strategically located in the nearshore waters near at-risk Tyndall AFB assets, including the Primary Airfield, Fuel Port and Maintenance Area, Drone Runway, and hurricane evaluate route (US Highway 98). Each project is designed to attenuate wave energy, restore and enhance estuarine habitats (e.g., oyster, marsh, seagrass), support federally protected species (e.g., St. Andrew beach mouse, green sea turtle, Florida manatee [subspecies of the West Indian manatee]), and provide refuge for commercially and recreationally important fish and invertebrates (e.g., grouper, mullet, shrimp, blue crab [*Callinectes sapidus*]). These scalable keystone projects will serve as examples and blueprints for the expansion of nature-based solutions along Tyndall AFB's 40-miles of coastline. The projects play a crucial role in Tyndall AFB's coastal resilience strategy and align with other landscape-scale coastal restoration projects, including the St. Andrew Bay Surface Water Improvement and Management Plan (Northwest Florida Water Management District 2017), Scaling Up Nature-Based Solutions (The Nature Conservancy 2023), the Comprehensive Conservation and Management Plan (St. Andrew and St. Joseph Bays Estuary Program 2024), and the Northwest Florida Sentinel Landscapes Program.

The Tyndall AFB NEPA Program finalized the Programmatic EA for the CRIP in 2025; and satisfied NEPA review for the 3 projects. The EA can be applied to the future expansion of nature-based solution projects at Tyndall AFB. USACE Clean Water Act Section 404 and FDEP Environmental Resource Permit applications for the 3 projects were submitted in early 2025. The project team, which includes The Nature Conservancy, 325 FW, AFCEC, Jacobs Engineering, University of Florida, US Naval Research Laboratory, and the St. Andrew and St. Joseph Bays Estuary Program, is in the process of requesting funding to implement these projects (Restoration Implementation), with the goal of beginning construction in 2025 and completing monitoring by 2028.

Tyndall AFB is also implementing barrier island dune restoration. Efforts began in January 2024 and included experimental plot establishment, baseline vegetation and sedimentation monitoring, and planting vegetation. The restoration includes experimentally designed permanent plots to evaluate the effects of sedimentation accumulation, seedling recruitment, and outplanting survival, growth, and cover within planted plots and gaps. Three native dune plant species (sea oats, bitter panicgrass, and beach elder [syn., seacoast marsh elder, *Iva imbricata*]) will be planted, with grid-spacing, to cover the experimental dune areas. Post-planting survival, sedimentation, and other vegetation metrics will be collected. Some plants were planted in other priority areas that are not experimentally monitored to assist in additional sand entrapment and dune building. Some experimental plots and non-experimental areas were replanted in fall 2024 where initial plant survival was low. Sedimentation and vegetation survival is ongoing.

7.14 Cultural Resources Protection

Installation Supplement

Applicability Statement

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

Program Overview/Current Management Practices

The primary goal of cultural resources management at Tyndall AFB is to support mission readiness through regulatory compliance. As a federal agency, Tyndall AFB is required by law to consider the effects of its actions on archaeological sites and historic properties. Mandating legislation includes the following:

- Antiquities Act of 1906
- Historic Sites Act of 1935
- National Historic Preservation Act of 1966 as amended, 36 CFR Part 800
- Archaeological and Historical Preservation Act of 1974
- Archaeological Resources Protection Act of 1979
- NEPA of 1969
- Native American Graves and Repatriation Act of 1990
- American Indian Religious Freedom Act
- DAFMAN 32-7003, *Environmental Conservation*

Tyndall AFB's ICRMP (Tab 6) provides recommendations for the routine maintenance of archaeological sites that are eligible or potentially eligible for the National Register of Historic Places (NRHP), as well as historic buildings on Tyndall AFB. The ICRMP for Tyndall AFB was last updated in 2023.

Projects and other resource management activities located in unsurveyed areas have the potential to impact unknown sites. Section 106 of the National Historic Preservation Act and its implementing authority, 36 CFR Part 800, require that federal agencies analyze the impacts of their activities on historic properties or cultural resources eligible for or included in the NRHP through the State Historic Preservation Officer. Activities outlined in this INRMP are subject to Section 106 review; close coordination between Cultural Resources and Natural Resources staff occurs to avoid impacts to cultural resources, especially for timber sales, TSI, prescribed fire, erosion control, invasive species, and recreational use projects. For instance, Tyndall AFB Natural Resources Forest Management personnel submit maps to the Cultural Resources Office to determine if the areas will require a survey prior to a forestry operation. Fire Management personnel coordinate directly with the Cultural Resources Office by providing burn maps in advance of scheduled burns so that resources and areas that need to be protected from fire and heavy equipment can be identified.

7.15 Public Outreach

Installation Supplement

Applicability Statement

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

Program Overview/Current Management Practices

Communication and cooperation with the public is a critical component of any natural resource management effort. The goal of public outreach efforts is to encourage understanding of, support for, and

involvement in the many management and monitoring programs within the installation. Without the support of partner organizations and local citizens, it becomes very difficult to implement effective management programs. Outreach is accomplished through the following:

- Research partnerships and internships
- Presentations and guided tours
- Volunteer involvement (i.e., T&E monitoring, permit sales, forestry program, hunting)

As resources permit, Tyndall AFB's wildlife biologist and forester and USFWS staff provide classes and tours to interested parties, including but not limited to Boy/Girl Scouts, school groups, the Tyndall AFB Youth Center, civic groups, and wildlife-oriented organizations.

7.16 Natural Hazards

Installation Supplement

Applicability Statement

This section applies to DAF installations that have identified natural hazard risks, vulnerabilities, and adaptation strategies using authoritative region-specific climate science, climate projections, and existing tools. This section is applicable to this installation.

Program Overview/Current Management Practices

Tyndall AFB is at risk of the following natural hazard impacts:

- **Permanent loss of installation area**, especially along the East Bay and small portions in the west, due to flooding (Section 2.2.4)
- **Damage associated with extreme storms**, which is nearly certain to increase costs and challenges associated with natural resource management, infrastructure maintenance, facility maintenance, and staff safety but can be buffered by resilient natural infrastructure such as coastal marshes
- **Permanent loss of wetland ecosystems** and their associated ecosystem services, including up to 98% of Tyndall AFB's estuarine habitat and up to 60% of salt marsh habitat due to coastal flooding (Section 7.6)
- **Increased regulatory requirements due to threats to T&E species**, including the loss and changes of habitat (Section 2.3.4)
- **Impacts due to existing and new invasive species**, including increased costs associated with invasive species control and degradation of native ecosystems and habitat
- **Health impacts for staff and wildlife due to extreme heat events**, particularly during the summer (extreme heat exposure is increasingly common at Tyndall AFB, potentially hindering outdoor work and leading to physiological impacts on species that are sensitive to extreme heat events)
- **Greater rates of erosion** due to losses of vegetative cover, coupled with increases in precipitation intensity and reductions in soil aggregate stability (Section 2.3.2.3)
- **Challenges to biosecurity and infectious disease impacts**, particularly those related to wildlife and human diseases that are expanding outside of tropical zones

Extreme storms pose a significant natural hazard to Tyndall AFB. In recent years, tropical storms have frequently reached hurricane intensity before landfall and have exhibited rapid intensification compared to historical storms (Carstens et al. 2022). A growing number of recent storms have shown more damaging characteristics, including extreme rainfall, high winds, storm surge, and increased unpredictability. The effects of extreme weather include physical damage from wind and precipitation to natural and built

infrastructure. Precipitation may result in flood events that surpass historical flood regimes, damaging infrastructure and increasing the risk of severe erosion.

Natural resource management plays a critical role in addressing many of the risks associated with natural hazards on facilities such as Tyndall AFB, as natural systems provide a variety of protective functions relating to flood mitigation, storm mitigation, and post-extreme event recovery. The installation is a leader within the DoD for identifying infrastructure vulnerabilities to natural hazards and integrating solutions across all organizational levels to manage associated risks. Further natural hazard mitigation will require collaboration with internal and external stakeholders to ensure that the installation's mission is not compromised.

7.17 Geographic Information Systems (GIS)

Installation Supplement

Applicability Statement

This section applies to all DAF installations that maintain an INRMP, since all geospatial information must be maintained within the DAF GeoBase system. The installation is required to implement this element.

Program Overview/Current Management Practices

Tyndall AFB utilizes a geographic information system (GIS) called GeoBase to help base planners make informed decisions for current and future activities. This system contains digitized maps, land use data, and planning information. Tyndall AFB's Natural Resources Office uses ArcGIS Pro to assist with natural resources management. Currently, natural resources information incorporated into the GIS includes fire management, forestry, wildlife, and outdoor recreation information.

The DAF is working to consolidate and centralize all of its GIS data. The current centralized system loses fidelity at the installation level because the installations have had no ability to update the system; this situation is being addressed as funding permits. The consolidated system has not been conducive to T&E data or protected cultural data management. Should the current centralized system be adopted without enabling the local installation to update it, the ability to use GIS for natural resources planning will be diminished.

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 INRMP implementation. Objectives indicate a management initiative or strategy for specific long- or medium-range outcomes and are supported by projects. Projects are specific actions that can be accomplished within a single year. In cases where off-installation land uses may jeopardize DAF missions, this section may list specific goals and objectives aimed at eliminating, reducing, or mitigating the effects of encroachment on military missions. These natural resources management goals for the future have been formulated by the preparers of the INRMP from an assessment of the natural resources, current condition of those resources, mission requirements, and management issues previously identified. Below are the integrated goals for the entire Natural Resources Program.

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

Installation Supplement—Management Goals and Objectives

GOAL 1 PROVIDE NATURAL RESOURCE MANAGEMENT AND COORDINATION SERVICES IN SUPPORT OF THE MISSION.

Objective 1.1 Support military mission objectives through a responsive natural resources analysis and consultation process (National Environmental Policy Act [NEPA]/Endangered Species Act [ESA]).

Project 1.1.1 Continue to develop safeguards in the Environmental Impact Analysis Process to ensure that actions do not proceed until all pertinent coordinating agencies have had the opportunity to comment and any necessary Coastal Zone Management Act (CZMA), ESA, Essential Fish Habitat (EFH), and Marine Mammal Protection Act (MMPA) clearances have been obtained.

Objective 1.2 Ensure long-term availability of natural resources to support the military mission through coordination with other environmental and mission organizations.

Project 1.2.1 Review all Section 7 consultations, Environmental Impact Statements (EIS), Environmental Assessments (EAs), and other applicable regulatory permits for commitments made by Tyndall Air Force Base (AFB), and establish a process by which natural resource requirements are communicated to pertinent personnel for implementation. Ensure that those under the responsibility of the Natural Resources Office are programmed for in the Automated Civil Engineer System.

Project 1.2.2 Establish a process to track natural resource requirements from Section 7 consultations, MMPA and EFH permits, EIS, EAs, and other applicable regulatory permits, and implement a system that ensures compliance with the requirements (i.e., site inspections). Provide required annual reports to regulators.

Project 1.2.3 Provide a natural resources familiarization briefing and tour of the base for new commanders within 3 months of taking command.

Project 1.2.4 Develop a briefing on natural resources and associated protection measures, and provide the briefing to appropriate organizations and projects that have the potential to impact these resources.

Project 1.2.5 By 1 January of each year, conduct an assessment to determine what organizations have a need for beach access and driving; by 1 February of each year, provide a reminder or new notice about the base operating instructions to affected organizations.

Project 1.2.6 Ensure compatibility of recreation areas with the short- and long-term requirements of the military mission through annual (at a minimum) coordination with natural and cultural resource managers.

Project 1.2.7 Review and update natural resources data layers at least once a year.

Project 1.2.8 Annually identify and map locations of invasive plant species and treat approximately 500 acres of priority areas in accordance with (IAW) Executive Order (EO) 13112.

Project 1.2.9 Continue to establish criteria and a process to prioritize areas of invasive plant species infestations for treatment IAW EO 13112.

Project 1.2.10 Annually implement the Tyndall AFB Invasive and Nuisance Species Component Plan IAW Air Force Manual (AFMAN) 32-1053.

Project 1.2.11 Coordinate with other agencies and organizations regarding natural hazard impacts that may affect Tyndall AFB, and communicate pertinent information to base leadership.

Project 1.2.12 Engage staff with resilience efforts occurring in the region, especially relating to adjacent natural areas that might increase habitat connectivity for protected species on the base.

Project 1.2.13 Continue coordination with outside agencies and organizations to support the Coastal Resilience Implementation Plan, with a focus on the use of nature-based solutions to improve coastal resilience and protect natural resources against future threats such as extreme weather events and storm surge.

Project 1.2.14 Participate in Tyndall AFB Coastal Resilience Working Group information-sharing meetings.

Project 1.2.15 Continue to seek opportunities to leverage programs with potential synergies with coastal resilience at Tyndall AFB in terms of information sharing, partnerships, and joint pursuits of funding, including the Northwest Florida Sentinel Landscape Program and St. Andrew/St. Joseph Estuary Program.

Objective 1.3 Provide wildland fire management support to Tyndall AFB's military mission, in coordination with the Air Force Wildland Fire Branch (AFWFB), per DoD Instruction 6055.06 and Air Force Instruction 32-2001.

Project 1.3.1 Review annual Tyndall AFB Wildland Fire Management Plan (WFMP) updates and provide comments on natural resources components and impacts, in coordination with the US Fish and Wildlife Service (USFWS), as detailed in Department of the Air Force Manual (DAFMAN) 32-7003, Section 3.78.

Project 1.3.2 Conduct annual planning meetings between the Air Force Civil Engineer Center Environmental Directorate (AFCEC/CZOF) and Tyndall AFB Natural Resources staff to establish criteria to prioritize compartments and units that require prescribed fire and create an annually updated map displaying proposed burn units.

Project 1.3.3 Coordinate with pertinent installation personnel to develop an annually updated map of internal and external values at risk from wildfire.

Project 1.3.4 Submit annual Air Force (AF) Form 813 detailing proposed burn units and proposed roads and firebreaks to be maintained or created.

Project 1.3.5 Annually educate training groups and other organizations at Tyndall AFB concerning wildfire prevention/mitigation and the benefits of prescribed fire to reduce fire starts.

Project 1.3.6 Through a responsive planning process, ensure minimal interference with military mission activity during wildland fire operations.

Project 1.3.7 Enter the perimeters of all hazardous fuel treatments into the Fire Decision Support System DSS database to be maintained by AFWFB and annually analyze database to ensure that all priority lands within Tyndall AFB are included in the prescribed fire program.

Project 1.3.8 Annually maintain firebreaks, based on needs identified during condition monitoring, taking care to avoid disturbance to federally threatened flora inhabiting firebreak-adjacent habitat.

Project 1.3.9 Update fire considerations map with newly acquired data from wildland fire procedures and other surveys, detailing sensitive areas such as wetlands, endangered species locations, and unexploded ordinance-contaminated areas, and formalize procedures required for these areas.

Project 1.3.10 Support the wildland fire branch by participating during wildfire operations and providing technical support to wildland fire operations on Tyndall AFB (including the wildland/urban interface areas) to the extent possible.

Objective 1.4 Provide for effective resource conservation and protection through enforcement of natural resources laws and public use outdoor recreation rules and regulations.

Project 1.4.1 Maintain conservation law enforcement presence at Tyndall AFB to enforce natural resource regulations.

Project 1.4.2 Annually coordinate with Security Forces to identify areas where they could assist with enforcement of natural resources regulations, and develop procedures to support this coordinated effort.

Objective 1.5 Provide natural resources expertise and field support to Flight Safety and the Bird/Wildlife Aircraft Strike Hazard (BASH) Program.

Project 1.5.1 Annually maintain all permits required for lethal control of migratory birds and coordinate removal of nuisance wildlife as needed to promote airfield safety.

Project 1.5.2 Semi-annually meet with BASH Working Group to identify long-term solutions for management of airfield wetlands that minimize adverse effects to natural resources while reducing BASH risk.

Project 1.5.3 Conduct forestry operations, when practical, to remove trees that are in or have immediate potential to encroach into airfield glide slopes, IAW Unified Facilities Criteria 3-260-01 and DAFMAN 13-204, Volume 2.

GOAL 2 RESTORE AND MANAGE FORESTS FOR MISSION USE, HABITAT IMPROVEMENT, AND PROTECTION OF THREATENED AND ENDANGERED (T&E) SPECIES AND OTHER SPECIES OF CONCERN.

Objective 2.1 Annually prioritize and maintain/restore native forest ecosystems and associated species to increase ecosystem resiliency and military mission flexibility, IAW NEPA and the ESA.

Project 2.1.1 Annually initiate any NEPA, Section 7 consultation, Section 106 consultation, and other pertinent consultations/permits required for Tyndall AFB's forestry activities.

Project 2.1.2 Complete at least 6,000 acres of prescribed fire annually, based on a 5-year running average, in coordination with the AFWFB and following procedures from the Tyndall AFB WFMP.

Project 2.1.3 Meet annual prescribed fire acreage targets planned for Fiscal Year 2024 (FY24) to FY27 in the Tyndall AFB WFMP, with fire management units prioritized based on fuel reduction, ecological, and/or silvicultural drivers for fire.

Project 2.1.4 Conduct a forestry inventory of Tyndall AFB and related restoration efforts to establish baseline forestry data to be incorporated in WFMP updates, ESA flora and fauna planning/prioritization documents, and other relevant plans and reports.

Project 2.1.5 Annually prioritize areas for longleaf pine restoration, with a target condition of trees that are thinned to a basal area of 50 to 70 square feet per acre, little to no midstory shrubs, and an understory composed of native grasses, sedges, and forbs (as detailed in the 2024 Tyndall AFB Forest Management Component Plan), in support of ESA-listed flora species.

Project 2.1.6 Perform first-year survival check for planted longleaf pine seedlings and stocking checks 3 to 5 years after initial plantings, in support of native longleaf pine habitat restoration.

Project 2.1.7 Survey established long-term monitoring plots (using partnerships with the Florida Natural Areas Inventory [FNAI], University of Georgia, and others) to assess the success and trajectory of the native groundcover restoration areas that were reseeded.

Project 2.1.8 Use prescribed fire (on a 2- to 3-year return interval, with a growing-season emphasis, and promoting burning through wetlands) to restore natural ecosystems and disturbance regimes, promote floristic diversity, and improve habitat for federally listed species of concern. Pair prescribed fires with mechanical and/or chemical Timber Stand Improvement as needed to control undesirable shrubs such as swamp titi.

Project 2.1.9 Continue longleaf restoration work by replanting seedlings annually in areas with low survival, adjusting seedling rates based on success of previous plantings.

Project 2.1.10 Conduct predator and nuisance animal removal, control, hazing, and trapping in priority areas.

Project 2.1.11 Provide education/outreach services to housing residents, Security Forces, and geographically separated work areas on the Tyndall AFB range regarding nuisance species.

Project 2.1.12 Continue to integrate groundcover restoration with longleaf pine restoration, including a needs assessment of areas for planting, identification of suitable harvest sites, and determination of the best species composition and planting times for Tyndall AFB.

Project 2.1.13 Complete mechanical and/or chemical site preparation in advance of planting containerized longleaf pine seedlings, seeding native groundcover, and/or planting wiregrass plugs.

Project 2.1.14 Monitor and annually adjust prescribed fire plan prescription parameters (per Tyndall AFB's WFMP) through an iterative process based on fire behavior and fire effects in response to novel fuel conditions caused by Hurricane Michael.

Project 2.1.15 Monitor and annually adjust the prescribed fire plan's smoke management guidelines based on experience and lessons learned burning in hurricane-impacted fuels.

Objective 2.2 Conduct first-order fire effects monitoring within all permanent vegetation plots established by the FNAI that fall within prescribed burns or wildfires as they occur. Protect bald eagles, migratory birds, and other avian species IAW the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act (MBTA).

Project 2.2.1 Annually survey for new bald eagle nests. Maintain a minimum of 660-foot buffers around active nests, follow Activity-Specific guidelines for any applicable category of activity (A–H), and implement any other pertinent recommendations from the Bald Eagle Management Guidelines.

Objective 2.3 Protect gopher tortoise burrows and potential commensal species IAW the ESA.

Project 2.3.1 Survey for gopher tortoises, and other sensitive commensals at proposed project areas within high-priority habitat where the ground will be significantly disturbed.

Project 2.3.2 Annually survey and scope all burrows, and develop a comprehensive map layer of known gopher tortoise burrows and a report for candidate conservation agreement data call.

Objective 2.4 Survey for and manage federally listed and petitioned plant species IAW federal law and to minimize potential listing impacts.

Project 2.4.1 Annually survey and map federally listed and petitioned plant species that are either known to occur or may occur on Tyndall AFB, including Godfrey's butterwort, Henry's spider lily, blackbract pipewort, Kral's yelloweyed grass, smoothbark St. Johnswort, Florida skullcap, and telephus spurge, to document established population changes and detect new populations.

Project 2.4.2 Survey the federally threatened telephus spurge translocation site on a monthly or bi-monthly basis to continue documenting survival of individuals, as required by Biological Opinion 04EF3000-2020-F-0145.

Objective 2.5 Establish survey protocols and implement surveys for the proposed threatened monarch butterfly IAW ESA Section 7(a)(1).

Project 2.5.1 Meet with Monarch Joint Venture for guidance on monarch monitoring, as recommended in the Programmatic Conference Opinion: Department of Defense's Conservation Strategy for Monarch Butterfly.

Project 2.5.2 Implement the Integrated Monarch Monitoring Program to monitor monarchs and their habitat on Tyndall AFB, as recommended in the Programmatic

Conference Opinion: Department of Defense's Conservation Strategy for Monarch Butterfly.

GOAL 3 ENABLE LONG-TERM SUSTAINABILITY OF BARRIER ISLAND ENVIRONMENTS FOR MILITARY USE BY PROTECTING T&E SPECIES AND THEIR HABITATS.

Objective 3.1 Monitor for, support, and protect populations of sea turtles, marine mammals, gulf sturgeon, beach mice, tricolored bat, shorebirds, and other coastal birds.

Project 3.1.1 Locate, protect, and evaluate all sea turtle nests on Tyndall AFB property IAW the ESA. Collect and maintain data on nest success, depredation, and disorientation for all nests.

Project 3.1.2 Respond to and investigate all sea turtle stranding reports on Department of the Air Force (DAF) property IAW the ESA. Collect appropriate data and report to the Florida Sea Turtle Stranding and Salvage Network within 24 hours.

Project 3.1.3 Coordinate with outside partners to address marine mammal strandings IAW the MMPA.

Project 3.1.4 Report Gulf sturgeon strandings to the USFWS Panama City office and National Marine Fisheries Service Southeast Regional Office/Office of Protected Resources/St. Petersburg IAW the ESA.

Project 3.1.5 Monitor Choctawhatchee and St. Andrew beach mice; submit data to the Florida Fish and Wildlife Conservation Commission (FWC) to support Panhandle population recovery IAW the ESA.

Project 3.1.6 Translocate beach mice off-site to support species recovery in coordination with St. Andrews State Park to increase species resilience to catastrophic hurricanes IAW the ESA.

Project 3.1.7 Conduct assessments of beach mice habitat and species health (live trapping/observation) IAW the ESA.

Project 3.1.8 Annually monitor for tricolored bat and other protected bat species IAW the ESA.

Project 3.1.9 Annually post nesting and wintering areas for shorebirds (e.g., piping plover, rufa red knot, snowy plover, least tern, black skimmer, American oystercatcher) for protection IAW the ESA and MBTA.

Project 3.1.10 Conduct surveys of marsh habitats for black rails annually during their breeding season IAW the ESA.

Objective 3.2 Employ nature-based solutions to protect, enhance, and restore the coastal resilience of barrier island habitats to protect base infrastructure and protected species IAW the ESA and MBTA.

Project 3.2.1 Maintain the noncommissioned officer (NCO) beach access road.

Project 3.2.2 Identify priority beach areas in need of erosion prevention, food sources, and cover for protected species.

Project 3.2.3 Plant native vegetation to restore dune habitats for the benefit of all dune species and to protect mission infrastructure; assess and report success of restoration efforts.

Project 3.2.4 Facilitate ongoing work related to coastal resilience projects, which will help protect and improve the resilience of coastal species' habitat to future threats.

GOAL 4 RESTORE AND PROTECT WETLAND HABITATS TO COMPLY WITH FEDERAL LAWS AND PROTECT T&E SPECIES.

Objective 4.1 Survey, rehabilitate, and mitigate impacts to priority wetlands, with a focus on preserving federally protected plant species IAW Section 404 of the Clean Water Act, Section 7 of the ESA, and the CZMA.

Objective 4.2 Survey for and manage federally petitioned wetland animal species to minimize potential ESA-listing impacts.

Project 4.2.1 Survey and map federally petitioned wetland animal species locations that may occur on Tyndall AFB, including those of the coastal flatwoods crayfish.

GOAL 5 PROVIDE A VARIETY OF USES, VALUES, PRODUCTS, AND SERVICES TO PRESENT AND FUTURE GENERATIONS WHILE MAINTAINING SUSTAINABLE ECOSYSTEMS.

Objective 5.1 Provide hunting and fishing opportunities, consistent with demand, quality, and cost within the constraints of the DAF mission.

Project 5.1.1 Annually evaluate, prioritize, and submit AF Form 332s to maintain/repair boat ramps to prevent erosion and safety issues.

Project 5.1.2 Work with the USFWS to evaluate the fisheries management potential for Tyndall AFB's ponds, develop a management plan, and work with FWC and/or USFWS on stocking ponds as funding allows.

Project 5.1.3 Conduct baseline fisheries inventory of Tyndall AFB's ponds to identify fish populations.

Project 5.1.4 Annually monitor deer populations to ensure management objectives are being met.

Project 5.1.5 Conduct turkey surveys to determine if hunting is warranted.

Project 5.1.6 Continuously maintain the Tyndall AFB iSportsman website.

Objective 5.2 Provide nonconsumptive recreation opportunities, consistent with demand, quality, and cost within the constraints of the DAF mission.

Project 5.2.1 At the end of 2025, evaluate funding and logistical options for replacing the downed bridge on the Felix Lake Nature Trail.

Project 5.2.2 Annually reevaluate and repair posted informational signs that describe sensitive beach habitats and species and protective measures that should be followed.

Project 5.2.3 Provide presentations and tours highlighting sensitive species, habitats, and regulatory requirements.

Objective 5.3 Provide forest products, as compatible with the military mission, while restoring and maintaining long-term ecosystem sustainability, diversity, and productivity.

Project 5.3.1 Review AF Forms 813s and 332s to identify and mitigate potential conflicts between reforestation plan and installation projects.

9.0 INRMP IMPLEMENTATION, UPDATE, AND REVISION PROCESS

9.1 Natural Resources Management Staffing and Implementation

Tyndall AFB's goals and objectives (Section 8.0) are primarily carried out as duties and responsibilities of the Environmental Element Chief, as relayed to the Natural Resources staff. When possible, other organizations, contractors, and volunteers are utilized to provide technical assistance. Efforts beyond the capabilities of the installation are carried forward as projects to AFCEC for inclusion in the 5-year budget review. Current program staffing is provided in Table 9-1.

Table 9-1. Natural resources staff at Tyndall Air Force Base

Scale or Organization	Title or Position
GS-13	Environmental Element Chief
GS-11	Wildlife Biologist
GS-11	Forester
GS-09	Conservation Law Enforcement Officer
GS-07	Forestry Technician
GS-07	Biological Technician
NAF, CSU, or USFWS	Seasonal Biological Aid
NAF, CSU, or USFWS	Seasonal Biological Aid
USFWS—GS-12	Fish and Wildlife Biologist
USFWS—GS-9	Fish and Wildlife Biologist
USFWS—GS-9	Fish and Wildlife Biologist
USFWS—WG-8	Heavy Equipment Operator
USDA–APHIS–WS	Wildlife Biologist
USDA–APHIS–WS	Biological Technician
Environmental Fence to Fence Contract	Archeologist
USFWS	Wildland Fire Manager
USFWS	Wildland Fire Technician
USFWS	Wildland Fire Technician

Definitions: CSU=Colorado State University; GS=General Schedule; NAF=Non-Appropriated Funds; USDA–APHIS–WS=US Department of Agriculture–Animal and Plant Health Inspection Service–Wildlife Services; USFWS=US Fish and Wildlife Service; WG=Wage Grade

To fully implement the Goals and Objectives of this INRMP, additional resources are needed. Requests are dependent on the availability of base resources, AFCEC resources/expertise, funding, and civilian volunteers.

Implementation

Responsibility for implementation of the Tyndall AFB INRMP (not including the supporting plans) and coordination of reviews has been delegated to the Environmental Element Chief. Interim updates to the INRMP are made in cases where changes in the military mission, environmental compliance requirements, T&E species listings, or other new information significantly affect the ability of Tyndall AFB to implement the INRMP.

INRMP implementation includes, but is not limited to, the following:

- Execute all "must fund" projects and activities IAW specific timeframes identified in the INRMP

- Ensure sufficient professionally trained natural resources management personnel are available to perform the tasks required by the INRMP
- Review the INRMP annually, update goals and objectives, and coordinate changes with regulators, as appropriate
- Document specific INRMP accomplishments undertaken each year

Supporting plans and organizations each have their own authority for budgeting and implementation. The Environmental Element Chief has the responsibility to review, provide input, and recommend changes to plans so they further the goals and objectives of the Tyndall AFB INRMP. Overall implementation responsibility remains with the Installation Commander.

9.2 Monitoring INRMP Implementation

Monitoring of the INRMP implementation is accomplished on a yearly basis. Goals and objectives are reevaluated yearly to adjust for what has been accomplished, what needs to be added, and what is ongoing.

9.3 Annual INRMP Review and Update Requirements

The INRMP requires annual review, IAW DoDI 4715.03 and DAFMAN 32-7003, to ensure the achievement of mission goals, verify the implementation of projects, and establish any necessary new management requirements. This process involves installation Natural Resources Program 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, the appropriate state agency, and NOAA Fisheries. 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 requests return correspondence with comments/concurrence.

The annual review provides Tyndall AFB the opportunity to communicate INRMP implementation status, progress, and successes to the external agencies.

Installation Supplement

The USFWS, FWC, NOAA, and the NRM/Section conduct an Annual INRMP Review Meeting. This meeting takes place in person with representatives from 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.

10.0 ANNUAL WORK PLANS

Installation Supplement

The INRMP Annual Work Plans are included in this section. These projects are listed by FY, including the current year and 4 succeeding years. For each project and activity, a specific timeframe for implementation is provided (as applicable), as well as the appropriate funding source and priority for implementation. The work plans provide all the necessary information for building a budget within the DAF 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 DAF is noncompliant with the Sikes Act; or that the project 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 noncompliance with a specific requirement within a natural resources law or by EO 13112. However, the INRMP signatories would not contend that the INRMP is not being implemented if not accomplished within the programmed year due to other priorities.
- **Low**—Project supports a specific INRMP goal and objective, enhances conservation resources or the integrity of the installation mission, and/or supports long-term compliance with specific requirements within natural resources law; but it is not directly tied to specific compliance within the proposed year of execution.

Table 10-1. Annual work plans (*current year to 4 years out*)

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility	Funding Source	Priority Level	PB28 Code*	Standard Title*	Project Number	Description
	1	1.1								1.1.1	Continue to develop safeguards in the Environmental Impact Analysis Process to ensure that actions do not proceed until all pertinent coordinating agencies have had the opportunity to comment and any necessary Coastal Zone Management Act (CZMA), ESA, Essential Fish Habitat (EFH), and Marine Mammal Protection Act (MMPA) clearances have been obtained.
	1	1.2								1.2.1	Review all Section 7 consultations, Environmental Impact Statements (EIS), Environmental Assessments (EAs), and other applicable regulatory permits for commitments made by Tyndall Air Force Base (AFB), and establish a process by which natural resource requirements are communicated to pertinent personnel for implementation. Ensure that those under the responsibility of the Natural Resources Office are programmed for in the Automated Civil Engineer System.
	1	1.2								1.2.2	Establish a process to track natural resource requirements from Section 7 consultations, MMPA and EFH permits, EIS, EAs, and other applicable regulatory permits, and implement a system that ensures compliance with the requirements (i.e., site inspections). Provide required annual reports to regulators.
	1	1.2								1.2.3	Provide a Natural Resources familiarization briefing and tour of the base for new commanders within 3 months of taking command.
	1	1.2								1.2.4	Develop a briefing on natural resources and associated protection measures, and provide the briefing to appropriate organizations and projects that have the potential to impact these resources.
	1	1.2								1.2.5	By 1 January of each year, conduct an assessment to determine what organizations have a need for beach access and driving; by 1 February of each year, provide a reminder or new notice about the base operating instruction to affected organizations.
	1	1.2								1.2.6	Ensure compatibility of recreation areas with the short- and long-term requirements of the military mission through annual (at a minimum) coordination with natural and cultural resource managers.
	1	1.2								1.2.7	Review and update natural resources data layers at least once a year.
	1	1.2								1.2.8	Annually identify and map locations of invasive plant species and treat approximately 500 acres of priority areas in accordance with (IAW) Executive Order (EO) 13112.
	1	1.2								1.2.9	Continue to establish criteria and a process to prioritize areas of invasive plant species infestations for treatment IAW EO 13112.

Table 10-1. Annual work plans (*current year to 4 years out*)

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility	Funding Source	Priority Level	PB28 Code*	Standard Title*	Project Number	Description
	1	1.2								1.2.10	Annually implement the Tyndall AFB Invasive and Nuisance Species Component Plan IAW Air Force Manual (AFMAN) 32-1053.
	1	1.2								1.2.11	Coordinate with other agencies and organizations regarding natural hazard impacts that may affect Tyndall AFB, and communicate pertinent information to base leadership.
	1	1.2								1.2.12	Engage staff with resilience efforts occurring in the region, especially relating to adjacent natural areas that might increase habitat connectivity for protected species on the base.
	1	1.2								1.2.13	Continue coordination with outside agencies and organizations to support the Coastal Resilience Implementation Plan, with a focus on the use of nature-based solutions to improve coastal resilience and protect natural resources against future threats such as extreme weather events and storm surge.
	1	1.2								1.2.14	Participate in Tyndall AFB Coastal Resilience Working Group information-sharing meetings.
	1	1.2								1.2.15	Continue to seek opportunities to leverage programs with potential synergies with coastal resilience at Tyndall AFB in terms of information sharing, partnerships, and joint pursuits of funding, including the Northwest Florida Sentinel Landscape Program and St. Andrew/St. Joseph Estuary Program.
	1	1.3								1.3.1	Review annual Tyndall AFB Wildland Fire Management Plan (WFMP) updates and provide comments on natural resources components and impacts, in coordination with the USFWS, as detailed in Department of the Air Force Manual (DAFMAN) 32-7003, Section 3.78.
	1	1.3								1.3.2	Conduct annual planning meetings between the AFCEC/CZOF and Tyndall AFB Natural Resources staff to establish criteria to prioritize compartments and units that require prescribed fire and create an annually updated map displaying proposed burn units.
	1	1.3								1.3.3	Coordinate with pertinent installation personnel to develop an annually updated map of internal and external values at risk from wildfire.
	1	1.3								1.3.4	Submit annual Air Force (AF) Form 813 detailing proposed burn units and proposed roads and firebreaks to be maintained or created.
	1	1.3								1.3.5	Annually educate training groups and other organizations at Tyndall AFB concerning wildfire prevention/mitigation and the benefits of prescribed fire to reduce fire starts.
	1	1.3								1.3.6	Through a responsive planning process, ensure minimal interference with military mission activity during wildland fire operations.

Table 10-1. Annual work plans (*current year to 4 years out*)

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility	Funding Source	Priority Level	PB28 Code*	Standard Title*	Project Number	Description
	1	1.3								1.3.7	Enter the perimeters of all hazardous fuel treatments into the Fire Decision Support System DSS database to be maintained by Air Force Wildland Fire Branch (AFWFB) and annually analyze database to ensure all priority lands within Tyndall AFB are being included in the prescribed fire program.
	1	1.3								1.3.8	Annually maintain firebreaks, based on needs identified during condition monitoring, taking care to avoid disturbance to federally threatened flora inhabiting firebreak-adjacent habitat.
	1	1.3								1.3.9	Update fire considerations map with newly acquired data from wildland fire procedures and other surveys, detailing sensitive areas such as wetlands, endangered species locations, and unexploded ordinance-contaminated areas, and formalize procedures required for these areas.
	1	1.3								1.3.10	Support the wildland fire branch by participating during wildfire operations and providing technical support to wildland fire operations on Tyndall AFB (including the wildland/urban interface areas) to the extent possible.
	1	1.4								1.4.1	Maintain conservation law enforcement presence at Tyndall AFB to enforce natural resource regulations.
	1	1.4								1.4.2	Annually coordinate with Security Forces to identify areas where they could assist with enforcement of natural resources regulations, and develop procedures to support this coordinated effort.
	1	1.5								1.5.1	Annually maintain all permits required for lethal control of migratory birds and coordinate removal of nuisance wildlife as needed to promote airfield safety.
	1	1.5								1.5.2	Semi-annually meet with BASH Working Group to identify long-term solutions for management of airfield wetlands that minimize adverse effects to natural resources while reducing BASH risk.
	1	1.5								1.5.3	Conduct forestry operations when practical to remove trees that are in or have immediate potential to encroach into airfield glide slopes, IAW Unified Facilities Criteria 3-260-01 and DAFMAN 13-204, Volume 2.
	2	2.1								2.1.1	Annually initiate any NEPA, Section 7 consultation, Section 106 consultation, and other pertinent consultations/permits required for Tyndall AFB's forestry activities.
	2	2.1								2.1.2	Complete at least 6,000 acres of prescribed fire annually, based on a 5-year running average, in coordination with the AFWFB and following procedures from the Tyndall AFB WFMP.
	2	2.1								2.1.3	Meet annual prescribed fire acreage targets planned for Fiscal Year 2024 (FY24) to FY27 in the Tyndall AFB WFMP, with fire management units prioritized based on fuel reduction, ecological, and/or silvicultural drivers for fire.

Table 10-1. Annual work plans (*current year to 4 years out*)

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility	Funding Source	Priority Level	PB28 Code*	Standard Title*	Project Number	Description
	2	2.1								2.1.4	Conduct a forestry inventory of Tyndall AFB (post Hurricane Michael) and related restoration efforts to establish baseline forestry data to be incorporated in WFMP updates, ESA flora and fauna planning/prioritization documents, and other relevant plans and reports.
	2	2.1								2.1.5	Annually prioritize areas for longleaf pine restoration, with a target condition of trees that are thinned to a basal area of 50 to 70 square feet. per acre, little to no midstory shrubs, and understory composed of native grasses, sedges, and forbs (as detailed in the 2024 Tyndall AFB Forest Management Component Plan), in support of ESA-listed flora species.
	2	2.1								2.1.6	Perform first-year survival check for planted longleaf pine seedlings and stocking checks 3 to 5 years after initial plantings, in support of native longleaf pine habitat restoration.
	2	2.1								2.1.7	Install long-term monitoring plots (using partnerships with the Florida Natural Areas Inventory [FNAI], University of Georgia, and others) to assess the success and trajectory of the native groundcover restoration areas that were reseeded.
	2	2.1								2.1.8	Use prescribed fire (on a 2- to 3-year return interval, with a growing-season emphasis, and promoting burning through wetlands) to restore natural ecosystems and disturbance regimes, promote floristic diversity, and improve habitat for federally listed species of concern. Pair prescribed fires with mechanical and/or chemical Timber Stand Improvement as needed to control undesirable shrubs, such as swamp titi.
	2	2.1								2.1.9	Continue longleaf restoration work by replanting seedlings annually in areas with low survival, adjusting seedling rates based on success of previous plantings.
	2	2.1								2.1.10	Conduct predator and nuisance animal removal, control, hazing, and trapping in priority areas.
	2	2.1								2.1.11	Provide education/outreach services to housing residents, Security Forces, and geographically separated work areas on the Tyndall AFB range regarding nuisance species.
	2	2.1								2.1.12	Continue to integrate groundcover restoration with longleaf pine restoration, including a needs assessment of areas for planting, identification of suitable harvest sites, and determination of the best species composition and planting times for Tyndall AFB.
	2	2.1								2.1.13	Complete mechanical and/or chemical site preparation in advance of planting containerized longleaf pine seedlings, seeding native groundcover, and/or planting wiregrass plugs.

Table 10-1. Annual work plans (*current year to 4 years out*)

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility	Funding Source	Priority Level	PB28 Code*	Standard Title*	Project Number	Description
	2	2.1								2.1.14	Monitor and annually adjust prescribed fire plan prescription parameters (per Tyndall AFB's WFMP) through an iterative process based on fire behavior and fire effects in response to novel fuel conditions caused by Hurricane Michael.
	2	2.1								2.1.15	Monitor and annually adjust the prescribed fire plan's smoke management guidelines based on experience and lessons learned burning in hurricane-impacted fuels.
	2	2.2								2.2.1	Annually survey for new bald eagle nests. Maintain a minimum of 660-foot buffers around active nests, follow Activity-Specific guidelines for any applicable category of activity (A-H), and implement any other pertinent recommendations from the Bald Eagle Management Guidelines.
	2	2.3								2.3.1	Survey for gopher tortoises, and other sensitive commensals at proposed project areas within high-priority habitat where the ground will be significantly disturbed.
	2	2.3								2.3.2	Annually survey and scope all burrows, and develop a comprehensive map layer of known gopher tortoise burrows and a report for candidate conservation agreement data call.
	2	2.4								2.4.1	Annually survey and map federally listed and petitioned plant species that are either known to occur or may occur on Tyndall AFB, including Godfrey's butterwort, Henry's spider lily, blackbract pipewort, Kral's yelloweyed grass, smoothbark St. Johnswort, Florida skullcap, and telephus spurge, to document established population changes and detect new populations.
	2	2.4								2.4.2	Survey federally threatened telephus spurge translocation site on a monthly or bi-monthly basis to continue documenting survival of individuals, as required by Biological Opinion BO 04EF3000-2020-F-0145.
	2	2.5								2.5.1	Meet with Monarch Joint Venture for guidance on monarch monitoring, as recommended in the Programmatic Conference Opinion: Department of Defense's Conservation Strategy for Monarch Butterfly.
	2	2.5								2.5.2	Implement the Integrated Monarch Monitoring Program to monitor monarchs and their habitat on Tyndall AFB, as recommended in the Programmatic Conference Opinion: Department of Defense's Conservation Strategy for Monarch Butterfly.
	3	3.1								3.1.1	Locate, protect, and evaluate all sea turtle nests on Tyndall AFB property IAW the ESA. Collect and maintain data on nest success, depredation, and disorientation for all nests.

Table 10-1. Annual work plans (*current year to 4 years out*)

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility	Funding Source	Priority Level	PB28 Code*	Standard Title*	Project Number	Description
	3	3.1								3.1.2	Respond to and investigate all sea turtle stranding reports on Department of the Air Force (DAF) property IAW the ESA. Collect appropriate data and report to the Florida Stranding and Salvage Network within 24 hours.
	3	3.1								3.1.3	Coordinate with outside partners to address marine mammal strandings IAW the MMPA.
	3	3.1								3.1.4	Report Gulf sturgeon strandings to the US Fish and Wildlife Service (USFWS) Panama City office and National Marine Fisheries Service Southeast Regional Office/Office of Protected Resources/St. Petersburg IAW the ESA.
	3	3.1								3.1.5	Monitor Choctawhatchee and St. Andrew beach mice; submit data to the Florida Fish and Wildlife Conservation Commission (FWC) to support Panhandle population recovery IAW the ESA.
	3	3.1								3.1.6	Translocate beach mice off-site to support species recovery in coordination with St. Andrews State Park to increase species resilience to catastrophic hurricanes IAW the ESA.
	3	3.1								3.1.7	Conduct assessments of beach mice habitat and species health (live trapping/observation) IAW the ESA.
	3	3.1								3.1.8	Annually monitor for tricolored bat and other protected bat species IAW the ESA.
	3	3.1								3.1.9	Annually post nesting and wintering areas for shorebirds (e.g., piping plover, rufa red knot, snowy plover, least tern, black skimmer, American oystercatcher) for protection IAW the ESA and MBTA.
	3	3.1								3.1.10	Conduct surveys of marsh habitats for black rails annually during their breeding season IAW the ESA.
	3	3.2								3.2.1	Maintain the noncommissioned officer (NCO) beach access road.
	3	3.2								3.2.2	Identify priority beach areas in need of erosion prevention, food sources, and cover for protected species.
	3	3.2								3.2.3	Plant native vegetation to restore dune habitats for the benefit of all dune species and to protect mission infrastructure; assess and report success of restoration efforts.
	3	3.2								3.2.4	Facilitate ongoing work related to coastal resilience projects, which will help protect and improve the resilience of coastal species' habitat to future threats.
	4	4.2								4.2.1	Survey and map federally petitioned wetland animal species locations that may occur on Tyndall AFB, including those of the coastal flatwoods crayfish.
	5	5.1								5.1.1	Annually evaluate, prioritize, and submit AF Form 332s to maintain/repair boat ramps to prevent erosion and safety issues.
	5	5.1								5.1.2	Work with the USFWS to evaluate the fisheries management potential for Tyndall AFB's ponds, develop a management plan, and work with FWC/USFWS on stocking ponds as funding allows.

Table 10-1. Annual work plans (*current year to 4 years out*)

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility	Funding Source	Priority Level	PB28 Code*	Standard Title*	Project Number	Description
	5	5.1								5.1.3	Conduct baseline fisheries inventory of Tyndall AFB's ponds to identify fish populations.
	5	5.1								5.1.4	Annually monitor deer populations to ensure management objectives are being met.
	5	5.1								5.1.5	Conduct turkey surveys to determine if hunting is warranted.
	5	5.1								5.1.6	Continuously maintain the Tyndall AFB iSportsman website.
	5	5.2								5.2.1	By 2025, evaluate funding and logistical options for replacing the downed bridge on the Felix Lake Nature Trail.
	5	5.2								5.2.2	Annually reevaluate and repair posted informational signs that describe sensitive beach habitats and species and protective measures that should be followed.
	5	5.2								5.2.3	Provide presentations and tours highlighting sensitive species, habitats, and regulatory requirements.
	5	5.3								5.3.1	Review AF Forms 813s and 332s to identify and mitigate potential conflicts between reforestation plan and installation projects.

*Natural Resources standard titles by PB28 code (excluding CZT/CZC titles); see next table.

Table 10-2. Natural Resources standard titles by PB28 code (excluding CZT/CZC titles)

INRP	MMA	T&E	MNRA	WTLD
P&F, Cultural Natural (CN)	Mgt, Species	Mgt, Habitat	Compliance Public Notification	Mgt, Wetlands / Floodplains
Interagency/Intraagency, Government, Sikes Act	Interagency/Intraagency, Government, Sikes Act	Mgt, Species	Plan Update, Other	Monitor Wetlands
Interagency/Intraagency, Government, Sikes Act, Conservation Law Enforcement Officer (CLEO)	Outsourced Environmental Services, CN	Mgt, Invasive Species	Recordkeeping, Other	Interagency/Intraagency, Government, Sikes Act
Outsourced Environmental Services, CN	Supplies, CN	Mgt, Nuisance Wildlife	Outreach	Outsourced Environmental Services, CN

Table 10-2. Natural Resources standard titles by PB28 code (excluding CZT/CZC titles)

INRP	MMA	T&E	MNRA	WTLD
Supplies, CN	Supplies, CN, CLEO	Interagency/Intraagency, Government, Sikes Act	—	—
Supplies, CN, CLEO	Vehicle Leasing, CN	Interagency/Intraagency, Government, Sikes Act, CLEO	—	—
Equipment Purchase/ Maintain, CN	—	Outsourced Environmental Services, CN	—	—
Vehicle Leasing, CN	—	Supplies, CN	—	—
Vehicle Fuel & Maintenance, CN	—	Supplies, CN, CLEO	—	—
Mgt, Wildland Fire	—	Equipment Purchase/ Maintain, CN	—	—
Plan Update, Integrated Natural Resources Management Plan (INRMP)	—	Vehicle Leasing, CN	—	—
Plan Update, Other	—	Vehicle Fuel & Maintenance, CN	—	—
Mgt, Habitat	—	Plan Update, Other	—	—
Mgt, Species	—	Environmental Services, CN	—	—
Mgt, Invasive Species	—	—	—	—
Mgt, Nuisance Wildlife	—	—	—	—
Recordkeeping, Other	—	—	—	—
Environmental Services, CN	—	—	—	—

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11.1 Standard References (Applicable to all DAF installations)

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

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12.0 ACRONYMS

12.1 Standard Acronyms (Applicable to all DAF installations)

- eDASH Acronym Library
- Natural Resources Playbook—Acronym Section
- US EPA Terms & Acronyms

12.2 Installation Acronyms

325 CES/CEIE	325th Civil Engineer Squadron, Environmental Element
325 CES/CEIEA	325th Civil Engineer Squadron, Environmental Element, Natural Resources
325 FSS	325th Force Support Squadron
325 FW	325th Fighter Wing
325 FW/SEF	325th Fighter Wing Flight Safety
AF	Air Force
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFPD	Air Force Policy Directive
AFWFB	Air Force Wildland Fire Branch
BASH	Bird/Wildlife Aircraft Strike Hazard
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practices
CFR	Code of Federal Regulations
CIE	Crooked Island East
CIW	Crooked Island West
CLEO	Conservation Law Enforcement Officer
CRIP	Coastal Resiliency Implementation Plan
CWA	Critical Wildlife Area
CZMA	Coastal Zone Management Act
DAF	Department of the Air Force
DAFI	Department of the Air Force Instruction
DAFMAN	Department of the Air Force Manual

DoDI	Department of Defense Instruction
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statements
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act
FAC	Florida Administrative Code
FCMP	Florida Coastal Management Program
FDACS	Florida Department of Agriculture and Consumer Services
FDEP	Florida Department of Environmental Protection
FNAI	Florida Natural Areas Inventory
FWC	Florida Fish and Wildlife Conservation Commission
FY	Fiscal Year
GIS	Geographic Information System
GOA	Gulf of America (formerly, Gulf of Mexico)
IAW	In accordance with
ICRMP	Integrated Cultural Resources Management Plan
IDP	Installation Development Plan
INRMP	Integrated Natural Resources Management Plan
MBTA	Migratory Bird Treaty Act
MMPA	Marine Mammal Protection Act
NCO	Noncommissioned Officer
NEPA	National Environmental Policy Act
NLW	National Listing Workplan
NMFS	National Marine Fisheries Service (a.k.a., NOAA Fisheries)
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places

NRM	Natural Resources Manager
POC	Point of Contact
RCW	Red-cockaded woodpecker
RED HORSE	Rapid Engineer Deployable Heavy Operational Repair Squadron Engineers
SSC	Species of Special Concern
T&E	Threatened and Endangered
TSI	Timber Stand Improvement
USACE	US Army Corps of Engineers
USAF	US Air Force (now DAF, Department of the Air Force)
USC	US Code
US EPA	US Environmental Protection Agency
USDA	US Department of Agriculture
USFWS	US Fish and Wildlife Service
WFMP	Wildland Fire Management Plan
WMA	Wildlife Management Area
WSM	Wildland Support Module

13.0 DEFINITIONS

13.1 Standard Definitions (Applicable to all DAF installations)

- Natural Resources Playbook—Definitions Section

13.2 Installation Definitions

Add unique state, local, and installation-specific definitions.

14.0 APPENDICES

14.1 Standard Appendices

14.1.1 Appendix A

Table 14-1. Annotated summary of key legislation related to design and implementation of the Integrated Natural Resources Management Plan (INRMP)

Legislation	Description
Federal Public Laws (PLs) and Executive Orders (EOs)	
National Defense Authorization Act of 1989 (PL 101-189); Volunteer Partnership Cost-Share Program	Amends 2 Acts and establishes volunteer and partnership programs for natural and cultural resources management on DoD lands.
Defense Appropriations Act of 1991 (PL 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 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; (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.

Table 14-1. Annotated summary of key legislation related to design and implementation of the Integrated Natural Resources Management Plan (INRMP)

Legislation	Description
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 US Environmental Protection Agency (US EPA) authority to conduct reviews and inspections to monitor federal facility compliance with pollution control standards.
EO 13112, *Invasive Species*	Prevents 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 US Fish and Wildlife Service (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 (USC)	
Animal Damage Control Act (7 USC § 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 USC § 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, as amended (42 USC §§ 7401–7671q, 14 July 1955)	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), as amended (PL 96-510, 94 Stat. 2797; 26 USC §§ 4611–4682)	Authorizes and administers a program to assess damage, respond to releases of hazardous substances, fund cleanup, establish cleanup standards, assign liability, and other efforts to address environmental contaminants. Installation Restoration Program guides cleanups at DoD installations.

Table 14-1. Annotated summary of key legislation related to design and implementation of the Integrated Natural Resources Management Plan (INRMP)

Legislation	Description
Endangered Species Act (ESA) of 1973, as amended (PL 93-205; 16 USC § 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 National Oceanic and Atmospheric Administration (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 (Pittman-Robertson Act) (16 USC § 669–669i; 50 Stat. 917)	Provides federal aid to states and territories for management and restoration of wildlife. Fund derives from sports tax on arms and ammunition. Projects include acquisition of wildlife habitat, wildlife research surveys, development of access facilities, and hunter education.
Federal Environmental Pesticide Act of 1972	Requires installations to ensure pesticides are used only in accordance with their label registrations and restricted-use pesticides are applied only by certified applicators.
Federal Land Use Policy and Management Act (43 USC §§ 1701–1782)	Requires management of Bureau of Land Management 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 USC §§ 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) (33 USC §§1251–1387)	The Clean Water Act 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 (PL 96-366, 94 Stat. 1322; 16 USC §§ 2901–2911)	Installations are encouraged to use their authority to conserve and promote conservation of nongame fish and wildlife in their habitats.
Fish and Wildlife Coordination Act (16 USC § 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 USC § 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.

Table 14-1. Annotated summary of key legislation related to design and implementation of the Integrated Natural Resources Management Plan (INRMP)

Legislation	Description
Leases: Non-excess Property of Military Departments, as amended (10 USC § 2667)	Authorizes DoD to lease to commercial enterprises federal land not currently needed for public use. Covers agricultural outleasing program.
Migratory Bird Treaty Act (16 USC §§ 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 (PL 91-190; 42 USC § 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 USC § 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 USC §§ 1241–1249)	Provides for the establishment of recreation and scenic trails.
National Wildlife Refuge Acts	Provides for establishment of National Wildlife Refuges through purchase, land transfer, donation, cooperative agreements, and other means.
National Wildlife Refuge System Administration Act of 1966 (16 USC § 668dd-ee)	Provides guidelines and instructions for the administration of Wildlife Refuges and other conservation areas.
Native American Graves Protection and Repatriation Act of 1990, as amended (25 USC § 3001–13; 104 Stat. 3042)	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 USC § 401 et seq.)	Makes it unlawful for the US Department of the Air Force (DAF) to conduct any work or activity in Navigable Waters of the United States without a federal permit. Installations should coordinate with the US Army Corps of Engineers (USACE) to obtain permits for the discharge of refuse affecting navigable waters under National Pollutant Discharge Elimination System 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.

Table 14-1. Annotated summary of key legislation related to design and implementation of the Integrated Natural Resources Management Plan (INRMP)

Legislation	Description
Sale of certain interests in land (10 USC § 2665)	Authorizes sale of forest products and reimbursement of the costs of management of forest resources.
Soil and Water Conservation Act (PL 95-193; 16 USC § 2001)	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 USC § 670 et seq.)	Provides for the cooperation of DoD, the Department 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: Department of the Air Force Manual (DAFMAN) 32-7003 Section 3.11, *INRMP Implementation*. As defined in DoD Instruction (DoDI) 4715.03, use professionally trained natural resources management personnel with a degree in the natural sciences to develop and implement the installation INRMP. Per Section 3.11.1, *Outsourcing Natural Resources Management,* as stipulated in the Sikes Act, 16 USC § 670 et seq., the Office of Management and Budget Circular No. A-76, *Performance of Commercial Activities*, 4 August 1983 (Revised 29 May 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 Policies, Directives, and Instructions	
DoDI 4150.07, *DoD Pest Management Program,* dated 29 May 2008	Implements policy, assigns responsibilities, and prescribes procedures for the DoD Integrated Pest Management Program.
DoDI 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.
DoDI 4715.03, *Natural Resources Management*	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.

Table 14-1. Annotated summary of key legislation related to design and implementation of the Integrated Natural Resources Management Plan (INRMP)

Legislation	Description
Office of the Secretary of Defense (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.
DAF Instructions and Directives	
DAF Instruction (DAFI) 32-1015, *Integrated Installation Planning*, and 32 CFR Part 898, as amended	This publication establishes a comprehensive and integrated planning framework for development/redevelopment of DAF installations. Provides guidance and responsibilities in the Environmental Impact Analysis Process (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.

Table 14-1. Annotated summary of key legislation related to design and implementation of the Integrated Natural Resources Management Plan (INRMP)

Legislation	Description
DAFMAN 32-7003, *Environmental Conservation*	Implements Air Force Policy Directive (AFPD) 32-70, *Environmental Considerations in Air Force Programs and Activities*; DoDI 4715.03*, Natural Resources Management*; and DoDI 7310.5, *Accounting for Sale of Forest Products*. It explains how to manage natural resources on DAF property in compliance with federal, state, territorial, and local standards. This manual also implements DoDI 4710.1, *Archaeological and Historic Resources Management*. It explains how to manage cultural resources on DAF property in compliance with federal, state, territorial, and local standards.
DAFI 32-10112, *Installation Geospatial Information and Services (IGI&S)*	This instruction implements DoDI 8130.01, *Installation Geospatial Information and Services (IGI&S)*, by identifying the requirements to implement and maintain an Air Force Installation Geospatial Information and Services program and AFPD 32-10, Installations and Facilities.
AFPD 32-70, *Environmental Quality*	Outlines the DAF mission to achieve and maintain environmental quality on all DAF lands by cleaning up environmental damage resulting from past activities, meeting all environmental standards applicable to present operations, planning its future activities to minimize environmental impacts, managing responsibly the irreplaceable natural and cultural resources it holds in public trust and eliminating pollution from its activities wherever possible. AFPD 32-70 also establishes policies to carry out these objectives.
Policy Memo for Implementation of Sikes Act Improvement Amendments, HQ US Air Force (USAF) Environmental Office (USAF/ILEV) on 29 January 1999	Outlines the USAF interpretation and explanation of the Sikes Act and Improvement Act of 1997.

14.2 Installation Appendices

Not applicable.

15.0 ASSOCIATED PLANS

15.1.1 Tab 1—Forest Management Component Plan

15.1.2 Tab 2—Nuisance and Invasive Species Component Plan

15.1.3 Tab 3—Threatened and Endangered Species Component Plan

15.1.4 Tab 4—Wildland Fire Management Plan

15.1.5 Tab 5—Bird/Wildlife Aircraft Strike Hazard (BASH) Plan

15.1.6 Tab 6—Integrated Cultural Resources Management Plan

15.1.7 Tab 7—Integrated Pest Management Plan (IPMP)

15.1.8 Tab 8—Conservation Law Enforcement Program Operations Plan

15.1.9 Tab 9—Maps Containing Controlled Unclassified Information

Comment Matrix
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Section #	Section Heading	Page #	Reviewer	Comment	How Resolved
—	Signature Pages	8	MK	Change USFWS lead to: Constance Cassler Conservation Delivery Division Manager United States Fish and Wildlife Service, Florida Ecological Service Office Robert Carey retired.	Changed.
2.0	Installation Profile	16	MK	Change Robert Carey to Constance Cassler, U.S. Fish and Wildlife Service	Changed.
2.3.3	Fish and Wildlife	39	JCM	Second sentence: Change, "…these natural habitats contain wildlife that is…" to "…these natural habitats contain wildlife that are…"	Changed.
7.2.1	American Alligator	76	JCM	Remove "Olympia Pong (DoD only)" under the American Alligator section as it is in the CWA.	Changed.
7.2.1	American Alligator	76	JCM	Change "Non-DoD hunters are not allowed in hunt blocks, lakes, or ponds in the West or Flightline Hunt Units." To " Non-DoD hunters are not allowed in hunt blocks, lakes, or ponds in the West or Flightline Hunt Units unless escorted by a DoD hunter."	Changed.
7.2.3	Other recreational activities	77	JCM	Remove "at the hunting check station or" since permit sales are no longer offered at the check station.	Changed.
7.4.2	Gopher Tortoise	97	JCM	Add period after the sentence ending with "enhanced visibility to forestry equipment operators."	Added.
15.1.9	CUI Maps	Fig. 1	JCM	Not the same map as the last draft	Reverted to old map per email conversation with Jay.
15.1.9	CUI Maps	Fig. 5	JCM	Not the same map as the last draft map	Reverted to old map per email conversation with Jay.
15.1.9	CUI Maps	Fig. 7	JCM	What happened to the map that had each category defined in greater detail?	Reverted to old map per email conversation with Jay.
15.1.9	CUI Maps	Fig. 9	JCM	Not the same map as the last draft map	Retained map per email conversation with Jay.