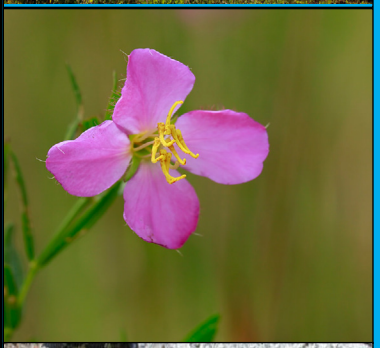

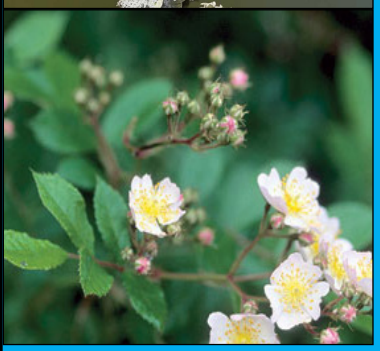

Integrated Natural Resources Management Plan

McEntire Joint National Guard Base
South Carolina

Final
December 2018

Integrated Natural Resources Management Plan
McEntire Joint National Guard Base
Richland County, South Carolina

Prepared for

Air National Guard
Plans and Requirements Branch NGB/A4AM
3501 Fetchet Avenue
Joint Base Andrews, Maryland 20762

On Behalf of

South Carolina Air National Guard
169th Fighter Wing
1325 Swamp Fox Road
Eastover, South Carolina 29044

December 2018

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SIGNATURE PAGE
SOUTH CAROLINA AIR NATIONAL GUARD BASE
RICHLAND COUNTY, SOUTH CAROLINA

This Integrated Natural Resources Management Plan (INRMP), dated December 2018, has been developed for McEntire Joint National Guard Base (JNGB) in cooperation with the U.S. Fish and Wildlife Service (USFWS) and the South Carolina Department of Natural Resources (SCDNR). The management of natural resources in this INRMP reflects the mutual agreement of all parties.

To the extent that resources permit, USFWS, SCDNR, and McEntire JNGB, by signature of their agency representative, do hereby agree to enter a cooperative agreement program for the conservation, protection, and management of natural resources present on McEntire JNGB, South Carolina. The intention of this agreement is to develop functioning, sustainable ecological communities on McEntire JNGB that integrate the interests and mission of the agencies charged with conservation, protection, and management of natural heritage in the public interest. This agreement may be modified and amended by mutual agreement of the authorized representatives of the three agencies. This agreement will become effective upon the date of the last signatory and shall continue in full force until terminated by written notice to the other parties, in whole or in part, by any of the parties signing this agreement.

By their signatures below, or an enclosed letter of concurrence, all parties grant their concurrence and acceptance of the following document.

Approving Officials:

Digitally signed by GANDHI.AKSHAI.MAHENDRA.1172985692
Date: 2019.01.03 16:35:59 -05'00'

18 December 2018

McEntire Joint National Guard Base
Base Commander Signatory

Date

Thomas J. McCoy

DECEMBER 17, 2018

United States Fish and Wildlife Service Signatory

Date

1/10/19

South Carolina Department of Natural Resources
Signatory

Date

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ANNUAL REVIEW AND COORDINATION DOCUMENTATION
2019

Signatures from the approving officials on this page certify the annual review and coordination of the Integrated Natural Resources Management Plan for the 169th Fighter Wing at McEntire Joint National Guard Base has been completed for the specified year.

Approving Officials:

McEntire Joint National Guard Base **Base Commander Signatory**	**Date**
United States Fish and Wildlife Service Signatory	**Date**
South Carolina Department of Natural Resources	**Date**

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ANNUAL REVIEW AND COORDINATION DOCUMENTATION
2020

Signatures from the approving officials on this page certify the annual review and coordination of the Integrated Natural Resources Management Plan for the 169th Fighter Wing at McEntire Joint National Guard Base has been completed for the specified year.

Approving Officials:

McEntire Joint National Guard Base **Base Commander Signatory**	**Date**
United States Fish and Wildlife Service Signatory	**Date**
South Carolina Department of Natural Resources	**Date**

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ANNUAL REVIEW AND COORDINATION DOCUMENTATION
2021

Signatures from the approving officials on this page certify the annual review and coordination of the Integrated Natural Resources Management Plan for the 169th Fighter Wing at McEntire Joint National Guard Base has been completed for the specified year.

Approving Officials:

McEntire Joint National Guard Base **Base Commander Signatory**	**Date**
United States Fish and Wildlife Service Signatory	**Date**
South Carolina Department of Natural Resources	**Date**

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ANNUAL REVIEW AND COORDINATION DOCUMENTATION
2022

Signatures from the approving officials on this page certify the annual review and coordination of the Integrated Natural Resources Management Plan for the 169th Fighter Wing at McEntire Joint National Guard Base has been completed for the specified year.

Approving Officials:

McEntire Joint National Guard Base **Base Commander Signatory**	**Date**
United States Fish and Wildlife Service Signatory	**Date**
South Carolina Department of Natural Resources	**Date**

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ANNUAL REVIEW AND COORDINATION DOCUMENTATION
2023

Signatures from the approving officials on this page certify the annual review and coordination of the Integrated Natural Resources Management Plan for the 169th Fighter Wing at McEntire Joint National Guard Base has been completed for the specified year.

Approving Officials:

McEntire Joint National Guard Base **Base Commander Signatory**	**Date**
United States Fish and Wildlife Service Signatory	**Date**
South Carolina Department of Natural Resources	**Date**

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TABLE OF CONTENTS

COMPONENT PLAN A: INTEGRATED CULTURAL RESOURCES MANAGEMENT PLAN

LIST OF FIGURES

LIST OF TABLES

LIST OF TABLES (continued)

1. EXECUTIVE SUMMARY

This Integrated Natural Resources Management Plan (INRMP) has been developed for McEntire Joint National Guard Base (JNGB). This revised INRMP provides McEntire JNGB with an updated description of the base and its surrounding environment, and presents various management practices designed to enhance the positive effects of the base's mission on regional ecosystems.

This INRMP is a practical guide for the management and stewardship of all natural resources present on McEntire JNGB, while ensuring the successful accomplishment of the military mission. The INRMP was developed using an interdisciplinary approach in which information was gathered from a variety of organizations including the U.S. Fish and Wildlife Service (USFWS) and South Carolina Department of Natural Resources (SCDNR). These varying perspectives allowed for an accurate portrayal of the status and management needs of local ecosystems, balanced against the requirement for the base to accomplish its mission(s) at the highest possible level of efficiency. As a result, the probable effects of base operations on the surrounding natural resources were projected, allowing for the development of possible operational alternatives which could result in lessening impacts on the environment.

The maintenance and enhancement of regional biological diversity and ecosystem function is particularly important in the management of natural resources and will be accomplished through the implementation of specific management practices identified in this INRMP. By protecting the riparian corridors and their associated habitats—areas which not only protect and support regional biodiversity, but also provide and protect important ecosystem functions—this INRMP will help perpetuate the form and function of native communities and natural processes, thus enhancing the long-term viability of McEntire JNGB and ensuring its sustainability for military operations.

The Plan presents practicable alternatives and recommendations that would minimize impact on McEntire JNGB missions while providing for management and stewardship of natural resources that would conserve and enhance the regional ecosystems in which the base is embedded.

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2. GENERAL INFORMATION

2.1 PURPOSE AND SCOPE

This Integrated Natural Resources Management Plan (INRMP) has been developed for use by McEntire Joint National Guard Base (JNGB) in accordance with Air Force Instruction (AFI) 32-7064, *Integrated Natural Resources Management*; Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*; Department of Defense (DoD) Instruction (DoDI) 4715.03, *Natural Resources Conservation Program*; DoD Manual 4715.03, *Integrated Natural Resources Management Plan Implementation Manual*; and the provisions of the Sikes Act, as amended (16 United States Code [USC] §670a et seq.).

This INRMP provides McEntire JNGB with a description of the base (e.g., location, history, and mission), information about the surrounding physical and biotic environment, and an assessment of the impacts on natural resources as a result of mission activities. Furthermore, the INRMP recommends various management practices, in compliance with federal, state, and local standards, designed to mitigate negative impacts and to enhance the positive effects of the base's mission on local ecosystems.

A multiple-use approach will be implemented to allow for mission-oriented activities and environmental quality through the efficient management of natural resources.

Specific management practices identified in this INRMP have been developed to maintain biological diversity and ecosystem function within the base. Specifically, management practices should do the following:

1. Minimize habitat fragmentation and promote the natural pattern and connectivity of habitats;

2. Protect native species and discourage nonnative, invasive species;

3. Protect rare and ecologically important species;

4. Protect unique or sensitive environments;

5. Maintain or mimic natural processes;

6. Restore species, communities, and ecosystems; and

7. Monitor impacts on biodiversity.

However, each of the management strategies described in this plan should be monitored so that modifications can be made during implementation as conditions change.

Biodiversity is defined as all heredity based variations occurring on four basic levels of organization: genetic diversity, species diversity, ecosystem diversity, and landscape diversity. Genetic diversity refers to the variation of genotypes (genetic makeup) within a species that influences different characteristics among individuals or populations. Species diversity refers to

the number and relative proportions of different kinds of species within a given area. Ecosystem diversity refers to the number, relative proportions, and interactions among communities within an ecosystem. Landscape diversity can be defined as the composition of and interactions among ecosystems across a defined landscape.

Human communities are entirely and completely dependent on the goods and services provided by diverse ecosystems. Decline of these ecosystems and the biodiversity within them is one of the foremost limitations to human prosperity. Ecosystem sustainability is the key to both biological diversity and human existence. It is the goal of this INRMP to successfully integrate ecological sustainability with goals and objectives that will sustain human communities and the operational mission of McEntire JNGB. By protecting a corridor of sensitive habitat that supports a variety of species, this INRMP helps perpetuate, on a local and regional basis, viable, sustainable populations of native species, and the communities they compose. The protection of these species and communities, in turn, promotes the sustainability of functional ecosystems across the landscape.

The information presented in this INRMP will be incorporated into the McEntire JNGB Master Plan. The base's comprehensive management planning process should incorporate the concerns presented in this INRMP so that the growth of the base can progress in a manner consistent with, and complementary to, the objectives of the U.S. Air Force (USAF) with respect to the protection of natural resources. Note that the cultural resources present on McEntire JNGB are addressed fully in a separate Integrated Cultural Resource Management Plan (ICRMP).

Appendix A of this INRMP provides the references for the document, while Appendix B provides a list of acronyms and abbreviations.

2.2 MANAGEMENT PHILOSOPHY

This INRMP was developed using an interdisciplinary approach and information gathered via a Task Force made up of installation personnel, the U.S. Fish and Wildlife Service (USFWS) and the South Carolina Department of Natural Resources (SCDNR). Correspondence with these agencies was documented and satisfies the requirements of 32 Code of Federal Regulations (CFR) 989, as amended, *The Environmental Impact Analysis Process.*

The Task Force ensured that information concerning the natural resources on or near the base was accurate and presented with acknowledgment to local and regional management strategies. As a result, the probable effects of base operations on the surrounding natural and cultural resources can be projected. This approach also allowed for insight into possible operational alternatives, which could result in reduced impacts on the natural resources on McEntire JNGB and in surrounding areas.

2.3 AUTHORITY

This INRMP is developed under, and proposes actions in accordance with, applicable DoD and USAF policies, directives, and instructions. AFI 32-7064, *Integrated Natural Resources Management*, provides the necessary direction and instructions for preparing an INRMP. Issues

are addressed in this Plan using guidance provided under legislation, Executive Orders (EOs), Directives, and Instructions that include DoDI 4715.03, *Natural Resources Conservation Program*; AFPD 32-70, *Environmental Quality*; AFI 32-7065, *Cultural Resources Management*; and AFI 32-7064. DoDI 4715.03 provides direction for DoD installations in establishing procedures for an integrated program for multiple-use management of natural resources. DoD Manual 4715.03 provides the procedures to prepare, review, update, and implement INRMPs in compliance with the Sikes Act. AFPD 32-70 discusses general environmental quality issues, including proper cleanup of polluted sites, compliance with applicable regulations, conservation of natural resources, and pollution prevention. Finally, AFI 32-7065 provides guidance on the preservation of cultural resources at USAF installations. Appendix D summarizes key legislation and guidance used to create and implement this INRMP.

2.4 INTEGRATION WITH OTHER PLANS

This INRMP is intended to be compatible with other McEntire JNGB planning documents. In preparing this document, other plans consulted are listed below. These documents can be found either as appendices to this INRMP or as Component Plans. Component Plans can be found electronically on the compact disk attached to this INRMP.

- ***Invasive and Nonnative Species Survey and Management Plan***—This plan developed in 2005 provides the results of invasive and nonnative species surveys conducted on McEntire JNGB and a management plan to address those species. The plan documents the legal mandates requiring federal entities to implement a pest management plan as well as the economic impacts of invasive species. The plan details the survey methods used to identify nonnative/invasive plants and nonnative/invasive/nuisance animals and a management plan based on the findings of the survey. The plan also discusses the suitability of four currently available techniques for the management of invasive plants at McEntire JNGB including biological, cultural, mechanical, and chemical (Appendix E).

- ***Integrated Pest Management (IPM) Plan—***This plan developed in 2017 establishes and maintains a safe, effective, and environmentally sound IPM program to prevent and control pests and disease vectors that may adversely impact readiness or military operations by affecting the health of personnel or damaging structures, material, or property. This plan also ensures that the pest management program is in compliance with requirements and incorporates sustainable IPM philosophies, strategies, and techniques (Appendix E).

- ***Bird/Wildlife Aircraft Strike Hazard (BASH) Plan***—This plan prepared in 2017 provides an active program to minimize bird and other wildlife strikes to aircraft at McEntire JNGB. Specific operations included in the plan are the establishment of a Bird/Wildlife Hazard Working Group, procedures for reporting hazardous bird activity and altering or discontinuing flying operations, provisions to disseminate information to aircrews, procedures to eliminate or reduce conditions that attract birds and wildlife to the airfield, and procedures to disperse birds and wildlife from the airfield (Appendix F).

- ***Wildland Fire Management Plan***—This plan was developed in 2010 to consolidate existing wildland fire information into a comprehensive plan. Both planned and

unplanned fires have occurred at McEntire JNGB, and this plan establishes personal safety while effectively managing the natural resources at the base as well as conforming to applicable air quality laws (Appendix G).

- ***Fish, Amphibian, and Reptile Survey, Report, and Management Plan***—This plan prepared in 2009 presents the findings of fish, amphibian, and reptile surveys performed at McEntire JNGB and management guidelines for the species identified. The plan also provides a seasonal schedule of installation land management activities for conservation purposes and the control of nonnative/invasive fish, amphibian, and reptile species (Appendix H).

- ***Integrated Cultural Resource Management Plan***—This plan prepared in 2011 outlines installation policies and procedures for the protection, management, and preservation of cultural resources including historic properties, and for integrating cultural resources management into the overall base planning process. The plan identifies known cultural resources at McEntire JNGB, provides standard operating procedures for managing unanticipated discoveries, compliance procedures for identifying and protecting cultural resources, and procedures for consulting with federal and state agencies and Native American groups. (Component Plan A).

3. INSTALLATION OVERVIEW

Current and historic information pertaining to land uses at McEntire JNGB and in surrounding communities is necessary to properly manage natural and cultural resources and assess future management activities. This section describes the location of McEntire JNGB and the surrounding community, and describes the natural and cultural resources associated with the area. A brief history of the base and its current mission is also presented.

3.1 LOCATION AND AREA

McEntire JNGB is in Richland County, South Carolina, approximately 12 miles southeast of Columbia, and 8 miles west of Eastover (Figure 3-1). The base is irregularly shaped, consisting of 2,344 acres. The base is bordered by Sumter Highway (U.S. Highway 76/378) on the north, Congaree Road (State Highway 769) and the CSX railroad on the south, private property on the east, and Cedar Creek on the west (Figure 3-2). The main gate (Sumter Gate) is along State Highway 378 at South Carolina Road. A secondary gate (Morrell Gate) is along the southern boundary at Swamp Fox Road. Another secondary gate (Church Gate) is along the western boundary at South Carolina Road.

3.2 INSTALLATION HISTORY AND MILITARY MISSIONS

Historic photo of South Carolina ANG

Formed in 1946, McEntire JNGB was named after the late Brigadier General Barnie B. McEntire, Jr., the first commander of the South Carolina Air National Guard (ANG) and its first general officer. The South Carolina ANG consists today of more than 1,500 Airmen who work and drill at McEntire JNGB. The base occupies approximately 2,344 acres and is the home to two flagship major commands of the South Carolina National Guard and serves over 4,000 Citizen Soldiers and Airmen. The base is routinely utilized by a variety of special operations units and law enforcement organizations. In times of emergency, McEntire JNGB becomes the aviation hub for state and federal disaster response.

The 169th Fighter Wing (169 FW) flies the F-16 Fighting Falcon, a single-seat multi-purpose fighter with the capability to fly at up to twice the speed of sound. The mission of the 169 FW is to organize, training, equip, and deploy mission ready airmen for our state and nation. The primary federal mission is accomplished by employing conventional munitions in the Destruction/Suppression of Enemy Air Defenses, while providing 24/7 homeland defense alert fighter response. Additionally, the 169 FW provides the Governor of South Carolina with defense assistance to the state's homeland security office and disaster preparation and response support for Defense Support of Civil Authorities activities. The Eagle Vision capability is one of five systems worldwide that provide rapid unclassified imagery support for disaster relief, combatant commanders, and state and federal agencies.

McEntire JNGB is a joint base with South Carolina ANG and the South Carolina Army National Guard (ARNG). The 169 FW is the host organization at the base. The South Carolina ARNG's 59th Aviation Troop Command bases 24 AH-64D Apache Longbows of the 1-151st Attack

Reconnaissance Battalion and 10 UH-60L Black Hawks of the 2-151st Security and Support Aviation Battalion at McEntire JNGB are premier aviation units that enable unparalleled combined arms combat power. A Combined Support Maintenance Shop provides field and sustainment maintenance for light and heavy tracked and wheeled vehicles which support more than 10,000 National Guard Soldiers state-wide, and nine South Carolina ARNG units utilize the Joint Armed Forces Reserve Center for monthly drills and annual training.

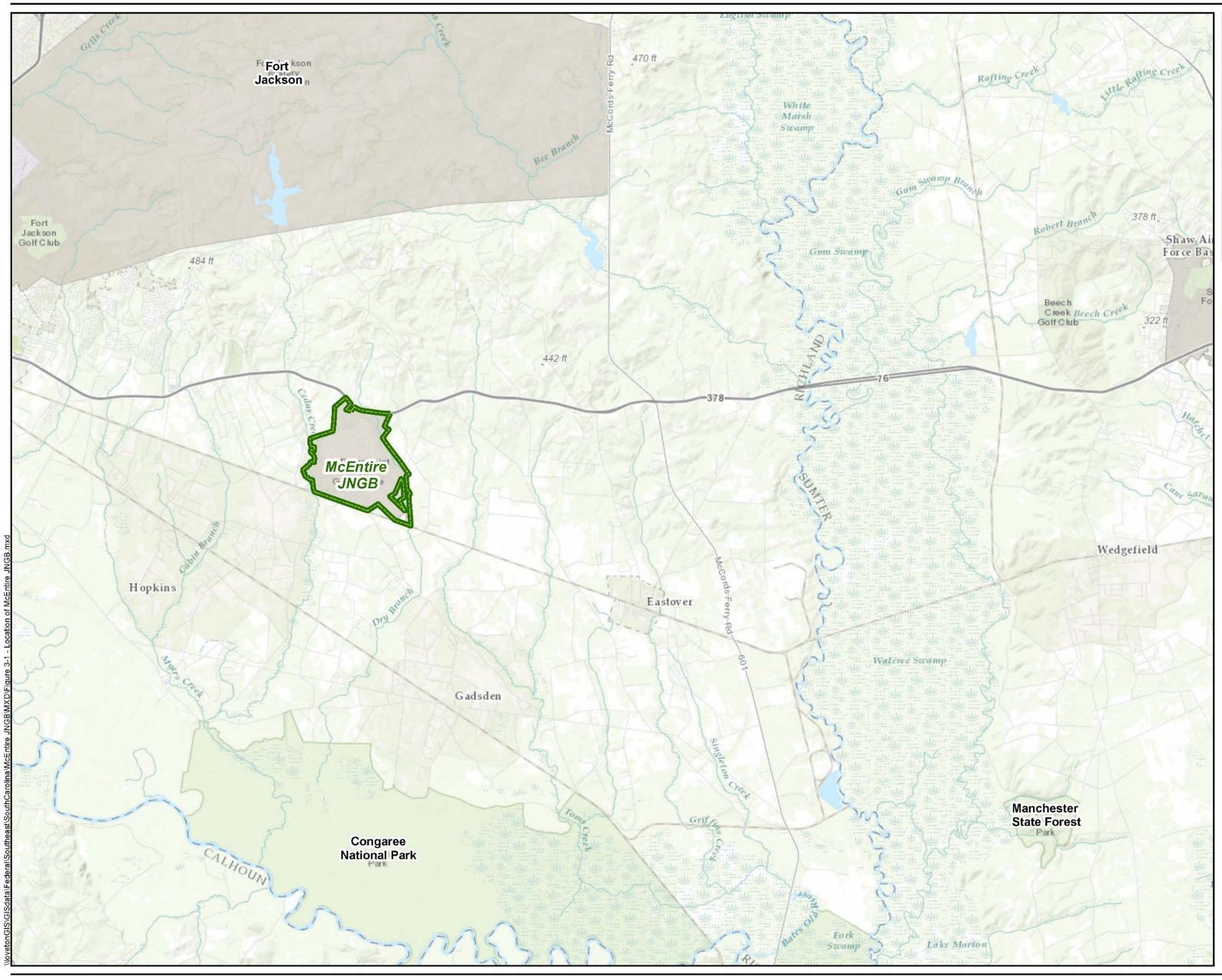
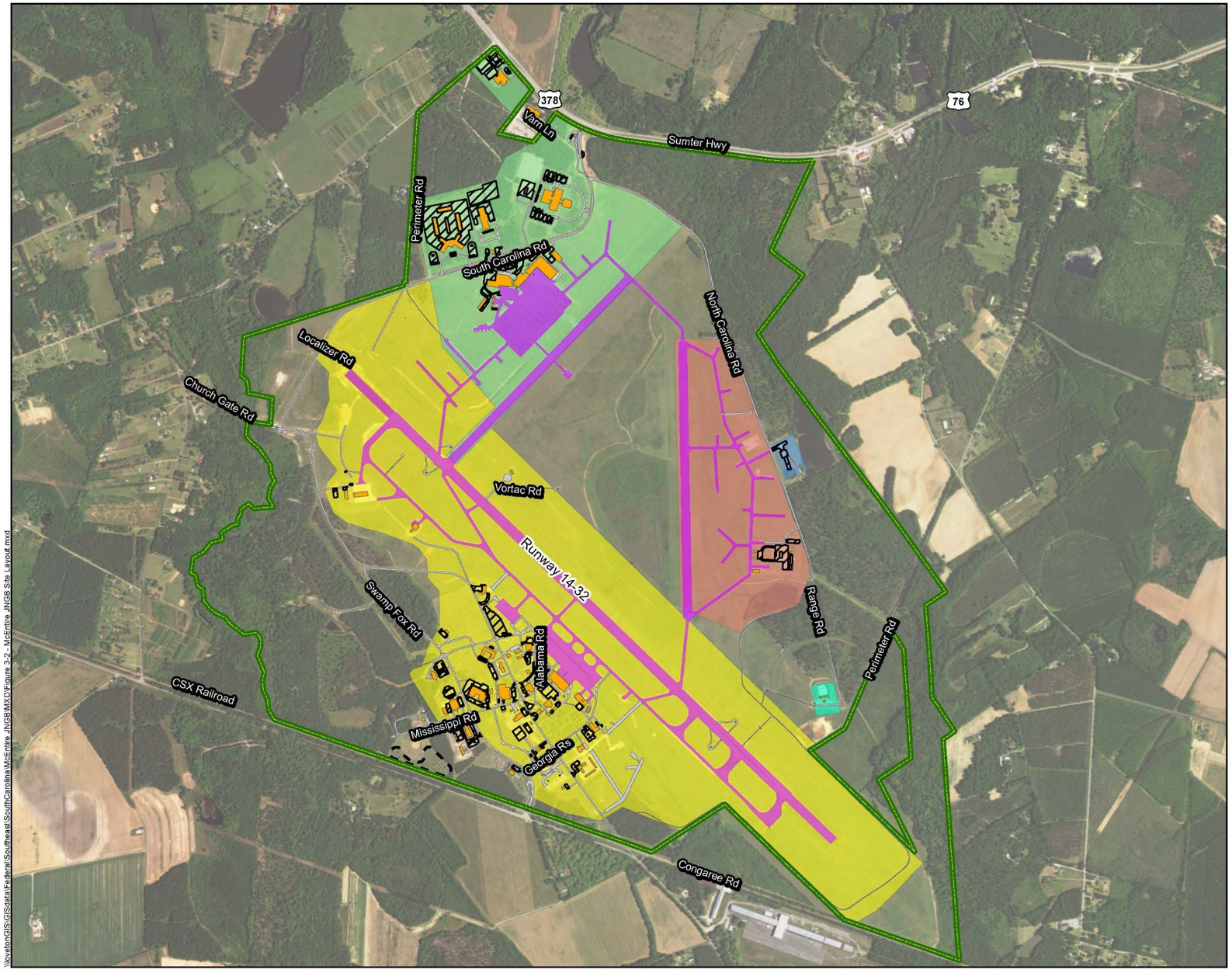
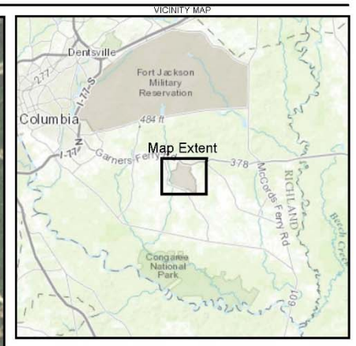


Figure 3-1
McEntire JNGB and Surrounding Region
Richland, South Carolina





Legend

- Recreation Trail
- Installation Boundary
- Parking Area
- Building
- Road
- Airfield Surface
- 169th Fighter Wing Property
- Army National Guard
- Bivouac Area
- Training Area/Drop Zone
- Small Arms Range

Map Date: 5/8/2017

Data Sources:
ESRI ArcGIS Map Service, 2016
McEntire JNGB, 2016

N

0 0.25 0.5
Miles

Figure 3-2
Site Layout
McEntire JNGB
Richland County, South Carolina

3.3 SURROUNDING COMMUNITIES

Surrounding communities adjacent to McEntire JNGB include Hopkins and Eastover, which are located approximately 6 miles west and 8 miles east; and Gadsen, approximately 6 miles south. Other significant landmarks include Fort Jackson to the north; Shaw Air Force Base, about 20 miles east; and Columbia Metropolitan Airport, about 25 miles to the west (Figure 3-1). The land use around McEntire JNGB is mostly privately owned agricultural and forested lands.

The area surrounding the base is predominantly rural. Adjacent land uses include residential, commercial, transportation, utilities, agricultural, institutional, and recreational activities.

Development trends in Richland County have been increasing in the last two decades as population growth has had an annual compounded rate of 1.83 percent. Much of the development associated with this growth occurred in the unincorporated portions of the county, in previously undeveloped land, resulting in a dispersed pattern of growth. Despite this growth, nearly 50 percent of all lands in Richland County were estimated to be agricultural or working land in 2015. Table 3-1 presents general land use categories for 2015 in both the unincorporated parts of Richland County, and in the portion of the southeast planning region where McEntire JNGB is located. In the southeast planning region of Richland County, agricultural use (agriculture and residential agriculture) makes up more than 70 percent of the existing land use. In the southeast region of the county, more than 90 percent of the area is zoned as rural residential (Richland County 2015).

Table 3-1. 2015 Land Use in Richland County

Land Use	% Total Area Unincorporated Richland County	% Total Southeast Planning Area of Richland County
Agricultural	37.55	47.29
Governmental	7.46	11.98
Residential	17.85	9.03
Residential Agriculture	20.01	24.34
Vacant	11.37	4.36
Institutional	2.68	1.45
Commercial	1.33	0.62
Industrial	1.75	0.79
Recreation	0.99	0.16
Source: Richland County 2015.		

3.4 LOCAL AND REGIONAL NATURAL AREAS

Congaree National Park
Photo Credit: National Park Service

The Congaree National Park is located approximately 15 miles south of McEntire JNGB (Figure 3-1). Situated along the meandering Congaree River in central South Carolina, Congaree National Park is home to champion trees, primeval forest landscapes, and diverse plant and animal life. This 22,200-acre national park protects the largest contiguous tract of old-growth bottomland hardwood forest remaining in the United States. Known for its giant hardwoods and towering pines, the park's floodplain forest includes one of the highest canopies in the world and some of the tallest trees in the eastern United States. Congaree National Park provides a sanctuary for plants and animals, a research site for scientists, and a place for one to walk and relax in a tranquil wilderness setting. Congaree National Park also provides a diversity of recreational activities including hiking, primitive camping, bird watching, picnicking, canoeing and kayaking, ranger guided interpretive walks and canoe tours, nature study, and environmental education programs.

Fort Jackson is located approximately 12 miles north of McEntire JNGB (Figure 3-1). Fort Jackson, incorporated into the city of Columbia, South Carolina, in 1968, encompasses more than 52,000 acres including at least 53 ranges and field training sites. Although Fort Jackson is the largest and most active Initial Entry Training Center in the U.S. Army, training in excess of 45,000 basic training and advanced individual training soldiers every year, it provides natural resources and is, therefore, listed in this document as a "local natural area." It should be noted that this does not imply any official status as a natural area or any obligation on the part of Fort Jackson to place management for natural resources above conduct of the training mission. In this same context, the 12,000-acre Poinsett Electronic Bombing Range near Poinsett, South Carolina, is also considered a "local natural area." Public access at the installation is restricted. Fort Jackson is open to active duty personnel, military retirees, retired civilian employees, reservists, National Guard, and family members of the above for hunting and fishing. The installation is also open to the general public during specific hunting or fishing programs or events. Fort Jackson also includes running and cycling routes, which are open to individuals affiliated with the installation.

Manchester State Forest, approximately 30 miles southwest of McEntire JNGB, is located in Sumter and Clarendon counties (Figure 3-1). This state forest consists of approximately 25,000 acres of mixed pine and hardwood species native to the midlands of South Carolina, and is considered a local natural area. The forest is managed for forest products, while also being managed to enhance timber production, environmental quality, fish and wildlife habitat, and recreational opportunities. The forest is included in a Wildlife Management Area, and hunting is allowed with a Wildlife Management Area permit from SCDNR. Other recreational opportunities provided at Manchester State Forest include fishing and trails for mountain biking, hiking, horseback riding, and off-highway vehicles.

4. PHYSICAL ENVIRONMENT

This section describes the general physical environment of McEntire JNGB, including climate, topography, geology, soils, and the base's watersheds and drainage patterns.

4.1 CLIMATE

Richland County has a relatively temperate climate. Summers are hot and humid from the moist air fed by the ocean, while winters are moderately cold and of short duration due to the movement of cold fronts from the north which are impeded by the mountains to the northwest. In 2016, the average temperature was 54 degrees Fahrenheit (°F) during winter months; the average daily minimum temperature was 42 °F. During summer months, the average temperature was 82 °F, while the average daily maximum temperature was 91 °F (National Oceanic and Atmospheric Administration [NOAA] 2018). Table 4-1 includes a summary of climate data for McEntire JNGB in 2017. Precipitation ranges throughout the year. Prevailing winds blow from the southwest with wind speeds rarely exceeding 9 miles per hour.

Table 4-1. Climate Summary for McEntire JNGB 2017

Month	Average Temperature (°F)—Daily			Average Precipitation (Inches)—Monthly
	Maximum	Minimum	Mean	
January	64.5	43.0	53.7	7.04
February	71.43	43.1	57.2	1.60
March	70.9	44.1	57.5	2.38
April	81.0	57.7	69.4	6.11
May	85.2	61.9	73.6	7.15
June	89.3	70.1	79.7	5.13
July	93.7	73.5	83.6	5.42
August	91.4	73.2	82.3	1.92
September	88.6	65.6	77.1	4.55
October	80.3	55.8	68.1	1.57
November	68.9	42.4	55.6	1.28
December	59.8	39.4	49.6	3.29
Source: NOAA 2018.				

Precipitation is distributed evenly throughout the year, with more consistently wet conditions prevailing in the summer. In 2017, the driest months were February, August, October, and November. The wettest months included January, April, and May. Approximately 30.28 inches (in.) of rain fell from April through September, with an annual total of 47.44 in. (NOAA 2018). The year 2017 represented a departure from normal weather patterns, with much greater rainfall than normal in January, April, and May and less rain than normal in February, March, and August. Winter temperatures were also warmer than typical. Thunderstorms occur about 54 times a year, and about 60 percent of these storms occur during the summer. Snowfall in the area is rare; 38 percent of winters have no measurable snowfall, and about 55 percent of winters receive less than 2 in. of snow. The average relative humidity during the afternoon is about 55 percent. Humidity is higher at night, averaging about 90 percent at dawn.

4.2 LANDFORMS

Two-thirds of Richland County, and all of McEntire JNGB, is in the Coastal Plain physiographic province. General characteristics of the area include broad ridge tops, and narrow floodplains along streams. Along major branches and creeks, the side slopes can be strongly sloping to moderately steep. Steep slopes prevail along the Broad River. The highest elevation in the region is in the northwestern part of the city of Columbia (approximately 825 feet [ft] above mean sea level [MSL]). The lowest elevation is in the swamps south of McEntire JNGB (approximately 100 ft above MSL). Elevations within the base area range from 84 ft above MSL at the Sumter Highway entrance to 54 ft above MSL along the western base boundary. Figure 4-1 provides the topography of McEntire JNGB.

4.3 GEOLOGY AND SOILS

Although surface and groundwater quality with respect to soil characteristics (e.g., erosion potential) do not currently pose an existing or proposed development problem, protection of soil and water resources is required under the following laws, regulations, and policies:

- Clean Water Act (CWA) of 1977, as amended
- EO 11514, *Protection and Enhancement of Environmental Quality*
- Federal Land Policy and Management Act of 1976
- Federal Water Pollution Control Act of 1977
- Soil and Water Conservation Act
- Food Security Act of 1975.

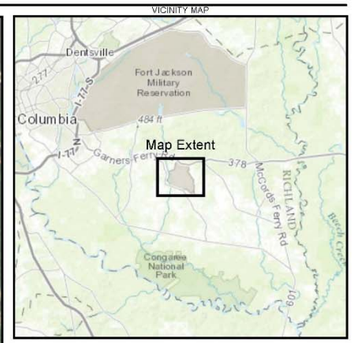
The Natural Resources Conservation Service (NRCS) describes soils according to the following criteria:

- ***Slope.*** Slope is the inclination of the land surface from horizontal. The percentage of slope is defined as the vertical distance divided by the horizontal distance.

- ***Erosion Potential.*** Erosion potential is defined as how susceptible a soil is to the wearing-away of land surfaces by water, wind, ice, or other geologic agents.

- ***Water Permeability.*** Permeability refers to the ability of water to move downward through saturated soil. It is measured in inches per hour. Table 4-2 identifies permeability measurement criteria.

- ***Shrink-Swell.*** Shrink-swell is the contraction (shrinking) of soil when dry and expansion (swelling) when wet. This can cause damage to roads, dams, building foundations, and other structures.



Legend

Installation Boundary

Elevation Contour (ft)

Map Date: 3/29/2017

Data Sources:
ESRI ArcGIS Map Service, 2016
McEntire JNGB, 2016

N

0 0.25 0.5
Miles

Figure 4-1
Topography
McEntire JNGB
Richland County, South Carolina

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Table 4-2. Water Permeability

Level of Permeability	Water Amount (Inches Per Hour)
Very Slow	Less than 0.06
Slow	0.06 to 0.20
Moderately Slow	0.20 to 0.60
Moderate	0.60 to 2.0
Moderately Rapid	2.0 to 6.0
Rapid	6.0 to 20.0
Very Rapid	Greater than 20

Soil erosion rates are generally lower in areas covered by vegetation. Erosion problems are more likely to occur on tilled firebreak areas, unimproved roads, near stream banks, and on other barren areas. The soils on McEntire JNGB are susceptible to water erosion if not protected with vegetation or other cover.

The soil types found at the base are classified within 11 soil series including the prominent Orangeburg and the less prominent Norfolk series (Figure 4-2). Soils of the Orangeburg and Norfolk series were formed on thick marine sediments and are deep, well-drained soils with moderate water-holding capacities (NRCS 2005c and 2014). A list of the 11 different types is found in Table 4-3. Orangeburg Loamy Sand is the most predominant soil type, representing approximately 70 percent of soils found at the base (Figure 4-2 and Table 4-3). Soil characteristics can influence the types of development that are feasible in a given area. For example, if the shrink-swell potential is high, as it is in many clay soils, upheaval to building foundations may occur. Therefore, building a facility on this soil type would be unsuitable without significant corrective measures and design considerations.

- ***Cantey Series* (Ca).** The Cantey soil series consists of deep, poorly drained, slowly permeable, nearly level loams that formed in clayey marine sediment (NRCS 1999a). These soils are found on stream terraces and are considered hydric (i.e., wetland soils) in South Carolina. On McEntire JNGB, soils in this series occur along Cedar Creek on the western base property boundary (Figure 4-2).

- ***Coxville Series* (Cx).** The Coxville soil series consists of deep, poorly drained, moderately to slowly permeable soils that formed in thick beds of clayey marine sediment. These soils are found on the coastal plain in shallow bays (such as the Carolina bays in the center of the base) on interstream divides and are considered hydric (i.e., wetland soils) in South Carolina (NRCS 2005a). The Coxville soil series is found in various locations on McEntire JNGB, but occurs primarily between the runways (Figure 4-2).

- ***Dothan Series* (DoB).** The Dothan soil series consists of deep, moderately to slowly permeable, well-drained soils that formed in thick beds of loamy marine sediment. These soils are largely found on broad ridgetops on the coastal plain (NRCS 2016). Soils in this series occupy only a small area on McEntire JNGB, in the northeastern portion of the base (Figure 4-2).

- ***Fuquay Series* (FuB).** The Fuquay soil series consists of deep, well-drained, slowly permeable soils that formed in sandy and loamy marine sediment. These soils are located on broad and narrow ridgetops on the coastal plain (NRCS 2013). The Fuquay soil series occurs in the western portion of McEntire JNGB, and extends to the edge of the pond that is just north of the base boundary (Figure 4-2).

- ***Goldsboro Series* (GoA).** The Goldsboro series consists of deep, moderately well-drained, moderately permeable soil that formed in loamy sediment on marine and flowing water terraces. These soils are found on interstream divides on the coastal plain (NRCS 2005b). The Goldsboro soil series occurs in two locations at McEntire JNGB: near the western entrance to the base and just east of the firing range on the eastern portion of the base (Figure 4-2).

- ***Johnston Series* (Jo).** The Johnston soil series consists of deep, very poorly drained soils that formed in loamy fluvial and marine sediment. These soils are found on floodplains adjacent to streams in the coastal plain and are water-saturated most of the year (NRCS 2008). Soils in the Johnston series are considered hydric (i.e., wetland soils) in South Carolina. The Johnston soil series occurs along the Cedar Creek drainage at the base (Figure 4-2).

- ***Norfolk Series* (NoA, NoB)**. The Norfolk soil series consists of deep, well-drained, moderately permeable soils that formed in thick, loamy marine sediment. These soils are found on broad interstream divides on the coastal plain (NRCS 2005c). The Norfolk soil series occurs adjacent to hydric soils (Rains and Johnston series) along both Cedar Creek and Dry Branch at the base (Figure 4-2).

- ***Orangeburg Series* (ObA, ObB, ObC).** The Orangeburg soil series consists of deep, well-drained, moderately permeable soils that formed in thick loamy marine sediment. These nearly level (slope 0–2 percent) soils are usually found on broad ridges and interstream divides on uplands in the Coastal Plain province. Orangeburg soils exhibit slow runoff, low water erosion potential, and low shrink-swell potential. As such, this soil type has high potential for row crops; hay; pasture; and production of loblolly, slash, and longleaf pine. The potential for urban development is also high with minor limitations for all urban uses (NRCS 2014). Covering 1,623 acres (69 percent of the installation), the Orangeburg soil series is the most abundant soil type on McEntire JNGB. It occurs to a large extent in the center of the base where the runways and support buildings are located (Figure 4-2).

- ***Persanti Series* (Ps).** The Persanti soil series consists of deep, moderately well-drained, slowly permeable soils that formed in clayey marine sediment. These soils are found on the coastal plain on broad floodplain terraces (NRCS 1999b). The Persanti soil series occurs in the northwestern portion north of the west entrance to the base adjacent to the hydric soils of Cedar Creek (Johnston soil series) (Figure 4-2).

- ***Rains Series* (Ra).** The Rains soil series consists of deep, poorly drained, moderately permeable soils that formed in loamy marine sediment. These soils are found on the coastal plain in broad flats and depressional areas on ridges between streams

(NRCS 2006). Soils in the Rains series are considered hydric (i.e., wetland soils) in South Carolina. The Rains soil series occurs in the Dry Branch drainage on the eastern portion of the base (Figure 4-2).

- ***Vaucluse Series* (VaC, VaD).** The Vaucluse soil series consists of well-drained, slowly permeable soils that formed in loamy marine sediment. These soils are found mainly on narrow, irregular slopes on uplands of the coastal plain (NRCS 2010). The Vaucluse soil series is found adjacent to hydric soils east of the sewage treatment plant and runs south to the southern base boundary (Figure 4-2).

Hydric Soils. Several of the soil series that occur on McEntire JNGB are designated as hydric. Hydric soils are soils that are saturated, flooded, or ponded for long enough during the growing season to develop anaerobic (oxygen-deficient) conditions in their upper part. Anaerobic soil conditions are conducive to the establishment of vegetation that is adapted for growth under oxygen-deficient conditions and is typically found in wetlands (hydrophytic vegetation).

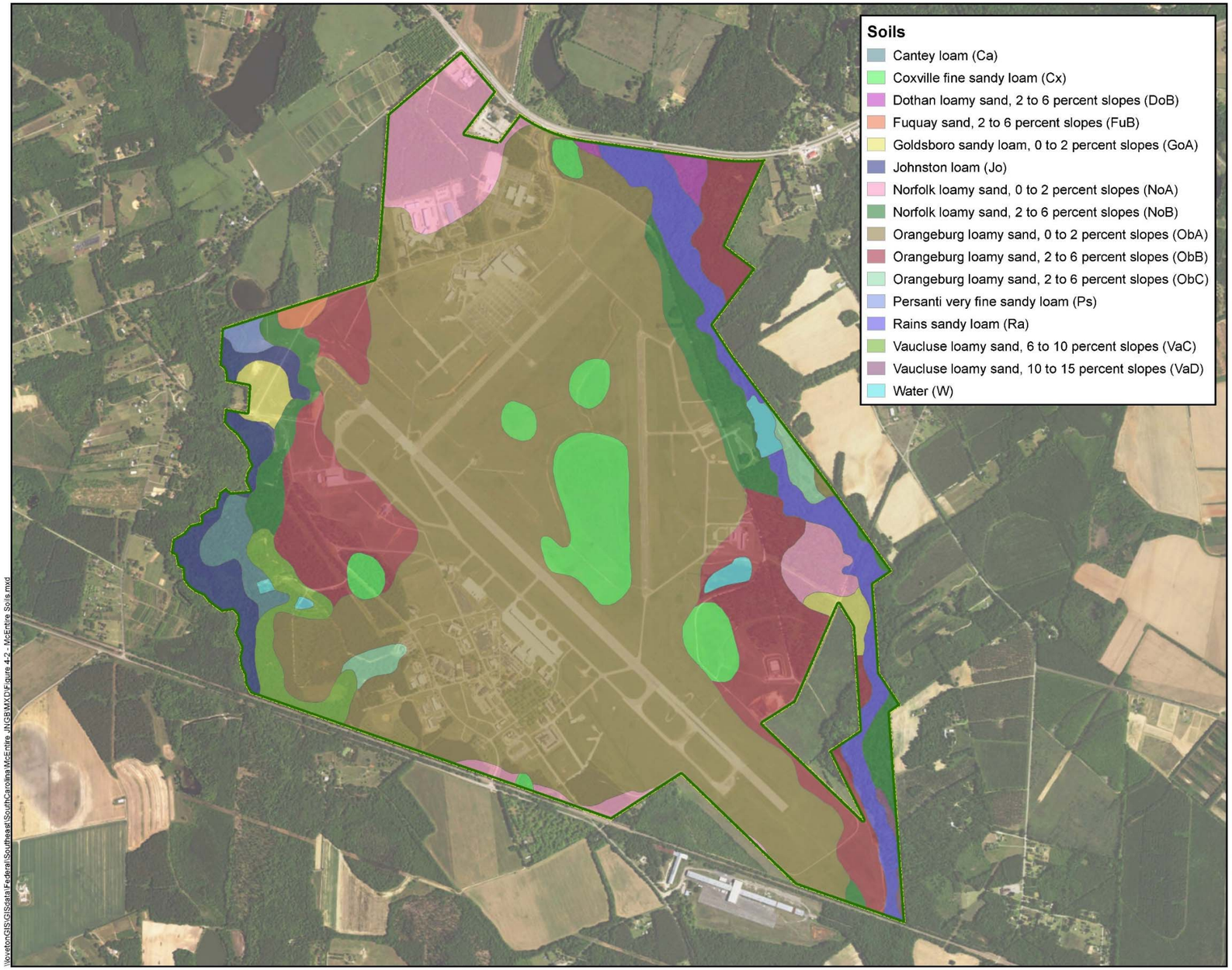
Hydric soils can be identified based on the *Field Indicators of Hydric Soils in the United States: A Guide for Identifying and Delineating Hydric Soils, Version 8.1,* 2017 (NRCS 2017). Characteristics that can indicate the presence of hydric soils include mottling, a low matrix chroma based on comparison to a soil color chart, high organic content, histic epipedons, concretions, and/or a sulfidic odor. The hydric category of the soil series found at McEntire JNGB were identified according to the NRCS hydric soil list for South Carolina (NRCS 2017).

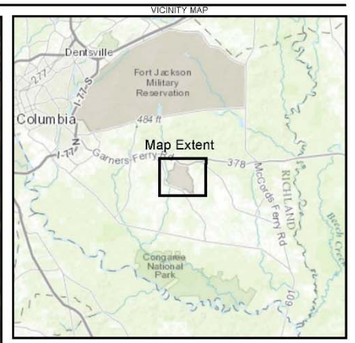
Undrained hydric soils are typically found in association with wetlands and their presence is one of the three criteria (hydric soils, hydrophytic vegetation, and wetland hydrology) used to determine if an area is a wetland under the methodology established in the U.S. Army Corps of Engineers (USACE) Wetlands Delineation Manual, Technical Report Y-87-1 (USACE 1987).

Table 4-3. Soil Types at McEntire JNGB

Map Unit Symbol	Name	Total Acreage	Slope	Hydric Category	Water Permeability	Shrink-Swell	Erosion Potential
Ca	Cantey Loam	25	< 2%	Hydric	Slow	Low to Moderate	Low
Cx	Coxville Fine Sandy Loam	132	0%–2%	Hydric	Moderately Slow	Low to Moderate	Low
DoB	Dothan Loamy Sand	12	0%–12%	Non-Hydric	Moderately Slow	Low	Low to Moderate
FuB	Fuguay Sand	5	0%–10%	Non-Hydric	Moderate to Slow	Low	Low to Moderate
GoA	Goldsboro Sandy Loam	30	0%–10%	Non-Hydric	Moderate	Low	Low to Moderate
Jo	Johnston Loam	61	0%–2%	Hydric	Moderately Rapid	Low	Low
NoA, NoB	Norfolk Loamy Sand	261	0%–10%	Hydric	Moderate	Low	Low to Moderate
ObA, ObB, ObC	Orangeburg Loamy Sand	1,623	0%–25%	Non-Hydric	Moderate	Low	Low to Moderate
Ps	Persanti Very Fine Sandy Loam	9	0%–6%	Hydric	Slow	Low to Moderate	Low to Moderate
Ra	Rains Sandy Loam	124	0%–2%	Hydric	Moderate	Low	Low
VaC, VaD	Vaucluse Loamy Sand	46	0%–25%	Non-Hydric	Moderately Slow	Low	Low to Moderate
W	Water	16					
Total		**2,344**					

Source: NRCS 1999a, b; 2005a, b, c; 2006; 2008; 2010; 2013; 2014; 2016; and 2018.





Legend

Installation Boundary

Map Date: 3/28/2017

Data Sources:
ESRI ArcGIS Map Service, 2016
McEntire JNGB, 2016
USDA NRCS, 2016

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Miles

\\lovetonGIS\GISdata\Federal\Southeast\SouthCarolina\McEntire_JNGB\MXD\Figure 4-2 - McEntire Soils.mxd

Figure 4-2
Soils
McEntire JNGB
Richland County, South Carolina

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4.4 HYDROLOGY

A watershed includes areas of land bounded by a hydrologic system, where all drainage flows to a single point, or another waterbody such as a river, lake, reservoir, estuary, wetland, sea, or ocean. Watersheds are affected by runoff and hazards associated with floodplains. Runoff is the water that flows off the land surface without soaking into the soil. Floodplains are belts of low, level ground present on one or both sides of a stream channel that are subject to either periodic or infrequent flooding. Dangers associated with flooding have prompted federal, state, and local legislation to limit development in these areas largely to recreation and ecological preservation activities. Water resources presented in this INRMP include surface and groundwater resources. Surface water resources comprise lakes, rivers, and streams and are important for a variety of reasons including economic, ecological, recreational, and human health. Groundwater properties are often described in terms of depth to aquifer, aquifer or well capacity, water quality, and surrounding geologic composition. The quality and availability of surface water and groundwater are addressed in this section.

4.4.1 Surface Water

Surface water resources are important for a variety of reasons including their significant role in determining historical migratory and settlement patterns of virtually all mammals, including humans; their influence on nesting and migratory activities of many bird species; their contribution to the evolution of landforms through their roles in the erosion process; and their effects on critical global systems including rain patterns, global temperature changes, and oxygen provision for the atmosphere. These functions and processes have obvious economic, ecological, recreational, and human health implications.

McEntire JNGB is in the Congaree River watershed. Surface water runoff from the base flows directly into Cedar Creek and Dry Branch, both of which are tributaries of the Congaree River. Waterbodies present on the base are included in Figure 4-3. Cedar Creek runs along the western boundary of the base and Dry Branch runs near the east boundary. There are also three ponds within the base: Dry Branch Pond is the largest, covering approximately 10 acres of surface area; Cedar Creek Pond is the smallest, comprising 0.5 acre of surface area; and Cypress Pond is roughly 5 to 10 acres depending on the stormwater flow.

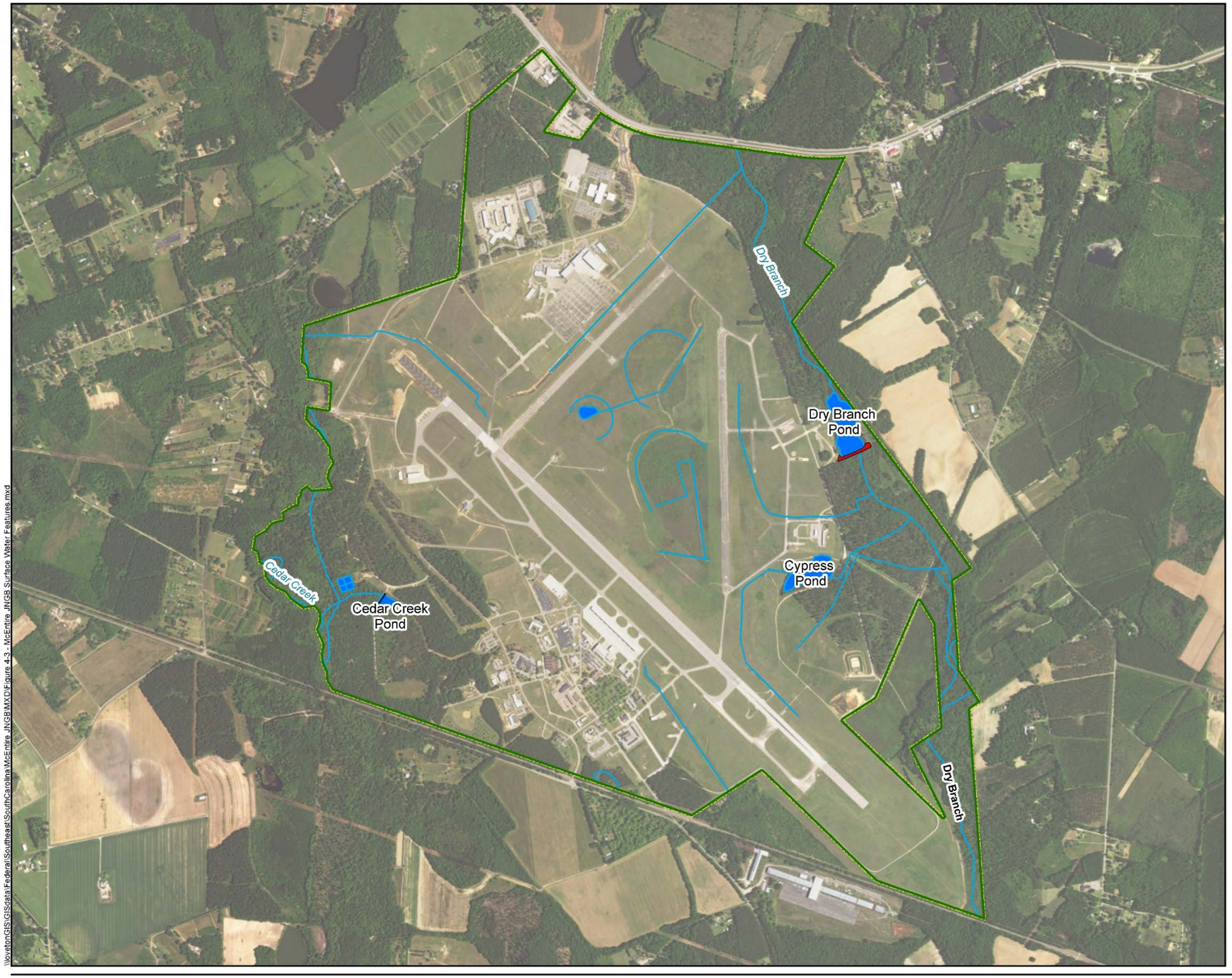
Dry Branch Pond

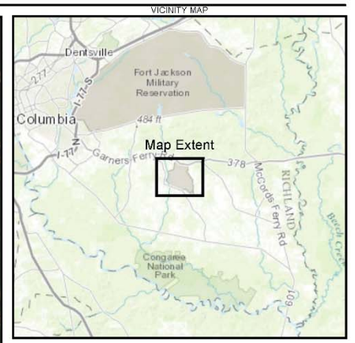
Land adjacent to streams (i.e., riparian corridors) requires special attention due to its ability to affect the transport of nutrients and sediments into streams. There are two stream types on McEntire JNGB. Perennial streams (e.g., Cedar Creek) have well-defined banks and natural channels that flow constantly year-round. Intermittent streams (e.g., Dry Branch) also have well-defined banks and natural channels, but flow is restricted to a portion of the year.

4.4.2 Groundwater

Groundwater comprises the subsurface hydrologic resources of the physical environment and is an essential resource in many areas. Groundwater is commonly used for drinking water, agricultural irrigation, and industrial applications. McEntire JNGB is in the Southeastern Coastal Plain aquifer system. The system consists of four regional aquifers that are composed predominately of clastic rocks ranging in age from Cretaceous to late Tertiary. McEntire JNGB is located within the Congaree River watershed. Regional groundwater likely flows from west to east within these aquifers (McEntire JNGB 2010a). The Congaree River sub-basin is underlain entirely by the Middendorf Aquifer System. Groundwater is obtained from Coastal Plain sediments which overlie the aquifer (McEntire JNGB 2010a).

Recharge to the aquifer system is primarily from precipitation. Groundwater recharge occurs at higher elevations, allowing groundwater to flow east towards lower elevations. Groundwater in the area approximately 200 ft southeast of the main aircraft hangar ranges from 45 to 55 ft below ground surface (McEntire JNGB 2010a).





Legend

- Installation Boundary
- Dam
- Surface Water
- National Hydrography Dataset Flowline

Map Date: 5/9/2017

Data Sources:
ESRI ArcGIS Map Service, 2016
McEntire JNGB, 2016
USGS, 2015

N

0 0.25 0.5
Miles

Figure 4-3
Surface Water Features
McEntire JNGB
Richland County, South Carolina

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5. ECOSYSTEMS AND THE BIOTIC ENVIRONMENT

This section describes the general biotic environment of McEntire JNGB and the surrounding area, including wetlands; current native vegetative cover; fireshed ecology; and native fauna, fish, and wildlife habitats. While no threatened or endangered species are known to be present on the base, those potentially occurring in the surrounding area are identified.

5.1 ECOSYSTEM CLASSIFICATION

McEntire JNGB is in the Outer Coastal Plain Mixed Forest Province as described by Bailey (1995). This province is a temperate rainforest, stretching along the eastern coast of the United States from the Chesapeake Bay south into Louisiana and encompasses approximately 173,800 square miles. Rainfall is abundant in this province and temperatures remain between 60 and 70 °F year-round. Forests are made up of shorter broadleaf evergreens and pines trees with a less dense leaf canopy than found in other temperate rainforests. Leaves of the broadleaf trees tend to be smaller and more leathery. Common species include evergreen oaks such as live oak (*Quercus virginiana*), members of the laurel and magnolia families, loblolly pine (*Pinus taeda*), short-leaf pine (*Pinus echinata*), and bald cypress (*Taxodium distichum*). Lower layers in the forests are usually well developed and may include tree ferns, small palms, shrubs, and herbaceous plants as well as lianas and epiphytes (Bailey 1995).

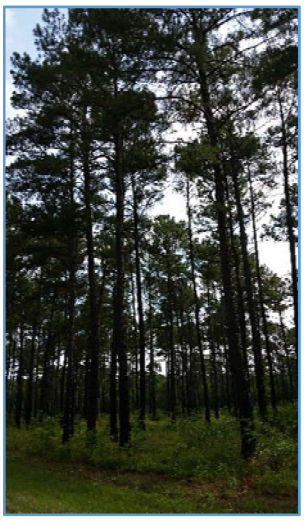
5.2 VEGETATION

5.2.1 Historic Vegetative Cover

Located in the coastal plain, McEntire JNGB was likely dominated by a longleaf pine (*Pinus palustris*) ecosystem prior to Euromerican settlement (Croker 1987; Peet and Allard 1993). The McEntire JNGB area was completely settled by Euro-Americans by the end of the 18th century, and the landscape was converted to plantation farming and eventually other agricultural cover.

5.2.2 Current Vegetative Cover

Land-based (i.e., vegetation) ecosystems at McEntire JNGB can be divided into four habitat types: forest, grasslands, pecan groves, and wetlands/riparian areas (Figure 5-1). Grasslands, forests, and pecan groves are discussed below; wetlands/riparian areas are discussed in Section 5.5.1, *Wetlands/Waters of the United States.*



Loblolly Pine Stand

Forest

On McEntire JNGB the forest vegetative cover consists of approximately 800 acres of pine, pine hardwood, and hardwood forest, the extent of which is shown on Figure 5-1. These forest units have been managed to enhance species diversity and for timber production (McEntire JNGB 2010b). The forest habitat type is broken down into Forest Area Units (FAUs) which are outlined in Table 5-1 and depicted in Figure 5-2. Approximately 270 acres on the north and east sides of the base consist predominantly of pine.

Located on the south and west sides of the base are 220 acres of predominantly pine merging into mixed pine hardwood and hardwood bottoms. Pine stands usually create a closed canopy, resulting in little understory or mid-story vegetation. The lack of these lower and middle layers of vegetation in these forested areas limits the habitat and food types available to wildlife. Moreover, these stands do not provide typical forest-edge habitat because of the artificial edges created by typical pine management plantings (e.g., no gentle transition to another vegetation type).

Grasslands


Grassland area near airfield

There are over 1,000 acres of grassland at McEntire JNGB, mostly around the airfield (Figure 5-1). Approximately 140 acres of this was in agricultural (hay) outlease until 2005 when new BASH recommendations required cessation of this practice. The grassland, composed largely of coastal Bermuda (*Cynodon dactylon*) and bahia grass (*Paspalum notatum*), is maintained by frequent mowing and supports only a few plant and animal species due to the invasive nature of the grass species present. These grasses are well-established and prevent wind and water erosion of the soil, in addition to providing a pleasant appearance; however, they must be frequently mowed. Increasing wildlife diversity within the grassland is discouraged in this area due to potential conflicts with the flying mission. Accordingly, the grasslands are managed in order to maintain the relative undesirability of this habitat to prevent any increase in wildlife presence in this mission-sensitive area.

Pecan Groves

McEntire JNGB maintains two pecan groves covering a total of 17.23 acres inclusive of adjacent roads and buildings (Figure 5-1). In the northern grove, many of the trees were present when the property was initially purchased, and are estimated to be greater than 50 years old. The two groves are on deep, well-drained Orangeburg loamy-sand soil, providing highly suitable conditions for pecan production. There are sufficient breezes in the area to evaporate heavy dews, fog, and rain, which help prevent the proliferation of several pecan diseases
In the past, the pecan trees suffered from a lack of adequate early pruning, which has been shown to be a key practice in promoting healthy branches and the basic shape of the trees. In spite of this omission, the trees are relatively healthy and produce well under current management practices. These pecan orchards are randomly harvested by base personnel as part of the morale and welfare program.

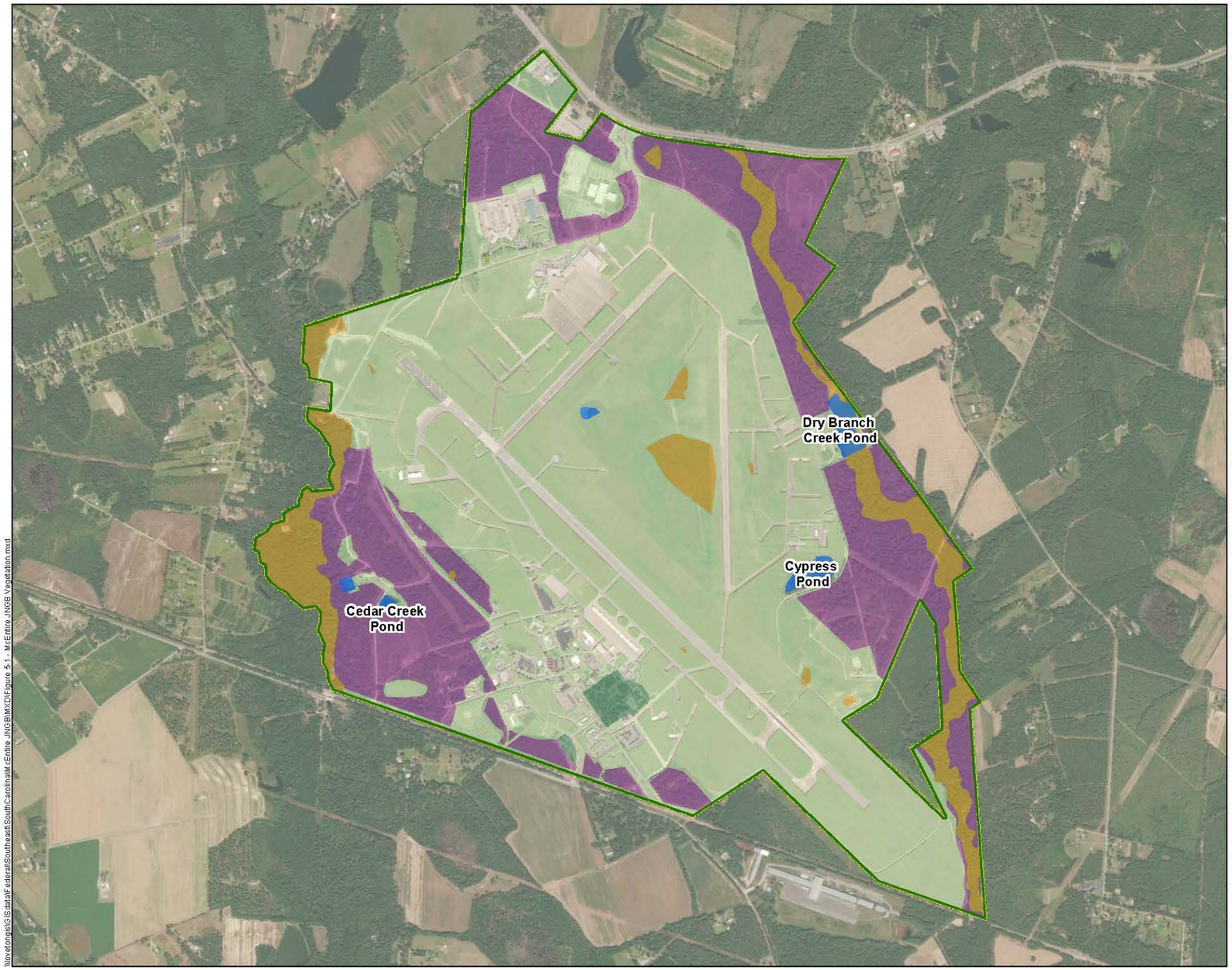


Figure 5-1
Vegetation
McEntire JNGB
Richland County, South Carolina

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Figure 5-2. Forest Area Units

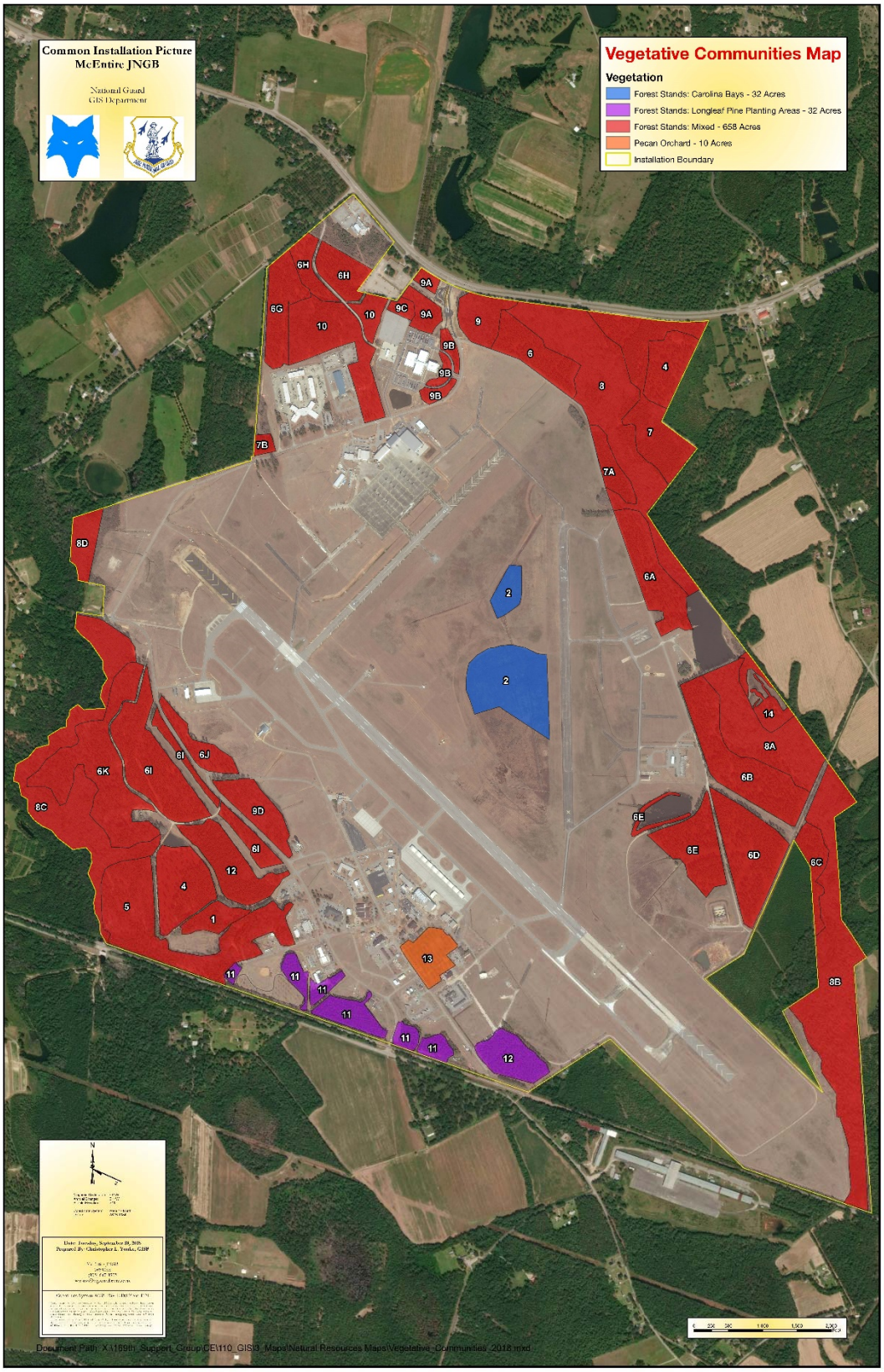

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Table 5-1. Forest Area Unit Descriptions

Unit	Acres	Description
1	13.2	• This unit includes loblolly pine (*Pinus taeda*) seed trees approximately 49 years old. Upland *hardwoods* are present in the southeastern section. A reduction of understory species including sweetgum (*Liquidambar styraciflua*), water oak (*Quercus nigra*), American elm (*Ulmus americana*), and Chinese privet (*Ligustrum sinense*) was conducted in 2010 using herbicides. The unit was prescribed burned in 2002, 2010, and 2013. The unit was thinned in 2004 and 2016. • Soils include Orangeburg and Vaucluse loamy sands; slopes range from nearly level to 6 percent.
2	30.9	• This unit contains two sections of Carolina Bay habitat. Although Atlantic white cedar (*Chamaecyparis thyoides*) and bald cypress (*Taxodium distichum*) were planted in 2000, 2002, and 2003, natural pine and hardwood regeneration dominate the site. The larger, southernmost bay is within the open/airfield area and will need to be cleared of woody vegetation, and possibly filled to facilitate maintenance consistent with BASH recommendations and line-of-sight with airfield navigation aids. • Prescribed burns were conducted in 2009 and 2011. • This unit contains portion of cultural resource 38RD322 (eligible). • In 2004, the unit contained approximately 1% greenbrier (*Smilax rotundifolia*), Japanese honeysuckle (*Lonicera japonica*), bull thistle (*Cirsium vulgare*), Chinese privet, and Chinaberry (*Melia azedarach*) within the Carolina bay habitats. • Soils include Coxville fine sandy loam with level to nearly level slopes.
3	13.5	• This unit contains longleaf pine approximately 2 years old. This unit was previously a pine hardwood forest. A reduction of understory species including sweetgum, water oak, American elm, and Chinese privet was conducted in 2010 using herbicides. Prescribed burns were conducted in 1998, 2003, and 2009. The unit was thinned in 2002 and harvested in 2015. After harvest, the site was prepared with herbicide and mechanically planted with longleaf pine in 2016. Soils are Dothan and Orangeburg loamy sands on 2 to 6 percent slopes.
4	31.4	• This unit consists of 2-year-old planted longleaf pine. The unit was harvested in 2016 and then the site was chemically prepared. The pines were then machine planted. • Contained approximately 7% bi-color lespedeza (*Lespedeza bicolor*). Soils include Orangeburg and Vaucluse loamy sands on slopes ranging from nearly level to 10 percent.
5	43.7	• This unit contains uneven-aged pine and upland hardwood approximately 25 years old. A portion of the unit also includes natural pine regeneration. Portions of the unit were prescribed burned in 2002 and 2011. • In 2015 the unit was thinned and pine was removed.

Unit	Acres	Description
		• In 2004, the unit contained 8.9% Chinese wisteria (*Wisteria sinensis*), 2.5 % Chinese privet, and 1% Chinaberry, mimosa (*Albizia julibrissin*), and kudzu (*Pueraria lobata*). • Soils include Orangeburg and Vaucluse loamy sand with slopes ranging from nearly level to 10 percent.
6	14.9	• This unit includes plantation loblolly pine approximately 47 years old. The pines were thinned in 1999 and 2015 and prescribed burns were conducted in 2003 and 2013. • In 2004, this unit contained 30% Chinese wisteria. • Soils include Norfolk and Orangeburg loamy sands on nearly level to 6 percent slopes.
6A	18.0	• This unit contains loblolly pine approximately 41 to 54 years old. A reduction of understory species including sweetgum, water oak, American elm, and Chinese privet was conducted in 2010 using a mower. • Prescribed burns were conducted in 1999, 2003, 2009, 2011, and 2014. Pines were thinned in 2002. • In 2004, the unit contained 25% Japanese honeysuckle, 1% Chinese privet and Chinaberry. • Soils include Norfolk loamy sand and Rains sandy loam; slopes range from nearly level to 6 percent.
6B	26.5	• This unit contains loblolly pine ranging from 47 to 55 years old. A few small areas of approximately 16-year-old loblolly pine are present. A reduction of understory species including sweetgum, water oak, American elm, and Chinese privet was conducted in 2010 using herbicide and a mower. • Prescribed burns were conducted in 1999, 2003, 2009, and 2011. The pines were thinned in 2002 and 2011. • In 2004, the unit contained 25% Chinese privet, 1% mimosa, and 5 % greenbrier, summer grape *(Vitis aestivalis),* and muscadine grape *(Vitis rotundifolia).* • Soils include Norfolk and Orangeburg loamy sands, Goldsboro sandy loam, and Rains sandy loam; slopes range from nearly level to 6 percent. Old drainage ditches are present which remove excess surface water.
6C	9.0	• This unit contains plantation and natural loblolly pine 35 to 55 years old. • Prescribed burns were conducted in 1998, 2003, 2010, and 2013. The unit was thinned in 1999 and 2011. • In 2004 this unit contained 5% Chinese privet. • Soils include Goldsboro and Rains sandy loams; slopes range from nearly level to 2 percent.
6D	23.3	• This unit contains loblolly pine ranging from 47 to 55 years old. A reduction of understory species including sweetgum, water oak, American elm, and Chinese privet was conducted in 2010 using a mower. Prescribed burns were

Unit	Acres	Description
		conducted in 1998, 2002, 2003, 2009, 2011, and 2013. The unit was thinned in 1999, 2011 and 2016. • In 2004, the unit contained 40% kudzu, 25% Chinese privet, and 1% Chinaberry. • Soils include Norfolk and Orangeburg loamy sands, Goldsboro sandy loam, and Coxville fine sandy loam; slopes range from nearly level to 6 percent. Coxville soils are indicative of a wetland area; old drainage ditches are present which remove excess surface water.
6E	16.7	• This unit contains loblolly pine ranging from 46 to 56 years old. A reduction of understory species including sweetgum, water oak, American elm, and Chinese privet was conducted in 2010 using herbicides. Prescribed burns were conducted in 1998, 2002, 2003, 2009, 2011, and 2013. The unit was thinned in 1999, 2011 and 2016. • In 2004, the unit had severe infestations of invasive plants, including 35% kudzu, 25% Japanese honeysuckle, and 1% Chinaberry. • Soils include Norfolk and Orangeburg loamy sands, Goldsboro sandy loam, and Coxville fine sandy loam; slopes range from nearly level to 6 percent. Coxville soil type is a good indicator of wetlands; old drainage ditches are present which remove excess surface water.
6G	16.0	• This unit contains loblolly pine approximately 54 years old and an open area under an electrical line. A reduction of understory species including sweetgum, water oak, American elm, and Chinese privet was conducted in 2010 using a mower. • A prescribed burn was conducted in 1998 and the area was thinned in 1999. • This unit has been removed from the burn rotation, primarily due to surrounding land use that is incompatible with the use of prescribed fire. A pine salvage cut was made in the area infested with Chinese wisteria in 2004. • The unit was thinned in 2016. • A 2004 survey reported 30% Chinese wisteria, 5% bi-color lespedeza, 5% Chinese privet, and 1% Chinaberry. • Soils include Norfolk and Orangeburg loamy sands on nearly level to 6 percent slopes.
6H	16.0	• This unit contains loblolly pine approximately 50 years old. A reduction of understory species including sweetgum, water oak, and American elm was conducted in 2010 using a mower. A prescribed burn was conducted in 1998 and the area was thinned in 1999, 2009, and 2015. This unit has been removed from the burn rotation primarily due to surrounding land use that is incompatible with the use of prescribed fire. • The unit was thinned in 2016. • In 2004, this unit contained 10% Japanese honeysuckle and 1% nandina (*Nandina domestica*). • Soils include Norfolk loamy sand on nearly level to 2 percent slopes.

Unit	Acres	Description
6I	45.3	• This unit contains mature loblolly pines ranging from 41to 70 years old with some hardwood. A reduction of understory species including sweetgum, water oak, American elm, and Chinese privet was conducted in 2010 using herbicides. • The unit was prescribed burned in February 2002 and in 2009. • In 2004, this unit contained approximately 1% bi-color lespedeza, 1% Chinaberry and multiflora rose (*Rosa multiflora*), and 15% greenbrier. • The dominant soils are Norfolk and Orangeburg loamy sands. A small area contains Coxville fine sandy loam which is indicative of a wetland site. Slopes range from nearly level to 6 percent.
6J	6.3	• This unit contains loblolly pines that are approximately 54 years old. A reduction of understory species including sweetgum, water oak, American elm, and Chinese privet was conducted in 2010 using herbicides. Stand was prescribed burned in 2005 and 2009. • A shelterwood/seed tree harvest was conducted in 2003, and the understory was chemically treated in 2004. • The predominate soil includes Orangeburg loamy sand with slopes ranging from nearly level to 6 percent.
6K	35.4	• This unit contains mature natural loblolly pine with some hardwood ranging from 56 to 66 years old. A prescribed burn was completed in February 2002. • In 2004, this unit contained 50% Chinese privet; and 1% each of Chinaberry, multiflora rose, and Japanese stilt grass (*Microstegium vimineum*). • Soils include Cantey loam, Goldsboro sandy loam, Norfolk loamy sand, and Vaucluse loamy sand; slopes range from nearly level to 10 percent. • A portion of cultural resources 38RD 1215 (eligible) is located within this unit.
7	31.7	• This unit contains loblolly pine ranging from 23 to 49 years old and some hardwood. A reduction of understory species including sweetgum, water oak, American elm, and Chinese privet was conducted in 2010 using herbicides. • A portion of the unit was prescribed burned in 2009 and 2013 and thinned in 2002 and 2015. • In 2004, this unit contained 1% Japanese honeysuckle, 8% Chinese privet, 8% greenbrier, and 1% mimosa. • Soils include Dothan and Orangeburg loamy sands and Rains sandy loam on nearly level to 6 percent slopes. • Unit encompasses cultural site 38RD1229 (eligible).
7A	6.9	• This unit contains natural loblolly pine saplings approximately 23 years old, coupled with some larger pines and hardwoods. Prescribed burns were conducted in 2010 and 2013. • Soils include Dothan and Orangeburg loamy sands and Rains sandy loam. Slopes range from nearly level to 6 percent.

Unit	Acres	Description
7B	2.0	• This unit includes planted longleaf pine with natural loblolly regeneration. The longleaf pines are approximately 22 years old. This unit was thinned in 2009. • In 2004, this unit contained 15% Bermuda grass (*Cynodon dactylon*), 5% Japanese honeysuckle, and 25% Chinese wisteria. • Soils include Orangeburg loamy sand on slopes up to 2 percent.
8	56.8	• This unit includes upland and bottomland hardwood bordering Dry Branch. Mature pines are also present. Mature pines are approximately 64 years old. Some pine and hardwoods were thinned in 2006 to satisfy TERPS criteria for helicopter runway 05-23. • Unit encompasses cultural site 38RD305 (potentially eligible). • In 2004, this unit contained 50% Chinese privet, 30% Japanese honeysuckle, 10% Chinese wisteria, and 5% each of Chinaberry and kudzu. • Soils include Dothan and Norfolk loamy sands and Rains sandy loam. Slopes range from nearly level to 6 percent.
8A	30.1	• Unit contains bottomland hardwoods with some pine bordering Dry Branch. Trees are approximately 95 years old. A prescribed burn was conducted in 2005. • In 2004, the unit contained 50% Japanese honeysuckle and 50% Chinese privet. • Soils include Rains sandy loam along Dry Branch with Norfolk, Orangeburg, and Vaucluse loamy sands on the outside edges. Slopes range from nearly level to 15 percent.
8B	75.6	• This unit contains bottomland hardwoods with some pine bordering Dry Branch. Trees are approximately 95 years old. A portion of this unit is within the airfield clear zone. • This unit contains cultural resource site 38RD1224. • In 2014, the unit contained 50% Chinese privet, and 1% mimosa and Chinese wisteria, combined. • Soils include Rains sandy loam along Dry Branch with Norfolk, Orangeburg, and Vaucluse loamy sands on the outside edges. Slopes range from nearly level to 15 percent.
8C	45.0	• The western boundary of this unit, composing bottomland hardwood and some natural pine, is Cedar Creek. Most of this unit is in wetland habitat. • Contains 1% Japanese stilt grass and a cover of approximately 50% Chinese privet in 2004. • The predominant soil type is Johnston loam with nearly level slopes. • A portion of cultural resource 38RD1215 (eligible) is located within this unit.
8D	7.5	• Some of this unit was cleared for the airfield clear zone; however, the western boundary is Cedar Creek, so a 40-foot minimum buffer of trees remains. • Chinese privet covers 60% of the unit.

Unit	Acres	Description
		• Soils include Johnston loam and Persanti very fine sandy loam on nearly level slopes.
9	10.1	• This unit includes large loblolly pine and hardwood with pine and hardwood regeneration. Mature pines are approximately 72 years old. This unit consists of a small wetland and surrounding forested area. • In 2004, this unit contained approximately 50% greenbrier. • Soils include Coxville fine sandy loam, Dothan loamy sand, and Orangeburg loamy sand; slopes range from nearly level to 10 percent.
9 A	5	• This unit is the wooded areas around the TAG Building complex. The area is made up of large hardwoods and loblolly pine. • Soils include Norfolk and Orangeburg loamy sands; slopes range from nearly level to 2 percent. • The area is managed for aesthetics.
9B	6.1	• This unit contains loblolly pine approximately 50 years old and upland hardwood. A prescribed burn was conducted in 1998, and the unit was thinned in 2009. • In 2004, the unit contained 8% Chinese wisteria and 1% Chinese privet. • Soils include Norfolk and Orangeburg loamy sands; slopes range from nearly level to 2 percent.
9C	3.9	• This unit contains large hardwoods covering an old homestead. • In 2004, this unit contained a severe infestation of Chinese wisteria and privet (approximately 100% and 75%, respectively). • Soils include Norfolk and Orangeburg loamy sands; slopes range from nearly level to 2 percent.
9D	11.8	• This unit contains mature pine and hardwood with mixed pine/hardwood natural regeneration. • Contains approximately 50% Chinese privet, 1% Chinaberry and mimosa, and 5% Japanese honeysuckle. • Soils include Coxville fine sandy loam and Orangeburg loamy sand; slopes range from nearly level to 6 percent. The Coxville portion of this unit is indicative of a wetland site.
10	25.3	• This unit contains loblolly pine ranging from 22 to 54 years old. Some of the loblolly pine is regeneration. Previously loblolly pine seed trees were included in this unit; however, they were removed in 2009. This unit also includes upland hardwood approximately 25 years old. • Portions of the unit were thinned in 2004 and in 2015. • In 2004 the unit contained 9% Chinese privet, 7% Chinese wisteria and 1% mimosa. • Soils include Norfolk and Orangeburg loamy sand on nearly level to 6 percent slopes.

Unit	Acres	Description
11	24.0	• This unit contains longleaf pine that was planted in January 1999. About 0.6 acre has been removed from this unit and converted to an equipment (Eagle Vision) facility, and another strip will need to be cleared to maintain a clear line of sight for that facility. • A prescribed burn was conducted in 2010. • In 2004, the unit contained 15% Bermuda grass. • Soils include Norfolk, Orangeburg, and Vaucluse loamy sand and Coxville fine sandy loam. Slopes range from nearly level to 10 percent.
12	36.2	• This unit includes loblolly pine approximately 22 years old. • This unit was thinned in 2015. • This unit contained approximately 6% Chinese privet, 5% Bermuda grass, 3% Japanese honeysuckle, and 1% multiflora rose in 2004. • Soils include Norfolk Orangeburg loamy sand on slopes ranging from nearly level to 10 percent.
13	17.23	• This unit contains the pecan plantations greater than 50 years old. • Soils include Orangeburg loamy-sand soil.
14	10	• Unit contains mast-producing hardwoods. Approximately 1 acre next to Dry Branch Pond has been planted to longleaf pine. Loblolly pine regeneration about 8 years old dominates the southern portion. In 2004 pines and some hardwoods were harvested. • In 2004, the unit contained 1% Chinese privet. • Soils include Norfolk and Orangeburg loamy sands on 2 to 10 percent slopes.
Sources: McEntire JNGB 2010b, 2010c, and 2011.		

In November 2004, a nonnative and invasive plant species survey was conducted within the Forest Area Management Units, the former Hay Lease Area, and the North ditch. Eighteen invasive nonnative species and three invasive native plant species were observed on McEntire JNGB (Table 5-2). Six South Carolina Exotic Pest Plant Council Category 1 (Severe Threat) species were found. The estimated percent cover of the invasive species found in each management unit are listed in Table 5-1 above. All of the units, unless otherwise stated, contained approximately 1% greenbrier (*Smilax rotundifolia*), summer grape (*Vitis aestivalis*), muscadine grape (*Vitis rotundifolia*), and Japanese honeysuckle (*Lonicera japonica*). Chinese privet (*Ligustrum sinense*) and Chinese wisteria (*Wisteria sinensis*) were the most abundant invasive plant species observed on McEntire ANGS. None of the species are found on the South Carolina Noxious Weed List, but that list is focused on agricultural pests. The following management units had greater than 25 percent estimated basal coverage of

Kudzu

Chinese privet: 6B, 6D, 6K, 8, 8A, 8B, 8C, 8D, 9C, and 9D. The following management units had greater than 25% estimated percent basal coverage of Chinese wisteria: 6, 6G, 7B, and 9C.

Table 5-2. Invasive Plant Species Observed at McEntire ANGS

Scientific Name	Common Name	Native/ Exotic	Exotic Pest Plant Council Status
Albizia julibrissin	Mimosa	E	2
Cirsium vulgare	Bull thistle	E	2
Crotalaria spectabilis	Showy rattlebox	E	
Crotalaria striata	Smooth rattlebox	E	
Cynodon sp.	Bermuda grass	E	
Hedera helix	English ivy	E	2
Lespedeza bicolor	Two color bush clover	E	2
Lespedeza cuneata	Sericea lespedeza	E	3
Ligustrum sinensis	Chinese privet	E	1
Lonicera japonica	Japanese honeysuckle	E	1
Melia azedarach	Chinaberry	E	2
Microstegium vimineum	Japanese stilt grass	E	1
Nandina domestica	Nandina/sacred bamboo	E	2
Paspalum notatum	Bahia grass	E	2
Pueraria lobata	Kudzu	E	1
Rosa multiflora	Multiflora rose	E	1
Smilax glauca	Greenbrier	N	
Sorghum halepense	Johnson grass	E	3
Vitis aestivalis	Summer grape	N	
Vitis rotundifolia	Muscadine grape	N	
Wisteria sinensis	Chinese wisteria	E	1

1—Severe Threat: exotic invasive species which are known to pose a severe threat to the composition, structure, or function of natural areas in the state of South Carolina.
2—Significant Threat: exotic invasive plant species which are not presently considered to spread as easily into native plant communities as number 1.
3—Watch: exotic plant species that are considered to be a potential threat to natural plant communities.
Source: McEntire ANGS 2005a.

5.2.3 Turf and Landscaped Areas

Landscape is defined as "the composite of natural and human features that characterize the surface of the land, including spatial, textural, compositional and dynamic aspects of the land." Landscaping is often used to improve the visual aesthetics of an area to promote a pleasing atmosphere. McEntire JNGB promotes water conservation landscaping by using xeriscape (plants adapted to dry conditions) methods combined with native plant materials.

Landscaping can be a very involved process, or something as simple as the upkeep of natural vegetation through weeding and mowing. Landscaped areas that are maintained are referred to as improved areas, although there are various degrees of improvement. Some areas might be grassy fields, where others might contain rocks and native plants.

5.3 FISH AND WILDLIFE

The USAF has determined that McEntire JNGB has sufficient habitat to warrant the preparation of this INRMP. Some limited nonconsumptive fish and wildlife management opportunities exist outside of the mission-critical areas of the base. Management for the consumptive use of game species is also limited due to the operational mission of the base. The primary game species identified on the base are white-tailed deer, southern fox squirrel, and gray squirrel, although Dry Branch Pond and Cedar Creek Pond are occasionally stocked with catfish and largemouth bass, respectively. White-tailed deer, other mammals such as coyotes, and birds have also been identified as BASH species.

Wildlife management is defined as manipulation of the environment and wildlife populations to produce desired objectives. Management can be performed in a manner that enhances biodiversity through the conservation or reestablishment of native habitats. In some cases, habitat management might be required to decrease the abundance of certain wildlife species to reduce animal damage or bird strike hazards. Traditionally, wildlife management was confined to large tracts of naturally vegetated land. The base's limited size necessitates implementation of wildlife management options that do not increase the potential for wildlife-mission conflicts but still conserve regional biodiversity.

DoD and ANG encourage support of State Wildlife Action Plans (SWAPs) as part of a comprehensive base natural resources program. Consequently, McEntire JNGB should continue to formally review the South Carolina Wildlife Compensation Conservation Strategy (CWCS), and consult frequently with the regional SCDNR office to determine areas where the base can participate in future wildlife conservation partnerships with SCDNR and other partners in support of the South Carolina CWCS.

McEntire JNGB is composed of grassland, forests, and wetlands that provide habitat for a corresponding diversity of animal species, including migratory bird species, which use these areas as spring and fall stopover points. McEntire JNGB is located within the Atlantic Flyway, a major bird migration route that runs along the eastern U.S. The Coastal Plains ecological community dominates the fish and wildlife habitat present on the base. This ecological community has a moderately high capability to sustain the species native to the region by providing adequate food supply and shelter. Appendix I identifies species that are documented or potentially occurring on the base and that are included in the South Carolina State Wildlife Action Plan (SC SWAP) (SCDNR 2014). Appendix I-5, Table 5-1 provides the conservation rank for these species per the Comprehensive Wildlife Conservation Strategy (CWCS) and their known habitat associations.

The health of fish and wildlife habitat on the base is, in large part, dependent on the interactions with areas surrounding McEntire JNGB. Ensuring connectivity of the landscape is vital to the functionality of McEntire JNGB fish and wildlife habitat. The primary habitat through which connectivity is accomplished is associated with the riparian corridors of Cedar Creek (perennial) and Dry Branch Creek (intermittent).

A Comprehensive Biological Survey was completed in 2003 to summarize wildlife presence and habitat preferences. During these surveys, non-listed species were documented. In addition,

surveys specifically for fish, amphibians, and reptiles were completed in 2007 and 2008, and the results were characterized in the 2009 *Final Fish, Amphibian, and Reptile Survey, Report & Management Plan* (Appendix H). The information below includes details on wildlife throughout the installation based on the 2003 and 2007–2008 surveys.

5.3.1 Birds

Carolina chickadee
Photo Credit: Audubon

Bird surveys conducted during Winter and Spring 2003 documented 84 bird species at McEntire JNGB. A comprehensive list of bird species detected is presented in Appendix I. Forty-six species of birds were observed during the 3 days of winter surveys, including year-round resident species, winter residents, summer residents, and migrants. Some of the winter residents observed included the ring-necked duck (*Aythya collaris*), sharp-shinned hawk (*Accipiter striatus*), palm warbler (*Dendroica palmarum*), fox sparrow (*Passerella iliaca*), song sparrow (*Melospiza melodia*), and dark-eyed junco (*Junco hyemalis*). Continental migrants migrate south from their Canadian and U.S. breeding grounds to spend the winter in the southern United States and then return to their northern nesting grounds in spring. McEntire JNGB is located within the Atlantic Flyway, which is used by some of these migratory species as a migratory route between northern nesting grounds and southern overwintering areas. A total of 64 species were encountered during the 5-day spring survey. The increase in observations represented an influx of 35 species of neotropical migrants and summer residents that were not present in the winter. Neotropical migrants are bird species that winter primarily south of the United States (e.g., West Indies, South America), and migrate to the United States and Canada to nest during the summer (e.g., American redstart, *Setophaga ruticilla*). Some of the neotropical migrants that were observed during the survey included the snowy egret (*Egretta thula*), hooded merganser (*Lophodytes cucullatus*), yellow-billed cuckoo (*Coccyzus americanus*), ruby-throated hummingbird (*Archilochus colubris*), red-headed woodpecker (*Melanerpes erythrocephalus*), red-eyed vireo (*Vireo olivaceus*), wood thrush (*Hylocichla mustelina*), and blue grosbeak (*Guiraca caerulea*). Some of the year-round resident species observed in both the winter and spring surveys included the Canada goose *(Branta canadensis*), red-shouldered hawk (*Buteo lineatus*), killdeer (*Charadrius vociferous*), mourning dove (*Zenaida macroura*), downy woodpecker (*Picoides pubescens*), Carolina chickadee (*Poecile carolinensis*), and the eastern bluebird (*Sialia sialis*).

Migratory birds are protected through international treaties and the Migratory Bird Treaty Act (MBTA). Federal regulations and EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, provide the framework for regulation of migratory bird take and possession. Federal permits are required to take, possess, transport, and dispose of migratory birds, bird parts, feathers, nests, or eggs. When necessary, applications for permits will be made to the USFWS Migratory Bird Permit Office in Atlanta, Georgia. The MBTA protects all migratory birds and prohibits the taking of migratory birds, their young, nests, and eggs, except as permitted by USFWS. USFWS recommends that the base avoid impacting birds protected under the MBTA by surveying for nesting birds in areas proposed for disturbance and if necessary, waiting until the nesting and fledging process is complete. Alternatively, USFWS recommends

that conducting activities outside of nesting areas or outside of the general migratory bird nesting season that extends from March through August to help avoid direct impacts.

5.3.2 Mammals

White-tailed deer
Photo Credit: SCDNR

The grasslands, forests, and wetlands at McEntire JNGB provide habitat for a variety of mammals. Mammal surveys were also conducted at McEntire JNGB during Winter and Spring 2003. Some of the species observed during the surveys included the house mouse (*Mus musculus*), eastern harvest mouse (*Reithrodontomys humilis*), hispid cotton rat (*Sigmodon hispidus*), golden mouse (*Ochrotomys nuttalli*), cotton mouse (*Peromyscus gossypinus*), southern short-tailed shrew (*Blarina carolinensis*), eastern fox squirrel (*Sciurus niger*), eastern gray squirrel (*Sciurus carolinensis*), eastern cottontail rabbit (*Sylvilagus floridanus*), bobcat (*Lynx rufus*), mink (*Mustela vison*), opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), red fox (*Vulpes fulva*), gray fox (*Urocyon cinereoargenteus*), coyote (*Canis latrans*), and white-tailed deer (*Odocoileus virginianus*).

5.3.3 Reptiles and Amphibians

Southern leopard frog

Reptile and amphibian surveys were conducted at McEntire JNGB in May and July 2003, September 2007, and March and April 2008. During the 2003 surveys, a total of 211 individuals were captured or observed, representing 25 species (Appendix I**)**. Five lizards, 5 snakes, 5 turtles, 51 frogs, and 145 toads were caught or observed. The captures yielded 15 reptiles and 196 amphibians. The most common amphibian species captured or observed include 77 Southern toads (*Bufo terrestris*), 46 Southern leopard frogs (*Rana sphenocephala*), and 30 American toads (*Bufo americanus)*. Some of the snake species observed included the brown water snake (*Nerodia taxispilota*), southeastern crown snake (*Tantilla coronata*), and scarlet snake (*Cemophora coccinea*). Some of the lizard species observed included the Carolina anole (*Anolis carolinensis*), broadhead skink (*Eumeces laticeps*), and eastern fence lizard (*Sceloporus undulatus*). Turtles included the yellow-bellied slider (*Chrysemys scripta*), eastern mud turtle (*Kinosternon subrubrum*), and eastern box turtle (*Terrapene carolina*).

Eastern kingsnake

The results from the 2007 and 2008 sampling event are provided in the 2009 *Fish, Amphibian, and Reptile Survey, Report, and Management Plan* (Appendix H). During this survey a total of nine individuals were observed, including three species of snakes, two frogs (one unidentified), and two salamanders. All of the species observed were not documented during the previous 2003 survey except the Southern leopard frog. Snake species observed included the yellow rat snake (*Elaphe obsoleta quadrivittata*), eastern hognose snake

(*Heterodon platirhinos*), and eastern kingsnake (*Lampropeltis getula getula*). Salamanders observed included the slimy salamander (*Plethodon glutinosus*) and many-lined salamander (*Stereochilus marginatus*) (McEntire JNGB 2009).

Establishment of "core habitat" is essential to the survival of riparian herpetofauna that require upland habitat for foraging, nesting, aestivation, and hibernation. The following habitats support reptiles and other wildlife. Brush piles: Brush piles should be 15 ft wide by 15 ft long by 8 ft high in size and number three to four per acre. The foundation of the pile should be designed with 6- to 10-in.-diameter logs placed parallel to each other 1 ft apart (old pallets make excellent foundations for a brush pile). Secondly, place branches and logs perpendicularly on top of the foundation. Lastly, smaller debris is added on top to form a mound. Brush piles can be placed randomly on land or partially submerged at the water's edge. Rock Piles: Pile rocks (e.g., riprap, concrete) up to 12 in. high. Finish by angling several 4- to 6-in.-diameter logs over the rock pile. Hibernaculum: Hibernacula are permanent below-ground structures that provide shelter for hibernating reptiles. Constructed hibernacula should face south, preferably along a sheltered wooded edge. To build a hibernacula, dig a hole 10 ft wide by 15 ft long by 6–10 ft deep; fill the hole with logs, rocks, and debris in a pile 4 ft higher than ground level; place rock on the south facing side of the hibernacula; cover all but the south-facing side of rock with 3 ft of soil and seed with native short grasses and forbs.

5.3.4 Fish

Bluegill
Photo credit: SCDNR

Electro-shocking was used to survey fish species occurring in Dry Branch Pond, Cedar Creek Pond, Dry Branch Creek, and Cedar Creek in 2007 and 2008. Results of the survey are provided in the 2009 *Fish, Amphibian, and Reptile Survey, Report, and Management Plan* (Appendix H). Eight fish species were identified during electrofishing surveys, and several species with the potential to occur on the base were also identified. Fish species observed within Drybranch Creek included the dusky shiner (*Notropis cummingsae*), margined madtom (*Noturus insignis*), and sawcheek darter (*Etheostoma serrifer*). Three fish species, brown bullhead (*Ameiurus nebulosus*), eastern mosquitofish (*Gambusia holbrooki*), and bluegill (*Lepomis macrochirus*) were observed within Dry Branch Pond. Fish species observed within Cedar Pond included grass carp (*Ctenopharyngodon idella*), pumpkinseed (*Lepomis gibbosus*), and eastern mosquitofish. Two fish species including the redbreast sunfish *(Lepomis auritus*) and creek chubsucker (*Erimyzon oblongus*) were identified within Cedar Creek (McEntire JNGB 2009).

5.4 THREATENED AND ENDANGERED SPECIES AND SPECIES OF CONCERN

The Endangered Species Act (ESA) defines "threatened" as any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The term "endangered species" refers specifically to a species that has been listed on the Endangered Species List, and is defined as an animal or plant species in danger of extinction throughout all or a significant portion of its range. As required by Section 7 of the ESA, all federal agencies shall ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of a federally protected species or

result in the destruction or adverse modification of critical habitat. All DoD installations are required to perform threatened and endangered species surveys periodically and prior to any activities that disturb the land.

An endangered species survey was conducted on McEntire JNGB on April 1982 by John Cely and Sam Phillips, Nongame and Endangered Species Coordinator/Biologists for the South Carolina Wildlife and Marine Resources Department (now known as the SCDNR Heritage Trust Program). No endangered species were observed and no critical habitat has been designated on McEntire JNGB. An additional sensitive species survey conducted at McEntire JNGB in 2003 also did not identify any federally or state listed species (McEntire ANGS 2003). SCDNR lists six federally listed species and four state listed species as being documented in Richland County (Table 5-3).

Table 5-3. List of Federal and State Listed Species in Richland County, South Carolina

Scientific Name	Common Name	Federal Status	State Status
Mammals			
Corynorhinus rafinesquii	Rafinesque's big-eared bat		E
Birds			
Haliaeetus leucocephalus	Bald eagle		T
Picoides borealis	Red-cockaded woodpecker	E	E
Amphibians			
Hyla andersonii	Pine barrens treefrog		T
Plants			
Echinacea laevigata	Smooth coneflower	E	
Lysimachia asperulifolia	Rough-leaved loosestrife	E	
Oxypolis canbyi	Canby's dropwort	E	
Rhus michauxii	Michaux's sumac	E	
Symphyotrichum georgianum	Georgia aster	C	

E – Endangered; T – Threatened; C – Candidate.
Source: SCDNR 2014.

Additionally, there are plant and animal species that are listed by the SCDNR Heritage Trust Program as rare species or communities in Richland County. The program's list which was updated in June 2014 is an incomplete listing of what actually exists in the county, as no complete survey of the state has ever been done (SCDNR 2014) (Appendix I).

Three rare plant species have been found to exist in the vicinity of McEntire JNGB. The plant species include awned meadowbeauty (*Rhexia aristosa*) approximately 1.5 miles southwest of the base, bigleaf magnolia (*Magnolia macrophylla*) approximately 2 miles northeast, and pyramid magnolia (*Magnolia pyramidata*) approximately 2.5 miles northeast. SCDNR has no record of any threatened or endangered species on the base. However, there is a potential (especially with bird species) for these species to appear within base boundaries even though habitats might not permanently exist.

5.5 WETLANDS AND FLOODPLAINS

5.5.1 Wetlands/Waters of the United States

Wetlands are defined as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (USACE 1987). Wetland functions include groundwater recharge/discharge, flood/flow alteration, sediment stabilization, sediment and toxicant retention, nutrient removal and transformation, aquatic and terrestrial diversity and abundance, and uniqueness. Wetlands are areas found along streams, rivers, springs, ponds, depressions, and drainage ditches; and in Carolina bays. Wetlands support a variety of water-dependent vegetation not found in drier upland areas as well as a variety of habitats and associated plant and wildlife species. Because of their high ecological function, wetland disturbance can have far-reaching effects on ecosystem health and the structure and function of stream and watershed ecosystems.

Wetlands are protected as a subset of the "waters of the United States" under Section 404 of the Clean Water Act (CWA). The term "waters of the United States" has broad meaning under the CWA and incorporates deep water aquatic habitats and special aquatic habitats (including wetlands). Jurisdictional waters of the United States are areas regulated under the CWA and may also include coastal and inland waters, lakes, rivers, ponds, streams, intermittent streams, vernal pools, and other waters, that if degraded or destroyed could affect interstate commerce. For an area to be classified as a jurisdictional wetland, three conditions must be present:

- ***Hydrophytic Vegetation***—Classified by the estimated probability of occurrence in wetland versus non-wetland areas throughout its distribution.

- ***Hydric Soils***—Soils that are saturated, flooded, or ponded for sufficient periods during the growing season and that develop anaerobic conditions in their upper layers.

- ***Hydrological Characteristics***—Determined by the frequency of flooding, duration of inundation, and soil saturation.

Wetland areas are determined using the routine onsite determination method described in the USACE *Wetlands Delineation Manual* (USACE 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)* (USACE 2010). Areas that may be periodically wet, but that do not meet the requisite criteria, are not classified as "jurisdictional" wetlands.

Section 404 of the CWA authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredged or fill into the "waters of the United States," including wetlands. Section 401 of the CWA gives the State of South Carolina the authority to regulate, through the state water quality certification program, proposed federally permitted activities that may result in a discharge to water bodies, including wetlands. Physical disturbances to wetlands and disturbances to both perennial and intermittent streams (e.g., stream crossings) are regulated by the CWA under Sections 404 and 401. In South Carolina, activities occurring within a wetland that falls under Section 404 of the CWA are regulated by USACE, as

the states does not have either a tidal or non-tidal wetland permitting program. South Carolina administers a Water Quality Certification Program under Section 401 of the CWA, and all Section 404 permits issued by USACE must also include Section 401 certification provided by the State. Most proposed activities within streams or wetlands (such as filling, dredging, or clearing of ditches) require either a general or individual permit.

The CWA requires any action that would involve the placement of fill material into wetlands or other waters of the United States to be subject to the permit requirement of Section 404. Under Section 404 (b)(1), the permitting of fill activities will not be approved unless the following conditions are met:

1) no practicable, less environmentally damaging alternative to the action exists;

2) the activity does not cause or contribute to violations of state water quality standards or jeopardize endangered or threatened species;

3) the activity does not contribute to significant degradation of waters of the United States; and

4) all practicable and appropriate steps have been taken to minimize potential adverse impacts on the aquatic ecosystem (Title 40 CFR 230.10).

Wetlands are also protected under EO 11990, *Protection of Wetlands* (43 CFR 6030). The purpose of EO 11990 is to reduce the adverse impacts associated with the destruction or modification of wetlands through federal actions. EO 11990 (Protection of Wetlands) requires federal agencies to take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the beneficial values of wetlands. In addition, DoDI 4715.03, *Natural Resources Conservation Program,* mandates that wetlands be managed for no net loss.

Under federal and state regulations, McEntire JNGB is responsible for identifying and locating jurisdictional waters of the United States (including wetlands), where these resources have the potential to be impacted by activities on the installation. Wetlands and waters of the United States have been identified in several past delineations. Wetlands were characterized according to the Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979), which provides information regarding the type of wetland. Forested is a wetland class within the Palustrine system that is characterized by woody vegetation that is 6 meters tall or taller; all water regimes are included except subtidal (McEntire JNGB 2010a). Emergent is a wetland class within the Palustrine system that is characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years; these wetlands are usually dominated by perennial plants. All water regimes are included except subtidal and irregularly exposed (McEntire JNGB 2010a).

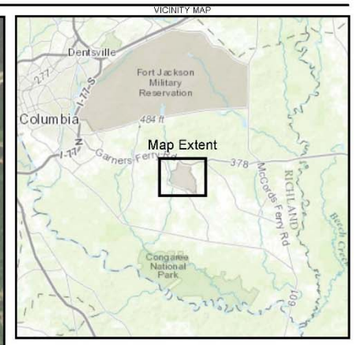
In 1998, a wetland identification and classification survey was performed for McEntire JNGB. Aerial photography was used to identify potential wetland areas. The identified potential wetlands were verified and further classified by a survey on the ground. A total of 150.61 acres of wetlands were identified on McEntire JNGB during that survey.

A second survey was conducted in September 2005 to perform a more detailed, site-specific wetland delineation. The purpose of the 2005 effort was to verify and update potential wetland areas located within the previously identified vertical and lateral clear zones (a 170-acre area) at McEntire JNGB. There were 71.8 acres of wetlands identified in this survey area (McEntire JNGB 2010a).

In 2007, a base-wide wetland survey and delineation was conducted and identified 149.88 acres of wetlands. Of the wetlands delineated, ten were identified as fully functional, and one was characterized as slightly impaired.

Wetland on McEntire JNGB

The wetlands identified in 2007 were confirmed and mapped with USACE in 2009 (McEntire JNGB 2010a). Table 5-4 includes the size and type of each wetland and dominant vegetation observed in this 2009 delineation. Figure 5-3 depicts the location of the identified wetlands throughout the base.



Legend

- Installation Boundary
- Forested Wetland
- Surface Water

Map Date: 5/9/2017

Data Sources:
ESRI ArcGIS Map Service, 2016
McEntire JNGB, 2016

Note:
Jurisdictional wetland number based on 2007 base-wide survey

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0 0.25 0.5
Miles

\\Houston\GIS\GIS\Data\Federal\Southeast\SouthCarolina\McEntire_JNGB\MXD\Figure 5-3 - McEntire_JNGB Wetlands.mxd

Figure 5-3
Wetlands
McEntire JNGB
Richland County, South Carolina

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All of the wetlands observed in the 2009 survey were characterized as either Palustrine Forested or Palustrine Emergent. According to the National Wetlands Inventory Mapping Code Descriptions (Cowardin 1979), the Palustrine system includes all non-tidal wetlands dominated by trees, shrubs, emergents, mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 parts per thousand (ppt). Wetlands lacking such vegetation are also considered Palustrine if they exhibit all of the following characteristics: (1) are less than 8 hectares (20 acres); (2) do not have an active wave-formed or bedrock shoreline feature; (3) have, at low water, a depth of less than 2 meters in the deepest part of the basin; and (4) have a salinity due to ocean-derived salts of less than 0.5 ppt.

Table 5-4. Waters of the U.S. at McEntire JNGB (2007)

Wetland Number/Stream Name	Acreage	Description	Vegetation/Drainage Pattern	Cowardin Classification	USACE Jurisdictional Determination
1	2.00	Forested wetland in floodplain of a culvert parallel to Highway 378/76	• Sweet gum (*Liquidambar styraciflua*) • Red maple (*Acer rubrum*) • Longleaf pine (*Pinus palustris*) • Jewelweed (*Impatiens capensis*) • Roundleaf greenbrier (*Smilax rotundifolia*) • Eastern poison ivy (*Toxicodendron radicans*)	PFO1	Jurisdictional
2	21.28	Forested wetland within Dry Branch Creek floodplain	• Sweet gum • Red maple • White oak (*Quercus alba*) • Flowering dogwood (*Cornus florida*) • Roundleaf greenbrier • Riverbank grape (*Vitis riparia*) • Japanese honeysuckle (*Lonicera japonica*) • Netted chain fern (*Woodwardia areolata*)	PFO1	Jurisdictional

Wetland Number/Stream Name	Acreage	Description	Vegetation/Drainage Pattern	Cowardin Classification	USACE Jurisdictional Determination
3	13.40	Forested wetland within Dry Branch Creek floodplain	• Sweet gum • Red maple • Black gum (*Nyssa sylvatica*) • Loblolly pine (*Pinus taeda*) • Christmas fern (*Polystichum acrostichoides*) • Sensitive fern (*Onoclea sensibilis*) • Swamp azalea (*Rhododendron viscosum*) • Roundleaf greenbrier • Japanese honeysuckle	PFO1	Jurisdictional
4	6.51	Forested wetland within Dry Branch Creek floodplain	• Sweet gum • Red maple • Willow oak (*Quercus phellos*) • Giant cane (*Arundinaria gigantea*) • Sensitive fern • Nepalese browntop (*Microstegium vimineum*) • Riverbank grape • Western bracken fern (*Pteridium aquilinum*) • Roundleaf greenbrier	PFO1	Jurisdictional
5	21.62	Forested wetland in topographic depression within the airfield	• Water oak (*Quercus nigra*) • Willow oak • Sweet gum • Devil's darning needles (*Clematis virginiana*)	PFO1	Jurisdictional

Wetland Number/Stream Name	Acreage	Description	Vegetation/Drainage Pattern	Cowardin Classification	USACE Jurisdictional Determination
			• Toad rush (*Juncus bufonius*) • Roundleaf greenbrier		
6	75.80	Forested wetland within Cedar Creek floodplain	• Sweet gum • Red maple • Willow oak • Coastal doghobble (*Leucothoe axillaris*) • Sensitive fern	PFO1	Jurisdictional
7	0.43	Manmade detention pond with emergent vegetation along S. Carolina Rd.	• Common rush (*Juncus effusus*) • Broadleaf cattail (*Typha latifolia*)	PEM1	Non-Jurisdictional
8	0.30	Isolated forested wetland associated with drainage	• Boxelder (*Acer negundo*) • Pignut hickory (*Carya glabra*) • Swamp cottonwood (*Populus heterophylla*) • Willow oak • Southern magnolia (*Magnolia grandiflora*) • Piedmont staggerbush (*Lyonia mariana*) • Cranberry (*Vaccinium macrocarpon*) • Hazel alder (*Alnus serrulata*) • American holly (*Ilex opaca*)	PFO1	Non-Jurisdictional
9	<0.5	Forested wetland in low-lying depression	• Pignut hickory • Sweet gum	PFO1	Jurisdictional

Wetland Number/Stream Name	Acreage	Description	Vegetation/Drainage Pattern	Cowardin Classification	USACE Jurisdictional Determination
		near Swamp Fox Rd and S. Carolina Rd	• Sugar maple (*Acer saccharum*) • Roundleaf greenbrier • Hazel alder • Riverbank grape		
10	<0.5	Forested wetland in low-lying depression near Swamp Fox Rd and S. Carolina R	• Sweet gum • Willow oak • White oak • American holly • Roundleaf greenbrier • American pokeweed (*Phytolacca americana*) • Riverbank grape	PFO1	Jurisdictional
11	<0.5	Unvegetated clay pit west of Dry Branch Creek	Unvegetated	PFO1	Non-Jurisdictional
12	0.53	Forested wetland along an ephemeral tributary to wetland 6	• Sweetgum • Red maple • Willow oak • Coastal doghobble • Sensitive fern	PFO1	Jurisdictional
13	3.28	Forested wetland in topographic depression within the airfield	• Water oak • Willow oak • Sweet gum • Devil's darning needles • Toad rush • Roundleaf greenbrier	PFO1	Jurisdictional
14	4.46	Palustrine emergent wetland in formerly forested area in southeastern	• Weedy successive species that have colonized the cleared area	PEM1	Jurisdictional

Wetland Number/Stream Name	Acreage	Description	Vegetation/Drainage Pattern	Cowardin Classification	USACE Jurisdictional Determination
		portion of WGR			
Cedar Creek and Tributaries	N/A	Perennial stream running along the western boundary of the installation	• In wetland 6; drains towards Cedar Creek • East of wetland 6; drains southeast towards Cedar Creek Pond • Around wetland 10; drains southwest towards Cedar Creek Pond • Around wetland 8; drains southwest towards Congaree Road and Cedar Creek	Perennial	Jurisdictional
Dry Branch Creek and Tributaries	N/A	Stream with intermittent flow that runs along the eastern boundary	• North of wetland 5; drains northeast towards Dry Branch Creek • In and south of wetland 5; drains southeast towards Runway Borrow Pit Pond • Along Dry Branch Creek north of Dry Branch Pond; drains into Dry Branch Creek and Dry Branch Pond • In wetland 3; drains into Dry Branch Pond	Intermittent	Jurisdictional
Source: McEntire JNGB 2010a.					

The 2009 wetland delineation also included the identification of waters of the United States present at McEntire JNGB. Five stream systems were noted, including two streams that serve as tributaries to the Congaree River (McEntire JNGB 2010a). Cedar Creek is a perennial stream that runs along the western boundary of the installation, while Dry Branch Creek runs along the eastern boundary, and has intermittent flow. The tributaries of Cedar Creek are located in or in proximity to wetlands 6, 8, and 10. One tributary drains from wetland 6 towards Cedar Creek,

while two additional tributaries drain towards Cedar Creek Pond. Waters of the United States identified in 2009 are described in Table 5-4.

In addition to wetlands and streams found at McEntire JNGB, the base contains the following three ponds: Dry Branch Pond, Cypress Pond, and Cedar Creek Pond (Figure 4-3). Dry Branch Pond is the largest of the three ponds, covering approximately 10 acres. Water level varies throughout the year and in dry years. Cypress Pond covers 5 to 7 acres of surface area and is adjacent to North Carolina Road. Cypress Pond is a borrow-pit pond and typically retains water only during wet periods. Cedar Creek Pond is the smallest of the ponds with about 0.5 acre of surface area and is adjacent to an unpaved road 500 ft southeast of the wastewater treatment plant (Figure 4-3).

5.5.2 Floodplains

Floodplains are low-lying areas along creeks and rivers that are prone to flooding during seasonal snow melt and spring rains. The principal concern associated with flooding is potential loss or damage to livestock, crops, and property. The frequency and duration of flooding depends on the natural features of a watershed and regional weather patterns. Floodplain management is a technique designed to avoid property damage by restricting new development in areas subject to flooding.

EO 11988, *Floodplain Management,* issued 24 May 1977, requires all federal agencies to provide leadership and take action to reduce the risk of flood loss; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values of floodplains when acquiring, managing, or disposing of federal lands. EO 11988 is implemented through the CWA and 44 CFR Part 9 *Floodplain Management and Protection of Wetlands*. Floodplains are defined in this EO as "the lowland and relatively flat areas adjoining inland and coastal waters including flood prone areas of offshore islands including, at a minimum, that area subject to a 1 percent or greater chance of flooding in any given year." Flooding in the 100-year floodplain is expected to occur from a flood that has a 1 percent probability of occurring in any given year; therefore, the 100-year floodplain has an annual probability of exceedance of 1 percent.

Flood Insurance Rate Maps (FIRMs) 45079C0420L, 45079C0416L, 45079C0415L, 45079C0405L, and 45079C0410L were used to determine if portions of McEntire JNGB occur within the 100-year floodplain. These FIRMs designate both Dry Branch and Cedar Creek to be in a 100-year floodplain (Federal Emergency Management Agency [FEMA] 2010) (Figure 5-4). Due to the increased likelihood of flooding in these areas, land use activities in the flood-prone areas should be restricted to those that would not suffer extensive damage from flooding. The 100-year flood could conceivably happen in any year, so these areas should be managed accordingly. Any activity within the 100-year floodplain must be conducted consistent with the guidelines and procedures established in EO 11988, *Floodplain Management*. No areas within McEntire JNGB fall within the 500-year floodplain.

5.6 OTHER NATURAL RESOURCE INFORMATION

Currently, no other biological inventories and surveys have been conducted on the installation that provide information applicable to natural resources program management.

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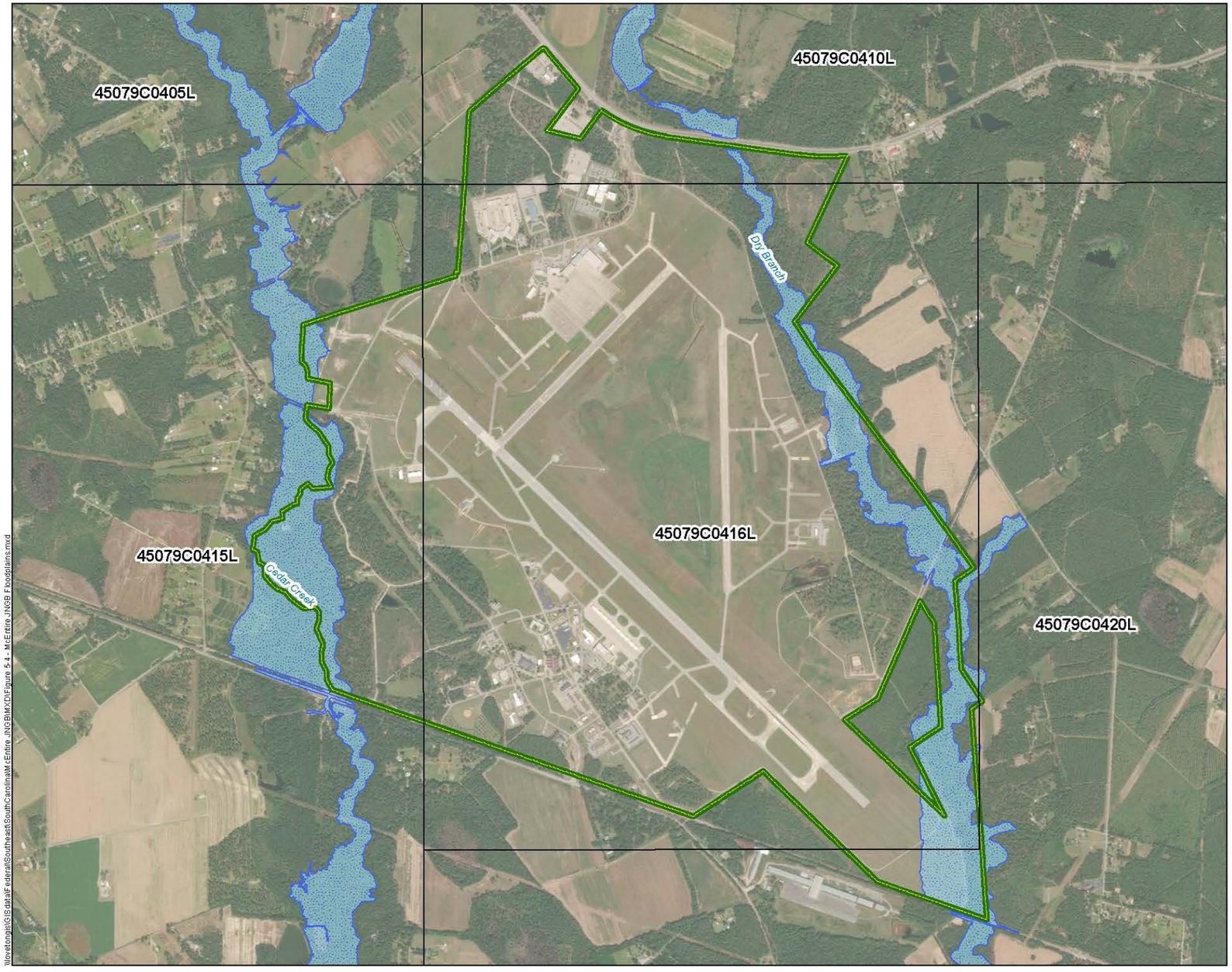

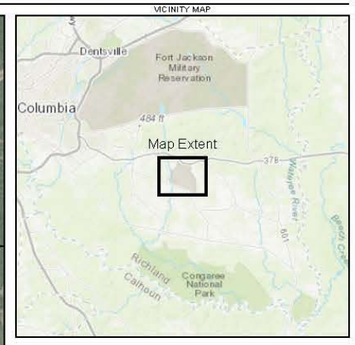

Legend

- Installation Boundary
- FIRM Panel
- 100 yr Floodplain

Map Date: 9/17/2018

Data Sources:
ESRI ArcGIS Map Service, 2016
McEntire JNGB, 2016
FEMA, 2015

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Figure 5-4
Floodplains
McEntire JNGB
Richland County, South Carolina

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6. MISSION IMPACTS ON NATURAL RESOURCES

6.1 NATURAL RESOURCES CONSTRAINTS TO MISSIONS AND MISSION PLANNING

The Sikes Act requires that INRMPs provide for "…no net loss in the capability of military installation lands to support the military mission of the installation" (16 USC §670 et seq.). The INRMP enables the installation to meet the requirements of the military mission within the limitations and legal restrictions of the baseline natural resources at McEntire JNGB.

Environmental constraints, such as wetlands, floodplains, and habitat features attractive to BASH species dictate where and when certain types of activities can occur to ensure regulatory compliance and long-term sustainability of natural resources on the installation. McEntire JNGB will manage environmental constraints during training and mission activities. Natural resources that have the ability to limit activity on the installation are shown in Figure 6-1. Activities in and around wetland areas are limited because impacts such as filling, modifying, draining, or construction may require federal, state, and local permits, and mitigation to offset permitted impacts. Any new training within these areas should be coordinated with the installation's environmental staff to ensure that actions are in compliance with all applicable laws. Construction within the 100-year floodplain should be avoided or minimized to prevent future damage to installation property. Any projects anticipated to significantly impact floodplains must undergo National Environmental Policy Act processes per 32 CFR Part 989 and be approved by NGB/A4AM. Any projects that permanently alter the hydrology of a floodplain must be reported to FEMA. Activities in the vicinity of the forested areas should also be limited to minimize soil compaction and damage to tree roots, and to encourage the growth of the native understory. McEntire JNGB possesses populations of, and habitat features that are attractive to high BASH threat species. This is also a constraint to the installation mission.

6.2 LAND USE

McEntire JNGB composes approximately 2,344 acres. Lands managed by ANG are grouped into three categories: improved, semi-improved, and unimproved grounds. McEntire JNGB contains 425 acres (18 percent) of improved grounds including commercial and industrial areas, 1,173 acres (50 percent) of semi-improved grounds which includes dirt roads, safety zones and the obstacle course, and 746 acres (32 percent) of unimproved land. The unimproved lands contain wetlands, riparian corridors, forested land and three ponds. There are also two pecan groves on the property (South Carolina ANG 2008; McEntire JNGB 2010b). These categories are defined by USAF in the following sections. The acreage of each category of managed lands on McEntire JNGB is provided in Table 6-1.

Table 6-1. Acreage of Grounds Categories on McEntire JNGB

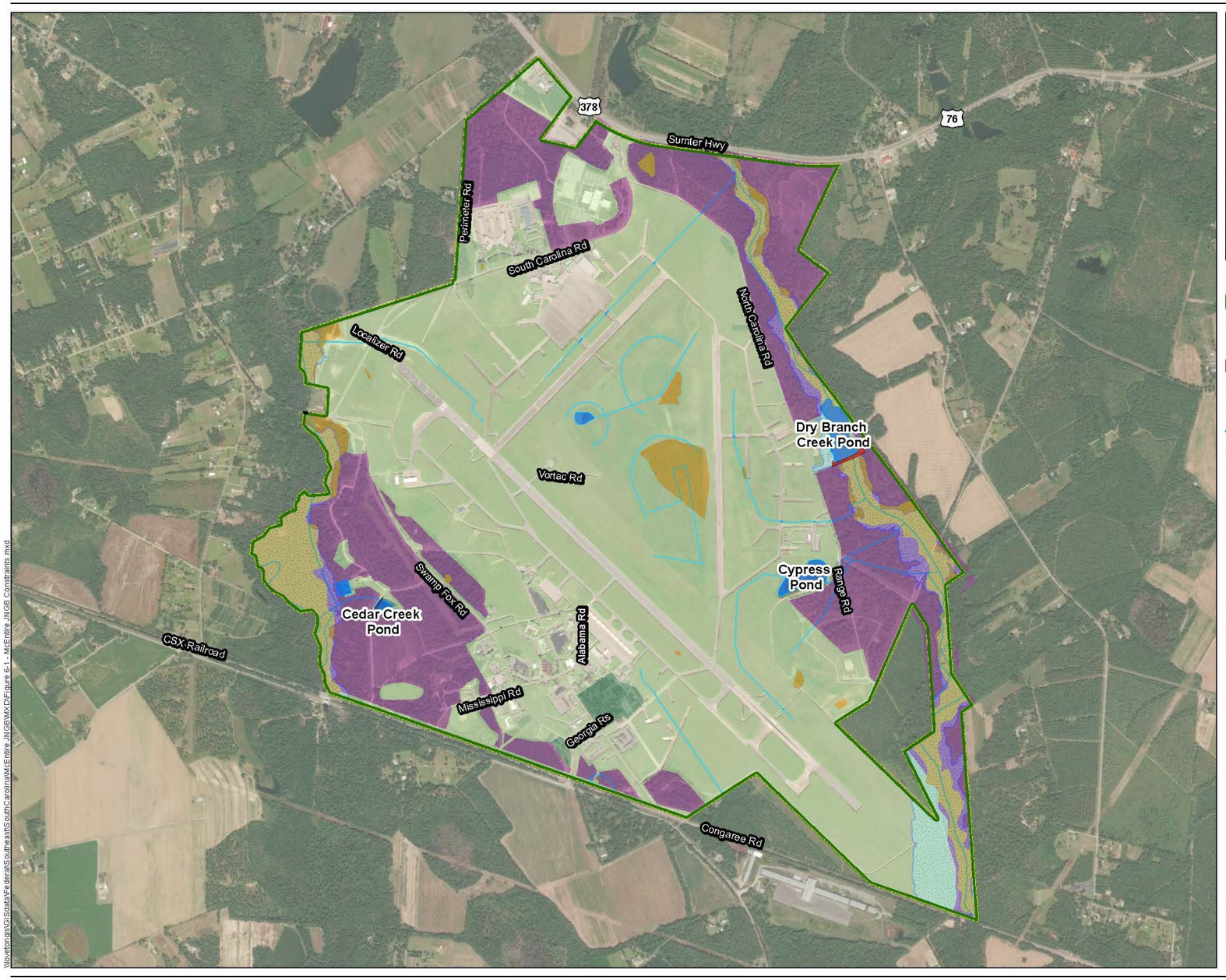
Area	Category	Size (acres)	General Description
McEntire JNGB 2,344 acres	Improved	425	Athletic areas, commercial and industrial areas, administrative areas, all paved surfaces
	Semi-improved	1,173	Dirt roads and low maintenance administrative areas, safety zones, training sites and obstacle course, road sides
	Unimproved	746	Forest management units including Carolina bays, wetlands, and ponds
Source: McKinney 2011.			

Improved grounds are those areas where annual, planned intensive or frequent maintenance activities are performed. These are developed areas that have lawns and landscaped plantings requiring continual maintenance. Improved grounds also include impervious surfaces such as buildings, roads, and parking lots. It also includes areas that have been extensively altered, like an active landfill or a stormwater catchment basin.

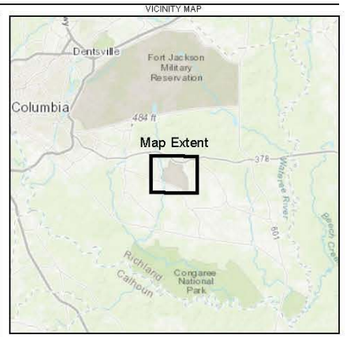
The majority of improved grounds on McEntire JNGB, including most of the buildings on the base that support the ANG mission, are in the cantonment area in the southern portion of the base. These buildings are supported by a complete utility infrastructure that includes electricity, water, gas, and sanitary sewer. Runways shared with South Carolina ARNG are also present in this portion of the base. Other improved areas include the portions used by South Carolina ARNG in the north, the munitions storage facility in the east, and the small arms range in the southeast.

Semi-improved grounds are grounds where periodic maintenance, primarily for operational and aesthetic reasons, is performed (such as erosion and dust control, weed control, bird control, and visual clear zones). These locations are typically serviced by minimal utilities and dirt roads.

Unimproved grounds are those areas not classified as improved or semi-improved and usually not requiring maintenance more than once per year, if maintenance occurs at all. Unimproved areas are typically managed by McEntire JNGB's Natural Resources Manager. Unimproved areas of McEntire JNGB can be found in all habitat types outside of the cantonment area. Most of the unimproved lands on McEntire JNGB are in the outer western and eastern portion of the base within the forest units.



VICINITY MAP



Legend

- Installation Boundary
- 100 yr Floodplain
- Wetland
- Dam

Hydrology

- Surface Water
- NHD FLowline

Vegetation

- Forested
- Grasslands
- Pecan Groves

Map Date: 11/13/2018

Data Sources:
ESRI ArcGIS Map Service, 2016
McEntire JNGB, 2016
FEMA, 2015

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Figure 6-1
Constraints
McEntire JNGB
Richland County, South Carolina

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6.3 CURRENT MAJOR IMPACTS

In accomplishing its mission, McEntire JNGB poses a variety of impacts on the local environment. This section identifies and describes the nature of these impacts.

Hazardous Materials and Hazardous Wastes

Operations associated with the 169 FW that use or generate hazardous materials and wastes include aircraft, vehicle, and aerospace ground equipment maintenance; fire department training; and petroleum, oil, and lubricants management and distribution. Hazardous wastes generated by the base include spent solvents, contaminated fuels, stripping chemicals, paint, oils, and batteries (McEntire JNGB 2008a).

McEntire JNGB is regulated as a small-quantity generator, producing between 100 and 1,000 kilograms of hazardous waste per month. Hazardous waste is temporarily stored at a satellite accumulation point (SAP) or a 180-day accumulation site. Hazardous waste is initially accumulated in containers at the SAPs prior to consolidation at the 180-day accumulation site. Wastes are then transported and disposed of offsite. One 180-day accumulation site is in Building 282 (McEntire JNGB 2008a).

The Environmental Manager oversees that the base complies with all federal, state, and local hazardous waste regulations from generation through disposal. In addition, the base's Oil and Hazardous Materials Spill Prevention and Response Plan specifies procedures for preparing for and responding to discharges of oil or releases of hazardous materials at the base. No impact is expected on hazardous materials and waste handling from the mission activities (McEntire JNGB 2008a).

Water Quality

Water quality changes in the surface drainages could occur during storm events. Increase in sedimentation might occur during construction activities; however, the use of best management practices (BMPs) to minimize loose soils from leaving the site ameliorates any potential impacts that could occur. Hazardous materials are managed according to all applicable regulations and, therefore, should not affect water quality.

Noise

Potential sources of noise impacts at McEntire JNGB include aircraft, firing range activities, highway traffic volume, railroads, and major industrial or production facilities. Although the noise generated from low-altitude military overflights can be initially startling to wildlife, habituation to jet aircraft noise occurs with most wildlife and domestic species. Species-specific responses to low-altitude overflights vary considerably, and responses from individual animals could have the potential to cause injury. Variations in responses also have been documented among homogeneous species under similar environmental conditions. However, animal responses to aircraft noise depend on numerous factors, including the physical features of the environment and the animals' own physiological attributes. Wildlife populations usually are affected only when a variety of factors combine to affect them (e.g., declines or fluctuations in

the availability of a food source, habitat destruction or alteration, predation, hunting, trapping, poaching, disease, or inclement weather) rather than noise alone. Normally, it would be unrealistic to predict or attribute any wildlife population decline to a single stressor, such as noise. In addition, no published scientific evidence was identified that indicated harm might occur to wildlife as a result of exposure to the levels of noise generated by military aircraft using McEntire JNGB.

Air Quality

Primary emissions sources at McEntire JNGB include stationary combustion sources (e.g., boilers, water heaters, furnaces, diesel-fuel generators, hush house with engine testing, and aerospace ground equipment); operational sources (e.g., chemical usage, degreasers, woodworking, abrasive blasting, welding operations, fuel cell maintenance, wastewater treatment, and small arms firing range); fuel storage and transfer (e.g., horizontal tanks, internal floating roof tanks, and fuel transfer losses); and mobile sources (e.g., vehicle operations, aircraft operations, and trim and power checks).

Prescribed burns for the purpose of vegetative debris burning related to forestry, wildlife, and agriculture in the State of South Carolina is coordinated by the South Carolina Forestry Commission (SCFC) under a Memorandum of Understanding (MOU) between the South Carolina Department of Health and Environmental Control Bureau of Air Quality (SCDHEC-BAQ) and the SCFC. The *Wildland Fire Management Plan* in Appendix G includes a copy of the MOU (McEntire JNGB 2010b).

All prescribed burning activities on McEntire JNGB are managed in accordance with the "Smoke Management Guidelines for Vegetative Debris Burning for Forestry, Agriculture, and Wildlife Purposes in the State of South Carolina" administered by the SCFC. Currently, the McEntire JNGB prescribed burn program conforms to the state and federal air quality regulations and it is not anticipated to have a major adverse effect on regional air quality (McEntire JNGB 2010b).

Air quality is measured at McEntire JNGB to ensure compliance with the Federal Clean Air Act requirements for pollutant concentrations as well as state standards. Richland County is currently in attainment for all criteria pollutants.

Integrated Pest Management (IPM)

IPM programs at McEntire JNGB have the potential to affect natural resources. Few pest species require the use of invasive management protocols on the base (McEntire JNGB 2017). Presently, there is use of pesticides, herbicides, rodenticides, and insecticides to control indigenous pest populations. These chemicals are inherently toxic to most biological systems and, as such, often have no natural degradation pathways and can persist for long periods in the environment. The presence of such compounds can degrade the quality of soil, surface water, and groundwater. Wildlife and plant life could be detrimentally affected by any inadvertent contact with pest management chemicals.

The DoD Armed Forces Pest Management Board establishes policy for installation IPM programs, based on IPM principles, including judicious use of pesticides in controlling pests. Pest management policies and procedures are based on the Federal Insecticide, Fungicide, and Rodenticide Act, which are spelled out in AFI 32-1053, *Integrated Pest Management Program*; DoDI 4150.07, *DoD Pest Management Program*; DoDM 4150.07, *DoD Pest Management Training and Certification Program*; and Engineering Technical Letter 10-5, *Self-Help Pest and Vegetation Management Program*. The intent of the DoD Pest Management Program is to establish and maintain safe, effective, and environmentally sound IPM programs to prevent or control pests and disease vectors that might adversely impact readiness or military operations by affecting the health of personnel or damaging structures, material, or property.

IPM uses mechanical, physical, cultural, biological, and educational methods to maintain pests at populations low enough to prevent undesirable damage or annoyance. In addition, application of the least toxic chemical should be used as a last resort.

Typical IPM Plans outline and describe policies, standards, and requirements for the Civil Engineer personnel in performing all operations in connection with the IPM Program on the installation and are consistent with DoDI 4150.07. Control measures for rats and a variety of insect pests that could be detrimental to the health and welfare of base personnel and property are briefly described in the IPM Plan for the base (Appendix E).

6.4 POTENTIAL FUTURE IMPACTS

Construction of new buildings and facilities will continue on McEntire JNGB, in support of its current missions and demands of modernization. The discrete and cumulative impacts on the local environment must continually be evaluated.

6.5 NATURAL RESOURCES NEEDED TO SUPPORT THE MILITARY MISSION

The primary purpose of the natural resources management at McEntire JNGB is to support the military mission by maintaining sustainable natural resources as a critical asset upon which to accomplish the mission of McEntire JNGB. Overall goals of natural resource management include:

- No net loss in the capacity of the installation lands to support existing and future military operations at McEntire JNGB

- Ensure military operations are not interrupted due to non-compliance with applicable laws.

This INRMP integrates the various aspects of natural resources management into the military mission, and is the primary tool for ecosystem management at McEntire JNGB while ensuring the successful, efficient accomplishment of the military mission. A multiple-use approach will be implemented through the INRMP to accommodate the presence of mission-oriented activities and provide for good stewardship, thereby maintaining and improving the quality, aesthetic values, and ecological relationships of the environment. Implementation of this INRMP will promote stewardship practices that protect and enhance natural resources for multiple use and biological integrity, while supporting the military mission. Mission activities at McEntire JNGB

consist primarily of installation operation and maintenance. The mission of McEntire JNGB does not require consumption or use of natural resources on the installation.

7. NATURAL RESOURCES PROGRAM MANAGEMENT

7.1 NATURAL RESOURCES PROGRAM MANAGEMENT

The INRMP Working Group will be responsible for the overall implementation of the INRMP. The INRMP Working Group will be made up of the key base personnel from the 169 FW and will assume an oversight role to ensure the effective implementation of this Plan. The Environmental Manager shall chair this organization and establish subcommittees to focus on high-priority natural resources management issues, such as fireshed maintenance. Top- and mid-level management representation and representation from several individuals with day-to-day on-base field experience will provide the INRMP Working Group with the leadership and structure necessary for the successful implementation of this INRMP.

Wing Commander—169 FW /CC

The Commander of the 169 FW (169 FW/CC) serves as the Chairman of the McEntire JNGB Environmental, Safety, and Occupational Health Council. In this capacity, the 169 FW/CC will ensure the implementation of the INRMP to the fullest extent practicable based on funding and manpower availability. The final approval of the INRMP and any future changes rests with 169 FW/CC.

Base Civil Engineer—169 CES

The 169 FW Civil Engineer (CE) plans, budgets, approves, and oversees all maintenance, environmental, and construction activities performed on the base. All projects or management activities proposed in this Plan should be approved by the base CE to ensure that (1) funding is available, and (2) these projects are complementary to the base comprehensive planning process.

Environmental Management Office—169 MSG/EM

The 169 FW Environmental Management Office (169 MSG/EM) is responsible for ensuring that activities associated with the implementation of this Plan adhere to applicable federal, state, local, and USAF environmental regulations and guidelines. Deviation from the projects proposed in this Plan should be independently reviewed by the 169 MSG/EM.

Natural Resources Manager

The McEntire JNGB Natural Resources Manager, in conjunction with the Public Affairs Office (169 FW/PA), is responsible for establishing and implementing a conservation education program to instruct base personnel on the protection and enhancement of biological diversity on McEntire JNGB. The McEntire JNGB Natural Resources Manager directs most of the ongoing natural resources management activities presented in this Plan. However, several management activities (e.g., BASH) fall under the responsibilities listed for other base organizations. The McEntire JNGB Natural Resources Manager will act as a technical point-of-contact for those natural resources-related activities for which the Natural Resources Manager is not directly responsible.

Wing Safety Officer—169 FW/SE

The Wing Safety Officer (169 FW/SE) is responsible for implementing activities presented in this Plan that pertain to the BASH Reduction Program. In addition, the 169 FW/SE is responsible for obtaining necessary bird/wildlife deterrent equipment (e.g., bird spikes, pyrotechnics), and ensuring that McEntire JNGB personnel are trained in their proper use. The 169 FW/SE will obtain the required depredation permits and report to the USFWS or SCDNR in the event of an incidental take of a listed species occupying the airfield. The SCO is also responsible for approving any base improvement or construction projects. In addition, the 169 FW/SE ensures that the Bird Hazard Working Group conducts meetings to evaluate and refine strategies for the reduction of the BASH threat on the base.

Legal—169 FW/JA

The legal office (169 FW/JA) is responsible for ensuring that the implementation of the management objectives contained within this INRMP meet all of the South Carolina ANG's and the 169 FW's regulatory and statutory requirements that pertain to natural resources management. The legal office will review any future natural resources management proposals and alert the 169 FW/CC, 169 MSG/EM, Natural Resources Manager, and 169 FW/SE should there be any regulatory conflicts or shortfalls. In addition, the legal office will keep the 169 FW/CC, 169 MSG/EM, Natural Resources Manager, and 169 FW/SE informed of any new statutes or regulations that might affect natural resources management on the base.

Public Affairs—169 FW/PA

The Public Affairs office is responsible for the coordination of access for public events at the base. Public Facilities/Recreation land use is oriented to providing recreational opportunities to assigned base personnel, members of reserve components and their families, active and retired military, and civil service personnel. The military mission and the limited amount of resources on the base preclude open public recreational use of McEntire JNGB. However, there are several opportunities for certain groups (e.g., Boy Scouts, birding groups) to use McEntire JNGB. The 169 FW/PA serves as the point-of-contact to interface between the Base Commander and civilian groups interested in using McEntire JNGB for environmental, educational, or other purposes.

Facility Management—169 CES/CEO

The McEntire JNGB Facility Manager (169 CES/CEO) is responsible for all grounds maintenance activities on the base. In addition, this office will ensure that the habitat management protocols established in this Plan for the conservation of biodiversity on McEntire JNGB are followed. The 169 CES/CEO will also periodically review the types and condition of grounds maintenance equipment to determine if new or additional equipment is needed for the proper maintenance of the base's landscapes.

Other Organizations—U.S. Fish and Wildlife Service and South Carolina Department of Natural Resources

The USFWS and SCDNR may provide technical assistance to McEntire JNGB. Specifically, these agencies will alert the McEntire JNGB Natural Resources Manager whenever new species that have the potential for inhabiting the base are added to the federal or state endangered species lists. In addition, these agencies should support McEntire JNGB personnel during scheduled wildlife and vegetation surveys. These agencies are signatories on this INRMP.

Other Organizations—U.S. Department of Agriculture – Wildlife Services (USDA-WS)

While under contract with McEntire JNGB, the U.S. Department of Agriculture – Wildlife Services (USDA-WS) is responsible for monitoring nuisance wildlife that have the potential to create a wildlife aircraft strike hazard. USDA-WS personnel support activities that pertain to the base BASH Reduction Program. USDA-WS personnel are also responsible for coordinating their activities with the 169 MSG/EM, 169 FW/SE, and 169 FW/Operational Support Airlift.

7.2 FISH AND WILDLIFE MANAGEMENT

The day-to-day management of fish and wildlife resources and enforcement of applicable laws and policies at McEntire JNGB are the responsibility of the Natural Resources Manager.

Current wildlife and habitat management at the base seeks to (1) attempt to deter animals from foraging or roosting in areas near or adjacent to the flightline and other mission critical areas, (2) attract wildlife to portions of the base away from these areas, (3) protect and conserve regional biodiversity through conservation of habitat corridors across the base, and (4) reduce impacts on the habitat created by over abundant wildlife populations. This approach has been chosen due to the relative abundance and variety of wildlife species present on McEntire JNGB, and the low likelihood of excluding all wildlife species from the base that pose a significant threat to the safety of the flying mission. While the first three objectives are addressed through appropriate habitat management, the fourth is a wildlife management goal.

Nuisance species (e.g., deer, coyote, small mammals, and birds) are managed due to BASH issues. Management is completed in a manner consistent with the recommendations of the 2017 BASH plan (McEntire JNGB 2017) to the best extent practicable while maintaining regional ecosystem integrity and function. The BASH Plan provides specific recommendations to reduce BASH potentials.

7.3 OUTDOOR RECREATION AND PUBLIC ACCESS TO NATURAL RESOURCES

Limited outdoor recreation opportunities exist at McEntire JNGB because of its size, the fact that it has no on-base housing for personnel, and access restrictions. People and social uses/needs are an integral part of ecosystem management. The outdoor recreation program is based on providing quality experiences while sustaining ecosystem integrity. McEntire JNGB has a hunting program for deer, rabbit, turkey, dove, and waterfowl. A base permit and a South Carolina hunting license are required. There are currently no fees collected from the hunters.

Hunting is open to Active Duty and National Guard Military Personnel, Civil Service and State personnel at McEntire JNGB, Retired Military Personal, and guests of authorized members. The hunting program is carried out in strict accordance with SCDNR rules and regulations. The Draft 169 FW Instruction 32-101 (*Outdoor Recreation Rules and Regulations*) provides additional details and the rules and regulations for this program (McEntire JNGB 2010d).

Activities that have a direct effect on species populations such as game harvest, or soil erosion from hiking trails, will be monitored to determine effects, and adaptive management (e.g., water bars on trails) incorporated to mitigate negative impacts. Special consideration will be given to protecting critical areas from negative impacts due to outdoor recreation or ecosystem management activities. From these general outdoor recreation management philosophies, a series of goals and objectives have been developed that have been used to identify management issues and actions to address them.

Fishing is allowed in the two ponds with a base permit and a South Carolina fresh water fishing license. See the SCDNR Fishing and Hunting Rules and Regulations brochure for exceptions to the license requirement (http://www.dnr.sc.gov/regulations.html). Fishing is open to Active Duty and National Guard Military Personnel, Civil Service and State personnel at McEntire JNGB, Retired Military Personal, and guests of authorized members. The perimeter pond has previously been stocked with bream, bass, and catfish. The Draft 169 FW Instruction 32-101 (*Outdoor Recreation Rules and Regulations*) provides additional details and the rules and regulations for this program (McEntire JNGB 2010d).

Activities that have a direct effect on species populations such as game harvest from these hunting and fishing programs are monitored to determine effects, and adaptive management (e.g., water bars on trails) is incorporated to mitigate negative impacts. Special consideration is given to protecting critical areas from negative impacts due to outdoor recreation or ecosystem management activities.

The pecan orchards located at McEntire JNGB are randomly harvested by base personnel as part of the morale and welfare program.

7.4 CONSERVATION LAW ENFORCEMENT

DoDI 5525.17, *Conservation Law Enforcement Program*, states that a Conservation Law Enforcement Program ensures that installations remain in compliance with appropriate environmental, natural, and cultural resource laws and regulations (Section 1(b)). Currently, no conservation law enforcement program exists at McEntire JNGB, and there are no conservation law enforcement officers on the base. Currently, hunters on the base sign in and out as they enter and exit the installation.

7.5 MANAGEMENT OF THREATENED AND ENDANGERED SPECIES AND HABITATS

No federally or state listed threatened, endangered, or candidate species have been documented on McEntire JNGB. Transient listed species, such as the wood stork (*Mycteria americana*), may occur at McEntire JNGB.

7.6 PROTECTION OF WETLANDS AND WATERS OF THE UNITED STATES

Water resource protection is important to natural resources management because it directly affects surface water quality and the value of aquatic habitats. McEntire JNGB currently protects its watershed and water resources through compliance with a number of federal, state, local, and USAF environmental regulations that require the base to have detailed spill control and response procedures and to implement stormwater pollution prevention BMPs. The objective of these regulations is to prevent pollutants (e.g., fuels, solvents, sediments) from entering the watershed, thus protecting surface waters. Specific watershed protection measures used by the base include spill cleanup equipment at industrial locations, integrated pest management, and reduction of fertilizer applications.

Storm events can result in erosion in some areas of the base where high flows occur, and the deposition of sediment into waterbodies is a current concern on the base. Water quality monitoring at the base includes ensuring that non-point sources are not affecting waterbodies on the installation. Water quality measurements are currently taken by the Environmental department at McEntire JNGB.

Previous soil erosion problems along Arizona Road, South Carolina Road, and in areas northeast and northwest of Runway 14-32 have been addressed in recent years. Travelable water bars were installed in potential soil erosion areas along roads. Areas northeast and northwest of the runway were armored with interlocking blocks.

A total of 149.88 acres of wetlands were identified on the installation in 2007. Of the wetlands delineated, ten were identified as fully functional, and one was characterized as slightly impaired at the time of the delineation. Wetlands on the base have surrounding vegetative buffers that follow the contours of the land.

Currently, McEntire JNGB natural resource staff seek to minimize the impact that the McEntire JNGB missions have on wetlands and floodplains, and to enhance healthy, functional wetlands that can sustain minor operational influences outside indirect infringement of wetlands. Management of wetlands and floodplains on the base attempts to maximize wetland values within the ecosystem and to society (e.g., floodwater retention, water quality protection) and to maximize floral diversity of wetland communities, which, in turn, maximizes the faunal diversity of the ecosystem.

7.7 GROUNDS MAINTENANCE

Base grounds-maintenance personnel currently perform most grounds maintenance activities at McEntire JNGB. Grounds-maintenance activities performed at McEntire JNGB consist of road maintenance, firebreak maintenance, and mowing of the open/airfield areas. Grounds maintenance helps to maintain and improve the aesthetic appearance of lands at McEntire JNGB, and can contribute to ecosystem health and overall biodiversity of the installation.

Mowed areas in proximity to aircraft movement or the airfield that may present a BASH concern are maintained in accordance with the BASH plan. Grounds management related to firebreaks

and other activities associated with wildfires and prescribed burns are managed under the Wildland Fire Management Plan. Grounds-maintenance activities related to the management of nuisance or pest species are completed in accordance with the Invasive and Nonnative Species Survey and Management Plan for McEntire JNGB.

7.8 FOREST MANAGEMENT

Forested habitats on McEntire JNGB have been designated into Forest Area Units (FAUs), and a forest inventory was completed on the installation in 2011. FAUs are discussed in Section 5.2.2 and are described in Table 5-1. Figure 5-2 provides an overview of FAUs at McEntire JNGB. The base has 270 acres of predominantly pine, with some mixed pine hardwood, and hardwood bottom stands.

Pine Forest on McEntire JNGB

As part of a Forest Habitat Management Plan developed in 2010, FAUs are managed in order to enhance species diversity and promote timber production. Management actions undertaken or that are currently needed include reducing understory species, thinning of stands, prescribed burns, control of invasive species, and replanting of stands where pine species are dying off. In some FAUs, stands of loblolly pine (*Pinus taeda*) have been converted to longleaf pine (*Pinus palustris*). These actions help to protect resources and prevent the loss of timber revenue.

7.9 WILDLAND FIRE MANAGEMENT

A Wildland Fire Management Plan was prepared for McEntire JNGB in 2010. The use of prescribed fire at McEntire JNGB is an important tool for maintaining a sustainable landscape capable of supporting the military mission while contributing to regional biodiversity and ecosystem function. Prescribed burns are used to control understory growth in timber units to minimize cover for BASH species, control nonnative and invasive plant species, and promote timber production. Prescribed burns also help to reduce the buildup of dangerous fuel loads on the base. The Wildland Fire Management Plan establishes personal safety as the first priority, while effectively managing the natural resources on the base. Prescribed burns are conducted in coordination with SCFC and SCDHEC-BAQ, and in accordance with applicable state and federal regulations.

Pine Forest on McEntire JNGB following a prescribed burn

The McEntire JNGB Fire Department responds to all wildfires on the installation, including those that threaten aircraft or the resources that support them. The chief of the Fire Emergency Services at McEntire JNGB is also responsible for determining Fire Danger Ratings and Restrictions, and the review and approval of prescribed burn plans.

7.10 AGRICULTURAL OUTLEASING

The Agricultural Outleasing Program element does not apply to McEntire JNGB, as no agricultural outleases are present on the base.

7.11 INTEGRATED PEST MANAGEMENT PROGRAM

Per AFI 32-1053, *Integrated Pest Management Program*, a "pest" is defined as arthropods, birds, rodents, nematodes, fungi, bacteria, viruses, algae, snails, marine borers, snakes, weeds, or other organisms (except for human or animal disease-causing organisms) that adversely affect readiness, military operations, or the well-being of personnel and animals; attack or damage real property, supplies, equipment, or vegetation; or are otherwise undesirable.

IPM objectives at McEntire JNGB include the protection of real estate, control of potential disease vectors or animals of other medical importance, control of undesirable or nuisance plants and animals (including insects), and prevention of damage to natural resources. In addition, the potential presence of several zoonotics (e.g., Lyme disease and encephalitis) on the base, and the potential threat to human health and safety (e.g., transmission of disease) cannot be underestimated.

European starling
Photo credit: Carolina Bird Club

The Invasive and Nonnative Species Survey and Management Plan for McEntire JNGB was prepared in 2005. This plan has been integrated with the Integrated Pest Management Plan in 2017 (Appendix E). The Plan ensures that the installation is in compliance with applicable federal and state regulations governing pest management. Pest and weed management activities at McEntire JNGB are managed through the installation's IPM Plan. Examples of IPM activities on the installation include mechanical and physical control such and mowing and burning, biological controls, and chemical control with herbicides and pesticides.

The 21 invasive plant species found at McEntire JNGB are presented in Table 5-2. Four invasive nonnative animal species including the imported red fire ant, European starling, house sparrow, and house mice have been recorded on the installation. Nuisance species also include feral cats, feral dogs, coyotes, white-tailed deer, Canada geese, and a variety of insect pests such as mosquitoes, biting flies, and termites. IPM strategies have been developed for each invasive and nuisance species.

7.12 BIRD/WILDLIFE AIRCRAFT STRIKE HAZARD

McEntire JNGB actively implements a BASH Reduction Plan, thereby reducing the potential for a bird strike to occur on the airfield. Birds can be encountered up to altitudes of 30,000 ft and higher; however, most birds fly close to ground level, and more than 95 percent of all reported incidents in which a USAF aircraft has struck a bird have been below 3,000 ft above ground level. Approximately half of these bird strikes occur in the airfield environment, and approximately one-quarter occur during low-altitude training. Strike rates rise significantly as altitude decreases, which is partly due to the greater number of low-altitude missions, but mostly because birds are commonly active close to the ground. Any gain in altitude represents a substantially reduced threat of a bird strike.

McEntire JNGB currently has a BASH Plan which is managed by 169 FW Safety Office personnel (Appendix F). The purpose of the BASH Plan is to provide an active program to

minimize bird and other wildlife strikes to aircraft. The plan is based on hazards from both resident and seasonal bird species as well as other species of wildlife. Daily and seasonal bird movements create various hazardous conditions. The plan establishes procedures to minimize the hazard to the ANG and the deployed aircraft at the installation and in their operating areas.

The plan is designed to implement the following specific operations:

- Establish a BHWG and designate responsibilities to its members.
- Establish procedures to identify high hazard situations and to aid supervisors and aircrews in altering or discontinuing flying operations when required.
- Establish aircraft and airfield operating procedures to avoid high-hazard situations.
- Provide for disseminating information to all assigned and transient aircrews on bird hazards and procedures for bird avoidance.
- Establish guidelines to decrease airfield attractiveness to birds.
- Provide guidelines for dispersing birds when they are present on the airfield.
- Provide guidelines for avoiding birds in operating areas away from the airfield.
- Identify organizations/Office of Primary Responsibility with authority to upgrade, initiate, or downgrade Bird Watch Conditions.
- Provide guidelines to maintain the working relationship between all host and tenant organizations on the installation.

At the McEntire JNGB airfield there is an average of two to five bird strikes per year that occur within an area of the airfield and/or occur within low-level routes or ranges in unknown areas. Strikes in recent years have resulted in over $200,000 in damages. Strikes on the base involved turkey vultures (*Cathartes aura*), red-tailed hawks (*Buteo jamaicensis*), chimney swifts (*Chaetura pelagica*), mourning doves (*Zenaida macroura*), killdeer (*Charadrius vociferous*), rock pigeons (*Columba livia*), yellow-rumped warblers (*Setophaga coronata*), Savannah sparrows (*Passerculus sandwichensis*), and other small songbirds. Two unidentified species of bats have also been struck (McEntire JNGB 2008b). Appendix F includes a list of the most hazardous birds identified in the vicinity of McEntire JNGB.

Airfield habitat management, bird control, removal of other wildlife, bird dispersal activities, and proper communications with the control tower have all occurred in the past and have served to significantly reduce the hazards at the airfield. The base civil engineering staff conducts habitat management on the airfield. Most of the bird dispersal and control efforts have been conducted by base operations staff and may be supplemented by other ANG personnel as needed. Pyrotechnics were the most common dispersal techniques used and are now supplemented with the "scare wars" remotely operated gas cannon system.

Habitats surrounding the airfields are maintained to be less attractive to wildlife. Maintenance activities include managing grass height, controlling weeds, planting bare areas, fertilizing to stimulate grass growth, promoting good drainage and removing standing water, controlling pests, and removing dead vegetation and dead animals. In addition, deterrents to wildlife use of the airfield include fencing, elimination of roost sites, bird-proofing measures, dispersal techniques, and trapping to prevent animal hazards to aircraft. The airfield is managed to make it as unattractive as possible so birds will avoid it and use alternatives available in the surrounding area.

7.13 COASTAL ZONE AND MARINE RESOURCES MANAGEMENT

There is no coastal or marine habitat at McEntire JNGB; as such, this program element does not apply to the base.

7.14 CULTURAL RESOURCES PROTECTION

McEntire JNGB currently has an ICRMP prepared in 2011 (Component Plan A). Several cultural resource surveys have been completed at the installation. In 1998, the central portion of the base was surveyed as part of an Architectural/Historical Assessment. A second cultural resources survey, conducted in 2003, focused on the outer portions of the base which were not included in the prior survey (McEntire ANGS 2004). A third archaeological survey was conducted in 2005 (McEntire ANGS 2005b) and focused on more intensive inspection of previously identified sites in addition to survey of previously unexamined areas. Combined results of the 1998, 2003, and 2005 archaeological surveys reveal four sites considered eligible for the National Register of Historic Places, and four potentially eligible sites on McEntire JNGB (McEntire ANGS 2004).

Cultural resources present on McEntire JNGB are addressed fully in the ICRMP, and management, goals, and objectives are addressed by the ANG Cultural Resources Management Program.

7.15 PUBLIC OUTREACH

Opportunities for public outreach are coordinated between the base Public Affairs Officer and the natural resource manager to maintain the natural resources public relations program. Opportunities for the public to participate in activities on the installation are minimal due to the mission-related activities at the base. McEntire JNGB is currently building an Environmental Education Center which will be open to the public in the future (school groups, Boy Scout groups, etc.). Base tours are also offered to local organizations, schools, and youth groups middle-school age and older to educate people about the South Carolina ANG and McEntire JNGB missions. Tours need to be scheduled in advance and are given two times per month.

7.16 GEOGRAPHIC INFORMATION SYSTEM

McEntire JNGB currently uses AutoCAD (Auto Computer Aided Drafting system) and geographic information system (GIS) for all of its spatial data storage and manipulation. The base began using GIS in 2008/2009. The base has updated the Common Installation Picture

(CIP) with the basic base infrastructure, but not with natural resources data. Once the natural resources GIS data are incorporated into the GIS application, this system will provide the opportunity for base personnel to accurately and completely analyze the potential effects of all future projects and activities. Managers can apply the capabilities of a GIS to watershed, wetlands, timber, and various other natural resources management applications. The DoD/USAF standardized requirement for GIS follows specific guidance as detailed in the ANG Engineering Technical Letter 13-11, *Geographic Information Systems Data Format Specifications*. This document specifies how electronic data are delivered to ANG. In addition, *ANG Specifications for Spatial Data Standards for Facilities, Infrastructure and Environment (SDSFIE) 3.0 Environmental Restoration Layers* further defines the specific data that will be collected for projects and how it should be configured and submitted. A copy of the SDSFIE guidelines may be obtained by visiting the SDSFIE website at http://www.sdsfieonline.org.

8. MANAGEMENT GOALS AND OBJECTIVES

Specific management objectives and strategies have been identified in a number of subject areas that affect the natural resources present on and immediately adjacent to McEntire JNGB. This chapter lists the goals and objectives for natural resources on the installation over the next 5 years. Each goal is supported by one or more objectives. An objective indicates a management initiative or strategy that will be used to achieve the stated goal. Projects or tasks are the individual component actions required to achieve an objective. Project statements describe the specific methods and procedures that will be used to achieve the objective supported.

Management objectives established in this INRMP were initially developed during a thorough evaluation of the natural resources present on McEntire JNGB. In accordance with AFI 32-7064 and the principles of adaptive ecosystem management, subject areas were identified and management alternatives developed by an interdisciplinary team of ecologists, biologists, geologists, planners, and environmental scientists. The revision of this INRMP involved a complete review of the original subject areas and management alternatives accomplished during the 5 years since the 2011 INRMP revision. This revised section presents the preferred management alternatives based on the professional opinions of the McEntire JNGB Natural Resources Manager, USFWS, SCDNR, and the McEntire JNGB Task Force. Through these evaluations, the original natural resources planning and management goals have been reevaluated to ensure they represent the most current theories on adaptive ecosystem-based planning. Selection of these management goals has been tempered with the fact that the operational mission at McEntire JNGB takes primacy over natural resources management. Consequently, the implementation of some of these management goals may sacrifice improvement of the base's natural resources in deference to the safety and efficiency of the flying and support missions. However, through the multiple-use adaptive paradigms used, sound ecological management on the installation should supplement the operational effectiveness and safety of the military missions. Ecosystem management provides a means for the USAF to conserve biodiversity and to provide high-quality military readiness. The INRMP is a mechanism through which McEntire JNGB can maintain sustainable land use through ecosystem management.

The specific "management issues" identified in the 2011 INRMP have been reviewed and updated in this revision. These management issues relate to a number of subject areas that affect the natural resources present on and immediately adjacent to McEntire JNGB. The purpose of this section is to identify actions and objectives for McEntire JNGB to obtain workable and useful solutions for each management issue identified. This chapter is divided into 17 sections, one for each of the natural resource subject areas. For simplicity and clarity within this INRMP, each natural resource subject area is assigned an individual "issue number." Each subject area has been abbreviated, as shown in Table 8-1. For example, the first management objective in Section 8.1, Natural Resources Program Management, is identified as NRP-1. In addition, a series of projects/tasks are presented following the goal and objective for each subject area. The projects/tasks are consecutively numbered for each management objective. A summary of the management objectives is provided in Chapter 10, Annual Work Plans.

Some of the projects described in this section will be accomplished through interactive partnerships with federal, state, and local organizations. McEntire JNGB natural resources

management staff will initiate partnerships based on the benefits to the regional ecosystem and the local environment. Required projects, which are part of the continued management of McEntire JNGB, will be funded through the ANG when fiscally feasible.

Table 8-1. Integrated Natural Resources Management Plan Subject Area Abbreviations

Section	INRMP Subject Area	Abbreviation
8.1	Natural Resources Program Management	NRP
8.2	Fish and Wildlife Management	FWM
8.3	Outdoor Recreation and Public Access to Natural Resources	OR
8.4	Conservation Law Enforcement	CLE
8.5	Management of Threatened and Endangered Species and Habitats	TE
8.6	Protection of Wetlands and Waters of the United States	WP
8.7	Grounds Maintenance	GM
8.8	Forest Management	FM
8.9	Wildland Fire Management	WFM
8.10	Agricultural Outleasing	AG
8.11	Integrated Pest Management and Program	IPM
8.12	Bird/Wildlife Aircraft Strike Hazard	BH
8.13	Coastal Zone and Marine Resources Management	CZ
8.14	Cultural Resources Protection	CRP
8.15	Public Outreach	PO
8.16	Geographic Information System	GIS

8.1 NATURAL RESOURCES PROGRAM MANAGEMENT

Operation and management of McEntire JNGB is conducted by installation personnel, departments, and stakeholders. Management teams provide support within their areas of expertise to ensure that operation of the installation is implemented successfully. It is necessary that management approaches are consistent between operational units and with the natural resources management goals and objectives developed in the INRMP. Coordination with installation operators and consistency of natural resources management goals and objectives developed in the INRMP with other installation operational plans and documents will ensure that natural resources management can be implemented successfully in a manner consistent with the missions of the installations.

A crucial function of this INRMP is to utilize an ecosystems approach for the management of resources found at McEntire JNGB. An ecosystems approach focuses on using an ecosystems model, in which all appropriate factors are accounted for by their function within the model. Natural resources management is emphasized in this INRMP because it is recognized that the mission of the ANG is inextricably linked to local, regional, and global ecological integrity. Protecting the ecological integrity of the installation aids in improving the natural resources of the area, including biodiversity and ecosystem health. Such practices also ensure that projects are completed with the foundations of sustainable use in mind. Another benefit of conserving the ecological integrity of ANG sites is that it can reduce management costs for natural resources over time. Native natural communities are best suited to localized areas, and are crucial to maintaining a functional and adaptable ecosystem, which decreases management needs.

Although the ecosystem at McEntire JNGB has already largely been altered by human activity, it is a priority to manage the remaining natural areas and resources under the principles of ecosystem management. While ecosystem management principles largely consider the complex interaction of natural factors, ecosystem-based management also must consider human needs and uses of an area when establishing suitable ecological management actions.

The natural resource management topics of concern and associated goals and objectives for McEntire JNGB are listed below. These goals focus on conserving and enhancing biodiversity by managing the ecosystem rather than focusing on a single biotic or abiotic component of the ecosystem. Ecosystem management encompasses both the function and the structure of the ecosystem and the processes that link them.

NRP GOAL 1: COMMUNICATION OF ECOSYSTEM MANAGEMENT PHILOSOPHY TO MCENTIRE JNGB PERSONNEL AND VISITING UNITS

- **NRP OBJECTIVE 1.1:** Promote discussion with base Command, personnel, and pertinent stakeholders to define, refine, and monitor the ecosystem management vision for the base. This should include training and education of installation personnel in applying an ecosystem-management approach to natural resources management decisions and actions on McEntire JNGB. Discussion and training is needed because McEntire JNGB personnel are unaware and currently lack the appropriate guidance on applying an ecosystem-management approach to natural resource management.

  — **PROJECT 1.1.1:** Maintain the educational materials that describe ecosystem management, natural resources, and operational policies for use in training installation personnel and visiting units.

NRP GOAL 2: UPDATE THE INRMP WHEN ENVIRONMENTAL OR MISSION CONDITIONS CHANGE AS REQUIRED BY THE SIKES ACT (16 USC 670A) AND DODI 4715.03.

- **NRP OBJECTIVE 2.1:** Coordinate with installation organizations to ensure there is an understanding of management goals and actions developed in the INRMP and to ensure that management actions developed in the INRMP are consistent with current management instructions and plans. Coordination with installation operational and management organizations and stakeholders is necessary to ensure that the goals and objectives of management actions developed in this INRMP are understood and consistent with current ongoing management on the installation. INRMP tasks need to be compatible with management and actions prescribed in other installation plans and documents.

  — **PROJECT 2.1.1:** Coordinate an internal annual meeting with installation stakeholder workgroup regarding natural resources management on the installation. The annual meetings are to focus on the progress in reaching INRMP goals and objectives and to discuss potential operational changes that could impact those goals and objectives. Upon completion of the meeting, the outcome is to be documented to the Installation Commander.

— **PROJECT 2.1.2:** On an annual basis, prepare the budget to implement the next fiscal year's actions.

- **NRP OBJECTIVE 2.2:** Conduct external stakeholders meeting annually and every 5 years with, at a minimum, the USFWS and SCDNR. At the meeting, discuss actions and projects that were conducted during the previous year and discuss actions and projects that will be the focus in the coming year.

  — **PROJECT 2.2.1:** Conduct internal annual meetings with installation stakeholders.

  — **PROJECT 2.2.2:** Conduct external annual review meetings with the USFWS and SCDNR.

  — **PROJECT 2.2.3:** Conduct internal and external review meetings every 5 years to determine if revisions are needed to the INRMP and to obtain installation, USFWS, and SCDNR signatures.

  — **PROJECT 2.2.4:** Incorporate the current INRMP into the Installation Development Plan, Installation Complex Encroachment Management Action Plan, and Master Plan for McEntire JNGB.

8.2 FISH AND WILDLIFE MANAGEMENT

Wildlife management is defined as manipulation of the environment and wildlife populations to produce desired objectives. Management can be performed in a manner that enhances biodiversity through the conservation or reestablishment of native habitats. In some cases, habitat management might be required to decrease the abundance of certain wildlife species to reduce animal damage or bird strike hazards. Traditionally, wildlife management was confined to large tracts of naturally vegetated land. The base's limited size necessitates implementation of wildlife management options that do not increase the potential for wildlife-mission conflicts but still conserve regional biodiversity.

Wildlife population and habitat management on McEntire JNGB will (1) attempt to deter animals from foraging or roosting in areas near or adjacent to the flightline and other mission critical areas, (2) attract wildlife to portions of the base away from these areas, (3) protect and conserve regional biodiversity through conservation of habitat corridors across the base, and (4) reduce impacts on the habitat created by over abundant wildlife populations. This approach has been chosen due to the relative abundance and variety of wildlife species present on McEntire JNGB, and the low likelihood of excluding all wildlife species from the base that pose a significant threat to the safety of the flying mission.

FWM GOAL 1: MAINTAIN FISH AND WILDLIFE POPULATIONS WHILE MINIMIZING POTENTIAL IMPACTS TO THE MILITARY MISSION

- **FWM OBJECTIVE 1.1:** Conduct reconnaissance level flora and fauna surveys at McEntire JNGB to reassess avian (including migratory birds), mammalian, herpetofauna, and insect species and populations.

— **PROJECT 1.1.1:** Conduct initial planning level surveys for plants and animals.

— **PROJECT 1.1.2:** Incorporate biological survey data into the INRMP as they are collected. Survey data can be incorporated into the applicable section of Chapter 5, *Ecosystems and the Biotic Environment*.

— **PROJECT 1.1.3:** Flora and fauna surveys should be completed every 3 to 5 years to determine if new species are present on the installation.

- **FWM OBJECTIVE 1.2:** Develop a cohesive plan for management of fish and wildlife species at McEntire JNGB. The plan should focus on conserving regional biodiversity, protecting habitats from wildlife impacts, and supporting efficient conduct of the flying mission.

  — **PROJECT 1.2.1:** Develop a Fish and Wildlife Management Plan as a component plan to this INRMP to include the following:

    – Adaptive management strategies that protect and enhance native habitats on the base and that are identified as key components of the regional ecosystem. These strategies should include habitat evaluation and monitoring methods and schedules to ensure protection and enhancement.

    – Detailed survey protocols and timelines for their completion to ensure that base personnel maintain the most current data available concerning the resources they are managing.

    – Management strategies outlined in the 2009 *Fish, Amphibian, and Reptile Survey Report and Management Plan*.

    – A hunting plan for game species, such as white-tailed deer, that formalizes species-specific hunting protocols and sets population limits which would trigger more effective herd reduction mechanisms (e.g. Wildlife Services herd-reductions).

  — **PROJECT 1.2.2:** Implement the Fish and Wildlife Management Plan.

  — **PROJECT 1.2.3:** Annually evaluate response of fish and wildlife to management actions and update plan/actions as needed.

- **FWM OBJECTIVE 1.3:** Investigate the possibility of developing a buffer along streams/wetlands in an effort to create upland habitat to allow for riparian herpetofauna to forage, nest, aestivate, and hibernate. Investigate mowing activities that benefit flower and plant growth.

  — **PROJECT 1.3.1:** Identify upland habitat boundaries adjacent to wetlands/streams to determine if an upland buffer is feasible while ensuring the mission is not affected.

Where feasible, maintain edge habitats that buffer the effects of one habitat as it merges into the next.

FWM GOAL 2: SUPPORT SOUTH CAROLINA STATE WILDLIFE ACTION PLAN (SC SWAP)

- **FWM OBJECTIVE 2.1:** Support the goals and objectives of the SC SWAP and identify possible areas where the installation could support wildlife conservation projects of mutual interest. DoD and ANG encourage support of SWAPs as part of a comprehensive natural resources program. The base should support the goals and actions of South Carolina's CWCS and SC SWAP by implementing actions in the INRMP that correspond to the goals of the SWAP. The current plan (2015) can be viewed at: http://dnr.sc.gov/swap/index.html.

  — **PROJECT 2.1.1:** During the reconnaissance level flora and fauna survey (Project 1.1.1), search for species included in the SC SWAP. Share data with SWAP coordinator.

  — **PROJECT 2.1.2:** Update Appendix I of the INRMP (Wildlife Species Documented or Potentially Occurring at McEntire JNGB and Included in SC SWAP) on a yearly basis.

  — **PROJECT 2.1.3:** Ensure the management actions in this INRMP related to the management of wildlife and habitat are given priority as they correspond to the Conservation Action Areas in the SWAP.

  — **PROJECT 2.1.4:** Work with SCDNR to identify areas of mutual interest and possible cooperation.

FWM GOAL 3: MINIMIZE IMPACTS ON MIGRATORY BIRDS

- **FWM OBJECTIVE 3.1:** Take efforts to minimize impacts on migratory birds during training or land management activities such as prescribed burning.

  — **PROJECT 3.1.1:** During the reconnaissance level flora and fauna survey (Project 1.1.1), assess diversity and population numbers of migratory birds that may be nesting in areas prone to disturbance due to mission activities. Determine if areas are population "sources" or "sinks" for migratory birds. If populations are "sinks" consider offsite mitigation.

  — **PROJECT 3.1.2:** Alter training or land management activities where possible to occur outside the nesting and fledging areas.

  — **PROJECT 3.1.3:** Conduct a survey for powerlines and poles that could be potential bird electrocution hazards. Periodically re-evaluate powerlines and poles after initial survey.

— **PROJECT 3.1.4:** Complete retrofits for the power poles identified in the survey using the equipment and procedures identified in guidance provided by the Avian Power Line Interaction Committee (Avian Power Line Interaction Committee 2006).

— **PROJECT 3.1.5:** Establish a protocol to evaluate all new power poles erected on the base for electrocution hazards.

FWM GOAL 4: COMPLETE WILDLIFE HABITAT IMPROVEMENTS

- **FWM OBJECTIVE 4.1:** Where feasible, develop and implement habitat improvements that benefit wildlife species that do not conflict with mission activities.

— **PROJECT 4.1.1:** Investigate installation lands adjacent to streams and wetlands to see where microhabitats, including logs, rocks, brush piles, and reptile hibernacula around wetlands and streams, would be of benefit to various species and would not conflict with mission activities.

— **PROJECT 4.1.2:** Monitor water quality in breeding ponds to determine whether the site provides a safe environment for developing eggs, larvae, and aquatic adults. Avoid introducing fish to breeding areas.

— **PROJECT 4.1.3:** Install new wood duck nesting boxes at appropriate locations. Wood duck boxes are available through SCDNR.

8.3 OUTDOOR RECREATION AND PUBLIC ACCESS TO NATURAL RESOURCES

Limited outdoor recreation opportunities exist at McEntire JNGB because of its size, the fact that it has no on-base housing for personnel, and access restrictions.

OR GOAL 1: PROVIDE ADDITIONAL OUTDOOR RECREATIONAL ACTIVITIES

- **OR OBJECTIVE 1.1:** Develop additional recreational activities on the base, dependent on funding availability.

— **PROJECT 1.1.1:** Determine the costs and feasibility of designing and installing a nature trail with interpretative signage. Prepare a pamphlet describing features of the trail for distribution to visitors that could be made available at an information kiosk at the trailhead.

— **PROJECT 1.1.2:** Continue to design and build the Environmental Education Center adjacent to Dry Branch Pond.

— **PROJECT 1.1.3:** Determine if it fiscally feasible to design and build a walkway over Dry Branch Pond or a viewing platform adjacent to the Environmental Education Center for the purposes of wildlife viewing and possibly fishing.

OR GOAL 2: MAINTAIN BASE HUNTING AND FISHING PROGRAMS

- **OR OBJECTIVE 2.1:** Maintain the hunting and fishing programs in place at McEntire JNGB. There are currently hunting and fishing programs on the base.

  — **PROJECT 2.1.1:** Maintain the hunting program according to 169 FW Instruction 32-101. Continue to collect harvest data.

  — **PROJECT 2.1.2:** Maintain the fishing program according to 169 FW Instruction 32-101.

8.4 CONSERVATION LAW ENFORCEMENT

DoDI 5525.17, *Conservation Law Enforcement Program*, ensures that installations remain in compliance with appropriate environmental, natural, and cultural resource laws and regulations. Conservation law enforcement also includes regulating hunting and fishing programs on the installation. There is currently a hunting and fishing program at McEntire JNGB. DoDI 5525.17 states that with an INRMP, the Conservation Law Enforcement section will provide specific goals and objectives to ensure compliance with laws and regulations to support the overarching goals of the INRMP (DoDI 5525.17 2(b)). There are a number of federal statutes and directives addressing specific requirements pertaining to natural resources. A comprehensive list of these regulations can be found in Appendix D.

CLE GOAL 1: ENSURE THAT THE ENFORCEMENT OF NATURAL RESOURCE LAWS AND REGULATIONS IS IMPLEMENTED.

- **CLE OBJECTIVE 1.1:** Implement a Memorandum of Understanding (MOU) between McEntire JNGB and SCDNR for conservation law enforcement. The MOU would allow appropriate SCDNR staff to gain access to the base in order to enforce natural resource laws specifically for hunting and fishing.

  — **PROJECT 1.1.1:** In cooperation with SCDNR, ensure the hunting and fishing programs meet regulatory standards.

8.5 MANAGEMENT OF THREATENED AND ENDANGERED SPECIES AND HABITATS

No federally or state listed threatened, endangered, sensitive, or candidate species have been documented on McEntire JNGB. The goal for this section is to manage McEntire JNGB on a regional ecosystem-based approach that manages potential habitat for such species while protecting the operational functionality of the base's missions.

TE GOAL 1: FIELD SURVEYS FOR FEDERALLY AND STATE LISTED SPECIES AND OTHER SPECIES OF CONCERN

- **TE OBJECTIVE 1.1:** During the reconnaissance level flora and fauna survey, conduct surveys for potential threatened and endangered species, species of concern, and at-risk

species. It is possible that listed species could begin to use the base as habitat, or existing but previously unidentified listed species are present on the base. The list of federal and state listed and rare species is included in Appendix I. The reconnaissance level surveys will help to assure that the base continues to remain in compliance with listed species regulations.

— **PROJECT 1.1.1:** On a semi-annual basis, update the list of threatened and endangered species, species of concern, and at-risk species that occur within Richland County.

— **PROJECT 1.1.2:** During the reconnaissance level flora and fauna survey, conduct survey for federal and state listed species, potential species of concern, and USFWS at-risk species. Conduct field surveys at a minimum of every 3 to 5 years.

— **PROJECT 1.1.3:** If listed species are observed, monitor the presence of the species on the base and develop a Threatened and Endangered Species Management Plan. Ensure that management actions within this INRMP would benefit any listed species, species of concern, or at-risk species, specifically management actions for longleaf pine.

8.6 PROTECTION OF WETLANDS AND WATERS OF THE UNITED STATES

McEntire JNGB complies with federal, state, local, and USAF environmental regulations including but not limited to development and management of the installation Spill Control Plan, Stormwater Management Pollution Prevention Plan, and Integrated Pest Management Plan.

WP GOAL 1: NPDES PERMIT IMPLEMENTATION

- **WP OBJECTIVE 1.1:** Ensure compliance with all National Pollutant Discharge Elimination System (NPDES) permits and ensure all permits are kept current.

  — **PROJECT 1.1.1:** Review all NPDES Permits to ensure adherence to all permit conditions.

WP GOAL 2: EROSION AND SEDIMENT CONTROL

- **WP OBJECTIVE 2.1:** Conduct an erosion study to identify areas on the installation experiencing erosion and determine a course of action to resolve problems found.

  — **PROJECT 2.1.1:** Work with the NGB A4AM Natural Resources Program Manager for a contract to identify, categorize, locate, and map areas of erosion on the installation. The contract should include conceptual designs and cost plans for how to correct areas of erosion.

- **WP OBJECTIVE 2.2:** Obtain information from South Carolina about their erosion and sediment control program to determine if it would be cost effective for installation personnel to receive training in erosion and sediment control.

— **PROJECT 2.2.1:** Determine if it will be cost effective for installation personnel to attend erosion and sediment control training from South Carolina.

WP GOAL 3: CONSERVATION OF ECOSYSTEM STRUCTURE AND FUNCTION

- **WP OBJECTIVE 3.1:** Maintain the structural and functional integrity of the riparian corridors, to the best extent practicable while complying with airfield safety requirements, to conserve ecosystem function and regional biodiversity.

  — **PROJECT 3.1.1:** To the best extent practicable, maintain a wooded riparian corridor that serves to protect the ecosystem functions described above.

WP GOAL 4: JURISDICTIONAL DETERMINATION AND PERMITTING

- **WP OBJECTIVE 4.1:** Remain in compliance with Sections 404 and 401 of the CWA.

  — **PROJECT 4.1.1:** Review current Wetlands and Waters of the United States delineation documents, conduct a new delineation if needed, and obtain a Jurisdictional Determination from USACE.

  — **PROJECT 4.1.2:** Obtain Section 404 and 401 permits for activities in Waters of the United States, when required.

WP GOAL 5: WATERS OF THE UNITED STATES CORRIDOR PROTECTION

- **WP OBJECTIVE 5.1:** Investigate the verified boundaries of Waters of the United States to determine where it may be feasible to establish a buffer.

  — **PROJECT 5.1.1:** Using the verified boundaries of Waters of the United States on the installation, and identify which area(s) would benefit from a buffer. Determine the width of the buffer while ensuring the buffer does not negatively affect the mission.

WP GOAL 3: BASE PERSONNEL'S UNDERSTANDING OF LOCATIONS AND OF REGULATIONS PERTAINING TO WETLANDS AND FLOODPLAINS

- **WP OBJECTIVE 3.1:** Educate key base and visiting personnel on the processes for conducting the mission in proximity to the wetlands and floodplains on McEntire JNGB. Further development of educational materials on wetlands and wetland buffers will help foster understanding of wetland resources on the base and the benefits and importance of protecting wetlands, streams, and buffers. In addition, the 169 MSG/EM will continue to maintain an effective working relationship with the appropriate regulatory agencies. The 169 MSG/EM will have primary responsibility to act as a reviewer for all proposed jurisdictional wetlands and floodplain activities, and for monitoring wetlands and floodplains after operations/exercises to assess impacts. Follow proper permitting procedures for all potential or planned encroachments.

— **PROJECT 3.1.1:** Develop and disseminate informational materials on locations of jurisdictional wetlands and floodplains, the importance of wetlands and wetland buffers, and the federal and state regulations designed to protect wetlands. Conduct short seminars as necessary.

— **PROJECT 3.1.2:** Inform key base and visiting personnel who are likely to impact floodplains or jurisdictional wetlands of the locations of such and the types of activities that will be precluded within these areas.

8.7 GROUNDS MAINTENANCE

Base grounds maintenance personnel currently perform most grounds maintenance activities at McEntire JNGB. Grounds-maintenance activities performed at McEntire JNGB consist of road maintenance, firebreak maintenance, and mowing of the open/airfield areas.

GM GOAL 1: REVEGETATION PLAN

- **GM OBJECTIVE 1.1:** Avoid erosion and sediment transport into adjacent waters and streams during excavation and grading activities associated with landscape management and revegetate with native species.

  — **PROJECT 1.1.1:** Implement erosion and sediment control measures during all phases of grading and excavation operations associated with grounds maintenance.

  — **PROJECT 1.1.2:** Replace disturbed vegetation with native species including but not limited to native grass mixes.

8.8 FOREST MANAGEMENT

Delineated timber stands are present on McEntire JNGB. Forest stands were surveyed as part of the 2010 Forest Habitat Management Plan, and FAUs on the base are currently managed in part to promote timber production. A 2011 survey of FAUs indicated that the base has predominantly pine forest stands. Stand health is managed through the use of understory thinning, prescribed burns, and invasive control. Loblolly pine stands are being replaced on the installation with longleaf pine, as a measure to protect resources and timber revenue.

FM GOAL 1: MANAGE TIMBER UNITS

- **FM OBJECTIVE 1.1:** Continue to manage delineated units for timber production and riparian buffers, converting to longleaf pine as harvest and funding allows, and implement recommendations to reduce BASH potentials. Delineated timber units are present on McEntire JNGB. Long-term management of the forestry resource should be continued to protect the resources and prevent loss of timber revenue. Conversion of upland timber units to longleaf pine, one of the most endangered ecosystems in North America, can complement long-term timber management. It should be recognized that these forest units could contain dead trees/snags that might serve as refugia for wildlife that could pose a threat to the mission and airfield safety.

— **PROJECT 1.1.1:** Continue to manage FAUs using the unit-specific management recommendations described below over the next 5 years:

FAU	Management Activity	Description
1	Prescribed Burning	Burn on a 3- to 5-year cycle. This unit was last burned in 2016
2	-	-
3	Prescribed Burning	Prescribed burns for Unit 3 and Unit 7 should occur together every 3 to 5 years. The last prescribed burn was conducted in 2009.
3B	Revegetation	Chemically prepare unit and replant open areas with longleaf pine.
	Prescribed Burning	Prescribe burn as needed for longleaf pine management. This unit was last burned in 2003.
5	Vegetation Management	Remove large trees from the perimeter of the fence. Maintain a portion of the site that is an Installation Restoration Program site as an open area with ground cover of native grasses. Thin the timber as needed to maintain aesthetics of the unit as this unit is highly visible. Management activities should be conducted in such a way as to not disturb or damage cultural resource site.
	Invasive Species Control	Conduct invasive species control for Chinese privet and Chinese wisteria.
6	Invasive Species Control	Conduct invasive species control for Chinese privet, Japanese honeysuckle, and Chinese wisteria. Management activities should be conducted in such a way as to not disturb or damage cultural resource site.
6A	-	-
6B	-	-
6C	Prescribed Burning	Prescribed burns should occur every 3 to 5 years. The unit was last burned in 2013.
	Firebreak Management	Install firebreaks.
6D	Invasive Species Control	Conduct invasive species control for Chinese privet.
	Prescribed Burning	Prescribed burns should occur every 3 to 5 years. The unit was last burned in 2013.
6E	Invasive Species Control	Conduct invasive species control for kudzu and Japanese honeysuckle.
	Prescribed Burning	Prescribed burns should occur every 3 to 5 years. The unit was last burned in 2013.
6G	Invasive Species Control	Conduct invasive species control for Chinese wisteria.
6H	-	-

FAU	Management Activity	Description
6I	Vegetation Management	Remove large trees from the perimeter fence. This unit is close to Swamp Fox Road and warrants aesthetic considerations. Thin as needed.
6J	-	-
6K	Invasive Species Control	Conduct invasive species control for Chinese privet. Management activities should be conducted in such a way as to not disturb or damage cultural resource site.
7	Prescribed Burning	Prescribed burns for Unit 3 and Unit 7 should occur together every 3 to 5 years. The last prescribed burn was conducted in 2013. Management activities should be conducted in such a way as to not disturb or damage cultural resource site.
7A	Vegetation Management	Reduce woody understory species.
	Prescribed Burning	Prescribed burns should occur every 3 to 5 years. The unit was last burned in 2013.
7B	Invasive Species Control	Conduct invasive species control for Chinese wisteria.
8	Ecosystem Protection	Protection of Dry Branch and its contribution to ecosystem function is the primary role for this unit.
	Invasive Species Control	Conduct invasive species control for Chinese privet, Japanese honeysuckle, and Chinese wisteria.
	Vegetation Management	Remove large trees from the perimeter of the fence. Management activities should be conducted in such a way as to not disturb or damage cultural resource site.
	Firebreak Management	Remove large trees from firebreaks.
8A	Ecosystem Protection	Protection of Dry Branch and its contribution to ecosystem function is the primary role for this unit. This unit should be managed for permanent hardwoods to protect Dry Branch and associated wetlands and contribute to maintenance of regional biodiversity.
	Invasive Species Control	Conduct invasive species control for Japanese honeysuckle and Chinese privet.
	Vegetation Management	Remove large trees from the perimeter fence and thin as needed.
8B	Ecosystem Protection	Protection of Dry Branch and its contribution to ecosystem function is the primary role for this unit. The unit should be managed for permanent hardwoods to protect Dry Branch and associated wetlands.
	Firebreak Management	Firebreaks should be installed.

FAU	Management Activity	Description
	Invasive Species Control	Conduct invasive species control for Chinese privet. Management activities should be conducted in such a way as to not disturb or damage cultural resource site.
8C	Invasive Species Control	Conduct invasive species control for Chinese privet. Management activities should be conducted in such a way as to not disturb or damage cultural resource site.
8D	Ecosystem Protection	Retain a 40-ft buffer along Cedar Creek.
	Invasive Species Control	Conduct invasive species control for Chinese privet.
9	Vegetation Management	Retain a hardwood buffer strip along North Carolina and South Carolina Roads, in addition to Sumter Highway for aesthetic purposes.
9B	Vegetation Management	Thin stand as needed. This unit was last thinned in 2009.
9C	Invasive Species Management	Conduct invasive species control for Chinese wisteria and Chinese privet.
9D	Vegetation Management	Thin stand as needed.
	Invasive Species Management	Conduct invasive species control for Chinese privet.
10	Vegetation Management	Thin stand as needed. Portions of the stand were last thinned in 2015.
	Invasive Species Management	Conduct invasive species control for Chinese privet and Chinese wisteria.
11	Vegetation Management	Continue to monitor tree growth. Maintain vegetation to allow for a clear line of sight for the Eagle Vision Facility.
12	Invasive Species Control	Conduct invasive species control for Chinese privet.
	Prescribed Burning	Begin a prescribed burn program for this unit.
13	-	-
14	Revegetation	Replant open areas with longleaf pine.
	Prescribed Burning	Prescribe burn as needed for longleaf pine management.

— **PROJECT 1.1.2:** The natural resource manager will assess the health and economic viability of the timber stock in the delineated units and develop a plan that will identify and implement methods to increase the economic viability and health of the timber stock for the long-term.

— **PROJECT 1.1.3:** Identify and remove the potential safety hazards that exist in the delineated timber stands.

- **PROJECT 1.1.4:** Identify wildlife that use the timber stands as habitat and identify and implement methods that will reduce the habitat suitability for unwanted wildlife species that could pose a threat to the mission and airfield safety.

- **PROJECT 1.1.5:** Establish mechanism for monitoring effectiveness of forested and transformed riparian buffers in performing key ecosystem functions (disturbance regulation, erosion control, and sediment retention).

- **PROJECT 1.1.6:** Conduct a complete forest inventory every 10 years per AFI 32-7064. The last inventory was completed in 2011.

- **PROJECT 1.1.7:** As loblolly FAUs reach maturity (60± years of age), convert the unit to longleaf pine.

- **PROJECT 1.1.8:** Coordinate with the Longleaf Alliance regarding opportunities for cost sharing/funding of forest projects.

8.9 WILDLAND FIRE MANAGEMENT

The use of prescribed fire at McEntire JNGB is an important tool for maintaining a sustainable landscape that is capable of supporting the military mission while contributing to regional biodiversity and ecosystem function. As such, understanding the fire ecology of the region and applying that knowledge to develop, implement, and monitor the prescribed burn program at McEntire JNGB has been identified as a management need.

WFM GOAL 1: IMPLEMENTATION OF THE WILDLAND FIRE MANAGEMENT PLAN

- **WFM OBJECTIVE 1.1:** Update and implement the goals and objectives of the Wildland Fire Management Plan to the maximum extent practicable. The Wildland Fire Management Plan Appendix G) was completed in 2010, and provided the goals and objectives that are presented below for fire ecology management.

  - **PROJECT 1.1.1:** Update the Wildland Fire Management Plan as necessary. Ensure that tasks identified in the plan are up-to-date.

WFM GOAL 2: PROTECTION OF THE MILITARY MISSION FROM WILD FIRES

- **WFM OBJECTIVE 2.1:** Continue to implement the controlled-burn plan to prevent the build-up of dangerous fuel loads on the base.

  - **PROJECT 2.1.1:** Review Wildland Fire Management Plan to ensure Plan is based on annual field information generated by the prescribed burn plan.

WFM GOAL 3: FIRE PERSONNEL AND PUBLIC SAFETY

- **WFM OBJECTIVE 3.1:** Strive for zero fire-related injuries or fatalities through effective fire management techniques and policies, proper training of fire personnel, sufficient resources to fight wildfires and to conduct control burns, and sound planning and execution. Control ignitions caused by military activities by restricting the use of incendiary devices during weather and fuel conditions that are particularly conducive to fire. Continually evaluate and improve upon fire management policies and procedures with the goal of constantly improving the level of fire protection on the base. Incorporate public health and environmental quality considerations into fire management planning and execution.

  — **PROJECT 3.1.1:** Continue road maintenance and improvements, as needed, to ensure that access roads sustain their purpose**.**

  — **PROJECT 3.1.2:** Continue to perform maintenance on firebreaks that takes into consideration slope and soil types to ensure that firebreaks remain effective.

WFM GOAL 4: THE SOUTHERN PINE ECOSYSTEM

- **WFM OBJECTIVE 4.1:** Maintain the ecological integrity of the southern pine ecosystem and comply with federal and state laws and meet the South Carolina ANG's land stewardship responsibilities. Base all fire management activities on "South Carolina's Best Management Practices for Forestry." Ensure the prescribed burn program is balanced between restoration and maintenance of the southern forest ecosystem found on the base and the control of the fuel load in fire prone areas to sustain the mission. Implement the prescribed burn program to establish a mosaic of burned and unburned areas. Support the goals and objectives of existing McEntire JNGB land management plans. Protect all natural and cultural resources, to the maximum extent practicable, through a program of prevention, pre-suppression, and suppression. Reduce or eliminate, to the extent feasible, firebreak impacts on the natural vegetation, aesthetics, cultural resources, and soils.

  — **PROJECT 4.1.1:** Conduct controlled burns of grasslands on an as-needed basis to promote a mosaic of diverse native vegetation and help reduce invasive species and woody plants. Do not burn grassland areas near the active runways that will create a BASH problem.

WFM GOAL 5: MAINTAIN OUTSIDE COORDINATION

- **WFM OBJECTIVE 5.1:** Maintain cooperative relationships with federal, state, and local agencies to work towards a regional approach to fireshed management and ensure continued coordination in wildland firefighting support. Maintain open lines of communication with other federal, state, and local agencies and solicit feedback where possible and beneficial to work towards a regional approach to fireshed management. A regional approach to fireshed management is not in place, and existing agreements with

federal, state, and local agencies to ensure cooperation during prescribed burns and wildland firefighting actions could expire.

— **PROJECT 5.1.1:** Update all interagency Mutual Aid Agreements as necessary to ensure prompt and complete cooperation during wildfire incidents on base lands.

WFM GOAL 6: FIREBREAKS

- **WFM OBJECTIVE 6.1:** Evaluate the potential for establishing firebreaks in the southeastern corner east of Dry Branch next to the base boundary adjacent to the Bell Farm. If it is determined to be viable, design a system of firebreaks that will be effective and will follow the contour as much as possible to facilitate maintenance. Consider the potential for increased erosion and sedimentation associated with the development of firebreaks in the southeastern corner east of Dry Branch next to the base boundary adjacent to the Bell Farm. Where feasible, align firebreaks on the contour to reduce the potential for excessive erosion and sedimentation.

  — **PROJECT 6.1.1:** If it is determined to be viable, design and construct a system of firebreaks that will be effective and will follow the contour as much as possible to facilitate maintenance.

- **WFM OBJECTIVE 6.2:** Erosion and Sedimentation from Firebreaks and Access Roads—some areas on existing firebreaks and access roads on McEntire JNGB are susceptible to excessive soil erosion due to slope and soil characteristics. Maintain firebreaks and access roads to reduce excessive erosion and sedimentation problems. Locate and align new firebreaks and access roads on the contour, where possible, to reduce the potential for excessive soil erosion. Consider the potential for increased erosion and sedimentation associated with the development of new firebreaks and access roads. Where possible, align firebreaks and access roads along the contour to minimize the potential for excessive erosion and sedimentation.

  — **PROJECT 6.2.1:** Conduct regular surveys of firebreaks and access roads to identify areas where soil erosion is occurring. Evaluate the sites and determine suitable management practices to address the problem. Implement and maintain management practices to address erosion and sedimentation associated with the site. Conduct surveys on a regular basis and following major storm or heavy trafficking (wildfire response) so that potential problem areas can be identified and addressed prior to becoming major problems areas.

  — **PROJECT 6.2.2:** Construct passable waterbars on firebreaks and access roads where excessive erosion has been identified. Implement and maintain management practices to reduce erosion and sedimentation at these sites. Use "South Carolina's Best Management Practices for Forestry" as a guide during construction and maintenance of roads and firebreaks.

- **WFM OBJECTIVE 6.3:** Firebreak maintenance—improve the condition of the permanent firebreaks base-wide. Install new firebreaks around the perimeter fence in

places were no breaks exist. Create a standard for firebreaks on the base, which includes firebreaks being at least 15 ft wide. Secure funding to bring all firebreaks up to standard, and include tree removal and land clearing.

— **PROJECT 6.3.1:** Inspect firebreaks to see which are not up to standard.

— **PROJECT 6.3.2:** Install new firebreaks around the perimeter fence.

— **PROJECT 6.3.3:** Add firebreaks to the base's GIS database, and ensure the data are compatible with the CIP.

— **PROJECT 6.3.4:** Monitor and maintain the firebreaks yearly. Address erosion problems per WFM Objective 6.2.

8.10 AGRICULTURAL OUTLEASING

The Agricultural Outleasing program element does not apply to McEntire JNGB.

8.11 INTEGRATED PEST MANAGEMENT AND PROGRAM

Coordination of effort to address outdoor invasive species, nuisance species, and noxious weeds must be routed through McEntire JNGB's Integrated Pest Management Coordinator (IPMC). All natural resources issues requiring pest management resolutions will be drafted by the McEntire JNGB Natural Resources Manager and routed through the IPMC and A4AM Natural Resources Program Manager and Pest Management Consultant. Funding for natural resources projects to address outdoor pest management needs will be considered on an as-needed basis with the intent to ensure IPM Management tools are implemented in accordance with the Integrated Pest Management Plan for McEntire JNGB.

IPM GOAL 1: COORDINATION AND IMPLEMENTATION OF INVASIVE AND NUISANCE SPECIES MANAGEMENT EFFORTS

- **IPM OBJECTIVE 1.1:** Work with the IPMC to ensure natural resources pest management needs are identified and contracted for.

  — **PROJECT 1.1.1:** Work with the IPMC and Pest Management Consultant to implement and fund projects within the IPM Plan related to natural resources to protect environmental quality and reduce the long-term costs of site management.

IPM GOAL 2: UPDATE INVASIVE SPECIES INVENTORY

- **IPM OBJECTIVE 2.1:** Conduct an invasive species survey at McEntire JNGB to reassess invasive species throughout the base.

  — **PROJECT 2.1.1:** Conduct a base-wide invasive species survey.

— **PROJECT 2.1.2:** Incorporate invasive species survey data into the INRMP. Survey data can be incorporated into the applicable section of Chapter 5, *Ecosystems and the Biotic Environment*.

— **PROJECT 2.1.3:** Invasive species surveys should be completed every 3 to 5 years to determine the status of invasive species and to determine if new invasive species are present on the installation.

8.12 BIRD/WILDLIFE AIRCRAFT STRIKE HAZARD

Migratory waterfowl (ducks, geese, and swans) pose a threat to low flying aircraft. Waterfowl vary considerably in size, from 1 to 2 pounds for ducks, 5 to 8 pounds for geese, and up to 20 pounds for most swans. At the installation, there are several common bird species that may pose a hazard, including hawks, blackbirds, starlings, ducks, geese, sparrows, killdeer, and common grackle. There are two normal migratory seasons, spring and fall. Waterfowl are usually only a hazard during the migratory season. Waterfowl typically migrate at night and generally fly between 1,500 and 3,000 ft above ground level during the fall migration and 1,000–3,000 ft above ground level during spring migration.

BH GOAL 1: SUPPORT THE SAFETY OFFICE AND USDA WILDLIFE SPECIALIST IN THEIR IMPLEMENTATION OF THE BASH PLAN

- **BH OBJECTIVE 1.1:** Provide support assistance from the Natural Resources Manager and Environmental Manager to the Safety Office and the USDA Wildlife Specialist in wildlife management for the purposes of BASH. Assistance may come in the form of working with the Safety Office in developing an action plan to reduce natural resource conflicts.

  — **PROJECT 1.1.1:** Attend quarterly BASH meetings to assist the Safety Office and USDA Wildlife Specialist to ensure species causing BASH hazards are properly identified and methods of removal do not violate federal and state environmental regulations including, but not limited to, the CWA and ESA.

8.13 COASTAL ZONE AND MARINE RESOURCES MANAGEMENT

The Coastal Zone and Marine Resources Management program element does not apply to McEntire JNGB.

8.14 CULTURAL RESOURCES PROTECTION

Cultural resource protection is addressed through the ANG Cultural Resources Management Program.

8.15 PUBLIC OUTREACH

Public outreach opportunities at McEntire JNGB can be limited due to installation security. However, there are opportunities to foster connections with local community groups and to hold

public events that provide quality public outreach activities. These activities help to develop a positive relationship between the base and surrounding communities.

PO GOAL 1: PROVIDE PUBLIC OPPORTUNITIES ON THE BASE

- **PO OBJECTIVE 1.1:** Determine if there are public outreach opportunities with local community groups, state entities, and non-governmental organizations.

  — **PROJECT 1.1.1:** Develop public outreach projects based on research regarding public outreach opportunities.

8.16 GEOGRAPHIC INFORMATION SYSTEM

McEntire JNGB currently uses GIS for spatial data storage and manipulation.

GIS GOAL 1: COLLECT GIS DATA FOR ALL STUDIES

- **GIS OBJECTIVE 1.1:** Ensure all studies conducted include a GIS component for uploading into the ANG GeoBase system.

  — **PROJECT 1.1.1:** Upload GIS data into the ANG GeoBase system.

9. INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN IMPLEMENTATION

9.1 IMPLEMENTATION

The INRMP Program has been organized to ensure the implementation of year-round, cost-effective management activities and projects that meet the requirements of the installation. The various organizations on the installation that are responsible for implementation of the INRMP are described below.

Installation Stakeholders—The INRMP Working Group will be responsible for the overall implementation of the INRMP. The INRMP Working Group will be comprised of key installation personnel from McEntire JNGB, in addition to the NGB/A4AM Natural Resources Program Manager who will provide technical assistance when necessary. This INRMP Working Group will assume an oversight role to ensure the effective implementation of this plan.

The Commander of McEntire JNGB will be the official signatory for the INRMP and the annual reviews. The installation's Natural Resources Manager is responsible for ensuring the activities associated with the implementation of this plan adhere to applicable federal, state, local, and USAF environmental regulations and guidelines. The NGB/A4AM Natural Resources Program Manager tracks DoD and USAF policies, and approves funding for projects and studies identified as a priority in this plan. The NGB/A4AM Natural Resources Program Manager acts as a technical point of contact on all natural resources-related activities. Projects proposed in this plan are reviewed by the installation's Natural Resources Manager and the NGB/A4AM Natural Resources Program Manager. Deviation from the projects proposed in this plan should be independently reviewed by the NGB/A4AM Natural Resources Program Manager.

External Stakeholders—USFWS and SCDNR can provide technical assistance to the installation. Specifically, these agencies will alert the Natural Resources Manager whenever new species that have the potential for inhabiting the installation are added to the federal and state endangered species lists. In addition, these agencies will be involved in the annual review of the INRMP and updates to the INRMP determined to be necessary as a result of changes in environmental conditions or the mission.

9.2 NATURAL RESOURCES MANAGEMENT STAFFING

A description of the offices or squadrons responsible for assisting in the portions of the INRMP are described in Section 7.1, *Natural Resources Program Management*.

9.3 MONITORING INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN IMPLEMENTATION

A variety of metrics will be used to measure the extent of INRMP implementation. In general, the Natural Resources Manager will be responsible for implementing the goals, objectives, and projects described in this INRMP. The following monitoring criteria have been established for each resource management.

- ***Natural Resources Program Management*—**Monitoring criteria will include documented completion of the annual coordination meeting with USFWS and SCDNR. When the annual INRMP review is conducted, concurrence from the signatory agencies will be obtained, and the INRMP document will be amended accordingly.

- ***Fish and Wildlife Management***—Monitoring criteria will include accessing habitat and wildlife on the installation to ensure healthy populations.

- ***Outdoor Recreation and Public Access to Natural Resources*—**Monitoring criteria will include developing a nature trail, education center, and boardwalk over Dry Branch Pond and monitoring use of these new features and other outdoor areas by base personnel.

- ***Conservation Law Enforcement***—Monitoring criteria will include ensuring that SCDNR has full access to the installation to enforce natural resource laws.

- ***Threatened and Endangered Species and Habitats Management***—Monitoring criteria will include updating the list of rare, threatened, and endangered species for Richland County and to verify if these species occur on the installation. If a listed species or their habitats occur on the installation, management actions will be implemented to avoid impacts to any listed species or habitats if they occur.

- ***Water Resource Protection***—Monitoring criteria will include the continuation of water quality sampling to ensure non-point source are not affecting the water bodies at the installation. Regular inspections of stormwater and erosion and sediment control BMPs to ensure proper functioning. These controls and practices are set in place to make sure that impacts to water resources associated with accidental spills and leakage from vehicles and equipment are minimized.

- ***Wetlands/Waters of the United States Protection***—Monitoring criteria for wetlands will include assessing the effectiveness of wetlands management to curtail wetland encroachment. Any unavoidable impacts to wetlands will be fully mitigated and in compliance with regulations.

- ***Grounds Maintenance***—Monitoring criteria will include regular assessment of the use of native species throughout the installation. Monitoring will also include evaluating mowing practices to ensure natural grasslands occur and impacts to herpetofauna do not exist.

- ***Forest Management***—Monitoring criteria will include the successfulness of the timber production on the installation. In addition, monitoring criteria will include the effectiveness of converting specific forest management units to longleaf pine.

- ***Wildland Fire Management***—Monitoring criteria will include surveys to determine if prescribed burns are an effective measure to manage the southern pine ecosystem. Monitoring will also include the effectiveness of fire breaks while implementing the Wildland Fire Management Plan.

- ***Integrated Pest Management***—Monitoring criteria will include ensuring that IPM practices are incorporated into pest management approaches on the installation. After treatment of invasive species and removal of nuisance species, post-monitoring will be implemented to determine the success of the effort.

- ***Bird/Wildlife Aircraft Strike Hazard***—Monitoring criteria will include ensuring that management strategies provided in this INRMP do not result in an increase in BASH.

- ***Cultural Resource Protection***—Cultural resources issues will be addressed through the ANG Cultural Resources Management Program.

- ***Public Outreach—***Monitoring criteria will include assessing the overall success of programs offered at the installation.

- ***GIS—***Monitoring will include measuring the effectiveness and accuracy of the Natural Resources GeoBase.

9.4 ANNUAL INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN REVIEW AND COORDINATION REQUIREMENTS

To ensure that this INRMP properly addresses all aspects of the natural resources present on the installation and proposes actions that are in accordance with USAF goals and objectives, this plan and all its components are subject to review by the installation's Environmental Management Office and the NGB/A4AM Natural Resources Program Manager. Similarly, all changes to be incorporated into this plan must be approved by the installation, USFWS, and SCDNR.

9.5 INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN UPDATE AND REVISION PROCESS

This INRMP is in effect from the date that all required signatures have been received; however, the Operational Component Plans must be updated annually during preparation of the installations' environmental budgets.

This INRMP should be reviewed internally on an annual basis to assess the recommended management practices in terms of their appropriateness for current conditions at the installation. The INRMP should also be coordinated annually with USFWS and SCDNR. In addition, the INRMP should be updated whenever there is a modification to the installation's missions, or when there is a substantial change to the installation's natural or cultural resources.

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10. ANNUAL WORK PLANS

The purpose of this chapter is to present a road map for the execution of specific actions to achieve management goals and objectives identified in this INRMP.

Under the authority and direction of the Commanding Officer, the Natural Resources Manager provides staff for implementing the INRMP management actions, and the NGB/A4AM Natural Resources Program Manager provides technical assistance when necessary.

Tables 10-1 through 10-5 summarize the management actions identified in Chapter 8 for McEntire JNGB and propose priorities for their implementation from 2018 through 2022. The actions proposed for this INRMP are aggressive, and might not be accomplished within the established timelines due to a number of factors (e.g., budget and manpower constraints, wartime tasks). However, their importance to the proper management of the installation's natural resources cannot be understated. Therefore, the management actions presented in these tables should be modified as part of the annual review of this INRMP by the INRMP Working Group to ensure that these goals are continually emphasized, and accomplished when practicable.

This INRMP reflects the commitment set forth by McEntire JNGB to conserve, protect, and enhance the natural resources present on the installation. This INRMP is the final plan that will direct the natural resources management at the installation from Fiscal Years 2018 through 2022. An ecosystem approach was used to develop the management measures for each resource area. Implementation of the management measures will maintain, conserve, and enhance the ecological integrity of the installation and the biological communities occurring on the installation. In addition, the natural resources management measures described in this plan will protect the installation's ecosystems and their components from unacceptable damage or degradation and identify and restore previously degraded habitats.

Natural resources and land use management issues are not the only factors contributing to the development and implementation of the INRMP. Installation management and other seemingly unrelated issues affect the implementation of this Plan. It is of utmost importance to the implementation of this INRMP that installation personnel take "ownership" of the Plan (i.e., individual or organizational primary responsibility to implement the INRMP), provide the necessary resources (i.e., personnel and equipment), and allocate the appropriate funding to enact the Plan. It is extremely important that an INRMP Working Group be established to aid in the continued development of and commitment to the implementation of this INRMP. The INRMP Working Group should be comprised of key installation personnel, and will assume an oversight role to ensure the effective implementation of this plan. Top- and middle-level management representation, as well as representation from several individuals with day-to-day on-installation field experience, will provide the INRMP Working Group with the leadership and structure necessary for the successful implementation of this INRMP.

Any requirement for the obligation of funds for projects in this INRMP shall be subject to the availability of funds appropriated by Congress, and none of the proposed projects shall be interpreted to require obligation or payment of funds in violation of any applicable federal law. Implementation of the actions and projects described in this INRMP are guided by how budget priorities are assessed for environmental work on DoD installations. This is described in

DoDI 4715.03, *Natural Resources Conservation Program*, which implements policy, assigns responsibilities, and prescribes procedures for the integrated management of natural and cultural resources on property under DoD control.

The Office of Management and Budget considers funding for the preparation and implementation of this INRMP, as required by the Sikes Act, to be a high priority; however, the reality is that not all of the projects and programs identified in this INRMP will receive immediate funding. As such, these programs and projects have been placed into four priority-based categories:

- Priority 0 – Day-to-day recurring projects
- Priority 1 – High priority projects
- Priority 2 – Medium importance projects
- Priority 3 – Low importance projects.

The prioritization of the projects is based on need, and need is based on a project's importance in moving the natural resources management program closer toward successfully achieving its goal. DoDI 4715.03 defines recurring and non-recurring conservation requirements as follows:

RECURRING AND NON-RECURRING CONSERVATION REQUIREMENTS

Priority 0: Recurring Natural Resources Conservation Management Requirements
a. Administrative, personnel, and other costs associated with managing the DoD Natural Resources Conservation Program that are necessary to meet applicable compliance requirements in federal and state laws, regulations, Eos, and DoD policies, or in direct support of the military mission. b. DoD components shall give priority to recurring natural resources conservation management requirements associated with the operation of facilities, installations, and deployed weapons systems. These activities include day-to-day costs of sustaining an effective natural resources management program, and annual requirements, including manpower, training, supplies, permits, fees, testing and monitoring, sampling and analysis, reporting and recordkeeping, maintenance of natural resources conservation equipment, and compliance self-assessments.
Priority 1 (High): Non-Recurring Natural Resources Management Requirements. Current Compliance.
Includes installation projects and activities to support: a. Installations currently out of compliance (e.g., received an enforcement action from an authorized federal or state agency or local authority). b. Signed compliance agreement or consent order. c. Meeting requirements with applicable federal and state regulations, standards, EOs, or DoD policies. d. Immediate and essential maintenance of operational integrity or military mission sustainment. e. Projects or activities that will be out of compliance if not implemented in the current program year including the following:

RECURRING AND NON-RECURRING CONSERVATION REQUIREMENTS

Priority 1 (High): Non-Recurring Natural Resources Management Requirements. Current Compliance (continued)

i. Environmental analyses for natural resources conservation projects, and monitoring and studies required to assess and mitigate potential impacts of the military mission on conservation resources.

ii. Planning documentation, master plans, compatible development planning, and INRMPs.

iii. Natural resources planning-level surveys.

iv. Reasonable and prudent measures included in incidental take statements of Biological Opinions; biological assessments; surveys; monitoring; reporting of assessment results; or habitat protection for listed, at-risk, and candidate species so that proposed or continuing actions can be modified in consultation with the USFWS or National Marine Fisheries Service.

v. Mitigation to meet existing regulatory permit conditions or written agreements.

vi. Non-point source pollution or watershed management studies or actions needed to meet compliance dates cited in approved state coastal non-point source pollution control plans, as required to meet consistency determinations consistent with Coastal Zone Management.

vii. Wetlands delineations critical for the prevention of adverse impacts on wetlands, so that continuing actions can be modified to ensure mission continuity.

Compliance with missed deadlines established in DoD-executed agreements.

Priority 2 (Medium): Non-Recurring Natural Resources Management Requirements. Maintenance Requirements.

Includes those projects and activities needed to meet an established deadline beyond the current program year and maintain compliance. Examples include the following:

a. Compliance with future deadlines.

b. Conservation, GIS mapping, and data management to comply with federal, state, and local regulations; EOs; and DoD policy.

c. Efforts undertaken in accordance with non-deadline specific compliance requirements of leadership initiatives.

d. Wetlands enhancement to minimize wetlands loss and enhance existing degraded wetlands.

e. Conservation recommendations in biological opinions issued pursuant to the ESA.

RECURRING AND NON-RECURRING CONSERVATION REQUIREMENTS

Priority 3 (Low): Non-Recurring Natural Resources Management Requirements. Enhancement Actions Beyond Compliance.
Includes those projects and activities that enhance conservation resources or the integrity of the installation's mission, or are needed to address overall environmental goals and objectives, but are not specifically required by law, regulation, or EO, and are not of an immediate nature. Examples include: a. Community outreach activities, such as International Migratory Bird Day, Earth Day, National Public Lands Day, Pollinator Week, and Arbor Day activities. b. Educational and public awareness projects, such as interpretive displays, oral histories, Watchable Wildlife areas, nature trails, wildlife checklists, and conservation teaching materials. c. Restoration or enhancement of natural resources when no specific compliance requirement dictates a course, or timing of action. d. Management and execution of volunteer and partnership programs.

Table 10-1. Summary of McEntire JNGB Management Actions 2018

Objective No.	Projects	Priority Level	Completed (Date)	Notes (include actions and dates)
Natural Resources Program Management				
NRP 1.1	Training and education of installation personnel in applying an ecosystem-management approach to natural resources management decisions and action.	Medium		
NRP 2.1	Coordinate a yearly meeting of installation stakeholders to identify operational needs relative to natural resources management.	High		
NRP 2.1	On an annual basis, prepare the budget to implement the next fiscal year's actions.	High		
NRP 2.2	Conduct external stakeholder annual meeting and update the INRMP as needed based on pertinent review findings.	High		
Fish and Wildlife Management				
FWM 1.1	Conduct a reconnaissance level flora and fauna survey.	High		
FWM 1.2	Develop a cohesive plan for management of fish and wildlife species at McEntire JNGB.	Medium		
FWM 1.3	Habitat should, at a minimum, be protected within a 985-ft radius from the edge of a wetland or stream. Mowing should be delayed until mid-summer to allow native flowers to grow.	Medium		
FWM 2.1	Support the goals and actions of the SC SWAP and identify possible areas where the installation could support wildlife conservation projects of mutual interest.	Medium		
FWM 3.1	Take efforts to minimize impacts on migratory birds during training or land management activities such as prescribed burning.	Medium		
Outdoor Recreation and Public Access to Natural Resources				
OR 1.1	Continue to design and build the Environmental Education Center adjacent to Dry Branch Pond.	Low		
OR 2.1	Maintain the hunting and fishing programs in place at McEntire JNGB.	Low		
Conservation Law Enforcement				
CLE 1.1	Implement an MOU between McEntire JNGB and SCDNR for conservation law enforcement.	High		
Management of Threatened and Endangered Species and Habitats				
TE 1.1	On a semi-annual basis, update the list of threatened and endangered species, species of concern, and at-risk species that occur within Richland County.	High		
TE 1.1	During the reconnaissance level flora and fauna survey, conduct survey for federal and state listed species, potential species of concern, and USFWS at-risk species.	High		
Protection of Wetlands and Waters of the United States				
WP 1.1	Ensure compliance with all National Pollutant Discharge Elimination System permits and ensure all permits are kept current.	High		
WP 2.2	Obtain information about cost effectiveness of sending installation personnel to erosion and sediment control training.	Medium		
WP 3.1	Maintain a wooded riparian corridor that serves to protect ecosystem functions.	Medium		
WP 4.1	Remain in compliance with Sections 404 and 401 of the CWA.	High		

Table 10-1. Summary of McEntire JNGB Management Actions 2018

Objective No.	Projects	Priority Level	Completed (Date)	Notes (include actions and dates)
WP 5.1	Investigate the verified boundaries of Waters of the United States to determine where it may be feasible to establish a buffer.	Medium		
Grounds Maintenance				
GM 1.1	Avoid erosion and sediment transport into adjacent waters and streams during excavation and grading activities and revegetate with native species.	Medium		
Forest Management				
FM 1.1	Continue to manage FAUs using the unit-specific management recommendations set forth in the 2010 Forest Habitat Management Plan.	Medium		
FM 1.1	As loblolly FAUs reach maturity (60± years of age), convert the unit to longleaf pine.	Medium		
Wildland Fire Management				
WFM 1.1	Update and implement the Wildland Fire Management Plan to the maximum extent practicable.	Medium		
WFM 2.1	Continue to implement the controlled-burn plan to prevent the build-up of dangerous fuel loads on the base.	Medium		
WFM 3.1	Strive for zero fire-related injuries or fatalities through effective fire management techniques and policies, proper training of fire personnel, sufficient resources to fight wildfires and to conduct control burns, and sound planning and execution.	Medium		
WFM 4.1	Conduct controlled burns of grasslands on an as-needed basis to promote a mosaic of diverse native vegetation and help reduce invasive species and woody plants.	Medium		
WFM 5.1	Update all interagency Mutual Aid Agreements as necessary to ensure prompt and complete cooperation during wildfire incidents on base lands.	Medium		
WFM 6.2	Conduct regular surveys of firebreaks and access roads to identify areas where soil erosion is occurring.	Medium		
WFM 6.3	Firebreak maintenance—improve the condition of the permanent firebreaks base-wide.	Medium		
Integrated Pest Management Program				
IPM 1.1	Work with the IPMC to ensure natural resources pest management needs are identified and contracted for.	High		
Bird/Wildlife Aircraft Strike Hazard				
BH 1.1	Provide support assistance from the Natural Resources Manager and Environmental Manager to the Safety Office and the USDA Wildlife Specialist in wildlife management.	High		
Public Outreach				
PO 1.1	Determine if there are public outreach opportunities with local community groups, state entities, and non-governmental organizations.	Low		

Table 10-2. Summary of McEntire JNGB Management Actions 2019

Objective No.	Projects	Priority Level	Completed (Date)	Notes (include actions and dates)
Natural Resources Program Management				
NRP 1.1	Training and education of installation personnel in applying an ecosystem-management approach to natural resources management decisions and actions.	Medium		
NRP 2.1	Coordinate a yearly meeting of the installation stakeholders to identify operational needs relative to natural resources management.	High		
NRP 2.1	On an annual basis, prepare the budget to implement the next fiscal year's actions.	High		
NRP 2.2	Conduct external stakeholder annual meeting and update the INRMP as needed based on pertinent review findings.	High		
Fish and Wildlife Management				
FWM 1.3	Habitat should, at a minimum, be protected within a 985-ft radius from the edge of a wetland or stream. Mowing should be delayed until mid-summer to allow native flowers to grow.	Medium		
FWM 2.1	Support the goals and actions of the SC SWAP and identify possible areas where the installation could support wildlife conservation projects of mutual interest.	Medium		
FWM 3.1	Take efforts to minimize impacts on migratory birds during training or land management activities such as prescribed burning.	Medium		
FWM 3.1	Conduct a survey for powerlines and poles that could be potential bird electrocution hazards.	Medium		
FWM 4.1	Construct various microhabitats including logs, rocks, brush piles, and reptile hibernacula around wetlands and in upland areas.	Medium		
Outdoor Recreation and Public Access to Natural Resources				
OR 1.1	Design and install a nature trail with interpretive signage on the installation	Low		
OR 1.1	Design and build a boardwalk over Dry Branch Pond adjacent to the Environmental Education Center.	Low		
OR 2.1	Maintain the hunting and fishing programs in place at McEntire JNGB.	Low		
Conservation Law Enforcement				
CLE 1.1	Continue to implement the MOU between McEntire JNGB and SCDNR for conservation law enforcement.	High		
Protection of Wetlands and Waters of the United States				
WP 1.1	Ensure compliance with all National Pollutant Discharge Elimination System permits and ensure all permits are kept current.	High		
WP 3.1	Maintain a wooded riparian corridor that serves to protect ecosystem functions.	Medium		
WP 4.1	Remain in compliance with Sections 404 and 401 of the CWA.	High		
WP 5.1	Investigate the verified boundaries of Waters of the United States to determine where it may be feasible to establish a buffer.	Medium		

Table 10-2. Summary of McEntire JNGB Management Actions 2019

Objective No.	Projects	Priority Level	Completed (Date)	Notes (include actions and dates)
Grounds Maintenance				
GM 1.1	Avoid erosion and sediment transport into adjacent waters and streams during excavation and grading activities and revegetate with native species.	Medium		
Forest Management				
FM 1.1	Continue to manage FAUs using the unit-specific management recommendations set forth in the 2010 Forest Habitat Management Plan.	Medium		
FM 1.1	Assess the health and economic viability of the timber stock in the delineated units and develop a plan that will identify and implement methods to increase the economic viability and health of the timber stock.	Medium		
FM 1.1	As loblolly FAUs reach maturity (60± years of age), convert the unit to longleaf pine.	Medium		
FM 1.1	Coordinate with the Longleaf Alliance regarding opportunities for cost sharing/funding of forest projects.	Low		
Wildland Fire Management				
WFM 1.1	Update and implement the Wildland Fire Management Plan to the maximum extent practicable.	Medium		
WFM 2.1	Continue to implement the controlled-burn plan to prevent the build-up of dangerous fuel loads on the base.	Medium		
WFM 3.1	Strive for zero fire-related injuries or fatalities through effective fire management techniques and policies, proper training of fire personnel, sufficient resources to fight wildfires and to conduct control burns, and sound planning and execution.	Medium		
WFM 4.1	Conduct controlled burns of grasslands on an as-needed basis to promote a mosaic of diverse native vegetation and help reduce invasive species and woody plants.	Medium		
WFM 5.1	Update all interagency Mutual Aid Agreements as necessary to ensure prompt and complete cooperation during wildfire incidents on base lands.	Medium		
WFM 6.1	Evaluate the potential for establishing firebreaks in the southeastern corner east of Dry Branch next to the base boundary adjacent to the Bell Farm.	Medium		
WFM 6.2	Conduct regular surveys of firebreaks and access roads to identify areas where soil erosion is occurring.	Medium		
WFM 6.3	Firebreak maintenance—improve the condition of the permanent firebreaks base-wide.	Medium		
Integrated Pest Management Program				
IPM1.1	Work with the IPMC to ensure natural resources pest management needs are identified and contracted for.	High		
IPM 2.1	Conduct an Invasive Species Survey.	Medium		

Table 10-2. Summary of McEntire JNGB Management Actions 2019

Objective No.	Projects	Priority Level	Completed (Date)	Notes (include actions and dates)
Bird/Wildlife Aircraft Strike Hazard				
BH 1.1	Provide support assistance from the Natural Resources Manager and Environmental Manager to the Safety Office and the USDA Wildlife Specialist in wildlife management.	High		
Public Outreach				
PO 1.1	Determine if there are public outreach opportunities with local community groups, state entities, and non-governmental organizations.	Low		
Geographic Information Systems				
GIS 1.1	Coordinate with the ANG GeoBase Program Point of Contact to populate the CIP with natural resources data.	Medium		

Table 10-3. Summary of McEntire JNGB Management Actions 2020

Objective No.	Projects	Priority Level	Completed (Date)	Notes (include actions and dates)
Natural Resources Program Management				
NRP 1.1	Training and education of installation personnel in applying an ecosystem-management approach to natural resources management decisions and actions.	Medium		
NRP 2.1	Coordinate a yearly meeting of installation stakeholders to identify operational needs relative to natural resources management.	High		
NRP 2.1	On an annual basis, prepare the budget to implement the next fiscal year's actions.	High		
NRP 2.2	Conduct external stakeholder annual meeting and update the INRMP as needed based on pertinent review findings.	High		
Fish and Wildlife Management				
FWM 1.3	Habitat should, at a minimum, be protected within a 985-ft radius from the edge of a wetland or stream. Mowing should be delayed until mid-summer to allow native flowers to grow.	Medium		
FWM 2.1	Support the goals and actions of the SC SWAP and identify possible areas where the installation could support wildlife conservation projects of mutual interest.	Medium		
FWM 3.1	Take efforts to minimize impacts on migratory birds during training or land management activities such as prescribed burning.	Medium		
FWM 4.1	Monitor water quality in breeding ponds.	Medium		
FWM 4.1	Install new wood duck nesting boxes at appropriate locations.	Low		
Outdoor Recreation and Public Access to Natural Resources				
OR 2.1	Maintain the hunting and fishing programs in place at McEntire JNGB.	Low		
Conservation Law Enforcement				
CLE 1.1	Continue to implement the MOU between McEntire JNGB and SCDNR for conservation law enforcement.	High		
Management of Threatened and Endangered Species and Habitats				
TE 1.1	On a semi-annual basis, update the list of threatened and endangered species, species of concern, and at-risk species that occur within Richland County.	High		
Protection of Wetlands and Waters of the United States				
WP 1.1	Ensure compliance with all National Pollutant Discharge Elimination System permits and ensure all permits are kept current.	High		
WP 2.1	Conduct an erosion study to identify areas on the base experiencing erosion and determine a course of action to resolve problems found.	Medium		
WP 3.1	Maintain a wooded riparian corridor that serves to protect ecosystem functions.	Medium		
WP 4.1	Remain in compliance with Sections 404 and 401 of the CWA.	High		

Table 10-3. Summary of McEntire JNGB Management Actions 2020

Objective No.	Projects	Priority Level	Completed (Date)	Notes (include actions and dates)
WP 5.1	Investigate the verified boundaries of Waters of the United States to determine where it may be feasible to establish a buffer.	Medium		
Grounds Maintenance				
GM 1.1	Avoid erosion and sediment transport into adjacent waters and streams during excavation and grading activities and revegetate with native species.	Low		
Forest Management				
FM 1.1	Continue to manage FAUs using the unit-specific management recommendations set forth in the 2010 Forest Habitat Management Plan.	Medium		
FM 1.1	As loblolly FAUs reach maturity (60± years of age), convert the unit to longleaf pine.	Medium		
Wildland Fire Management				
WFM 1.1	Update and implement the Wildland Fire Management Plan to the maximum extent practicable.	Medium		
WFM 2.1	Continue to implement the controlled-burn plan to prevent the build-up of dangerous fuel loads on the base.	Medium		
WFM 3.1	Strive for zero fire-related injuries or fatalities through effective fire management techniques and policies, proper training of fire personnel, sufficient resources to fight wildfires and to conduct control burns, and sound planning and execution.	Medium		
WFM 4.1	Conduct controlled burns of grasslands on an as-needed basis to promote a mosaic of diverse native vegetation and help reduce invasive species and woody plants.	Medium		
WFM 5.1	Update all interagency Mutual Aid Agreements as necessary to ensure prompt and complete cooperation during wildfire incidents on base lands.	Medium		
WFM 6.2	Conduct regular surveys of firebreaks and access roads to identify areas where soil erosion is occurring.	Medium		
WFM 6.3	Firebreak maintenance—improve the condition of the permanent firebreaks base-wide.	Medium		
Integrated Pest Management Program				
IPM 1.1	Work with the IPMC to ensure natural resources pest management needs are identified and contracted for.	High		
Bird/Wildlife Aircraft Strike Hazard				
BH 1.1	Provide support assistance from the Natural Resources Manager and Environmental Manager to the Safety Office and the USDA Wildlife Specialist in wildlife management.	High		
Public Outreach				
PO 1.1	Determine if there are public outreach opportunities with local community groups, state entities, and non-governmental organizations.	Low		

Table 10-4. Summary of McEntire JNGB Management Actions 2021

Objective No.	Projects	Priority Level	Completed (Date)	Notes (include actions and dates)
Natural Resources Program Management				
NRP 1.1	Training and education of installation personnel in applying an ecosystem-management approach to natural resources management decisions and actions.	Medium		
NRP 2.1	Coordinate a yearly meeting of installation stakeholders to identify operational needs relative to natural resources management.	High		
NRP 2.1	On an annual basis, prepare the budget to implement the next fiscal year's actions.	High		
NRP 2.2	Conduct external stakeholder annual meeting and update the INRMP as needed based on pertinent review findings.	High		
Fish and Wildlife Management				
FWM 1.1	Conduct a reconnaissance level flora and fauna survey.	High		
FWM 1.3	Habitat should, at a minimum, be protected within a 985-ft radius from the edge of a wetland or stream. Mowing should be delayed until mid-summer to allow native flowers to grow.	Medium		
FWM 2.1	Support the goals and actions of the SC SWAP and identify possible areas where the installation could support wildlife conservation projects of mutual interest.	Medium		
FWM 3.1	Take efforts to minimize impacts on migratory birds during training or land management activities such as prescribed burning.	Medium		
Outdoor Recreation and Public Access to Natural Resources				
OR 2.1	Maintain the hunting and fishing programs in place at McEntire JNGB.	Low		
Conservation Law Enforcement				
CLE 1.1	Continue to implement the MOU between McEntire JNGB and SCDNR for conservation law enforcement.	High		
Management of Threatened and Endangered Species and Habitats				
TE 1.1	During the reconnaissance level flora and fauna survey, conduct survey for federal and state listed species, potential species of concern, and USFWS at-risk species.	High		
Protection of Wetlands and Waters of the United States				
WP 1.1	Ensure compliance with all National Pollutant Discharge Elimination System permits and ensure all permits are kept current.	High		
WP 3.1	Maintain a wooded riparian corridor that serves to protect ecosystem functions.	Medium		
WP 4.1	Remain in compliance with Sections 404 and 401 of the CWA.	High		
WP 5.1	Investigate the verified boundaries of Waters of the United States to determine where it may be feasible to establish a buffer.	Medium		

Table 10-4. Summary of McEntire JNGB Management Actions 2021

Objective No.	Projects	Priority Level	Completed (Date)	Notes (include actions and dates)
Grounds Maintenance				
GM 1.1	Avoid erosion and sediment transport into adjacent waters and streams during excavation and grading activities and revegetate with native species.	Low		
Forest Management				
FM 1.1	Continue to manage FAUs using the unit-specific management recommendations set forth in the 2010 Forest Habitat Management Plan.	Medium		
FM 1.1	Conduct a complete forest inventory every 10 years per AFI 32-7064.	High		
FM 1.1	As loblolly FAUs reach maturity (60± years of age), convert the unit to longleaf pine.	Medium		
Wildland Fire Management				
WFM 1.1	Update and implement the Wildland Fire Management Plan to the maximum extent practicable.	Medium		
WFM 2.1	Continue to implement the controlled-burn plan to prevent the build-up of dangerous fuel loads on the base.	Medium		
WFM 3.1	Strive for zero fire-related injuries or fatalities through effective fire management techniques and policies, proper training of fire personnel, sufficient resources to fight wildfires and to conduct control burns, and sound planning and execution.	Medium		
WFM 4.1	Conduct controlled burns of grasslands on an as-needed basis to promote a mosaic of diverse native vegetation and help reduce invasive species and woody plants.	Medium		
WFM 5.1	Update all interagency Mutual Aid Agreements as necessary to ensure prompt and complete cooperation during wildfire incidents on base lands.	Medium		
WFM 6.2	Conduct regular surveys of firebreaks and access roads to identify areas where soil erosion is occurring.	Medium		
WFM 6.3	Firebreak maintenance—improve the condition of the permanent firebreaks base-wide.	Medium		
Integrated Pest Management Program				
IPM 1.1	Work with the IPMC to ensure natural resources pest management needs are identified and contracted for.	High		
Bird/Wildlife Aircraft Strike Hazard				
BH 1.1	Provide support assistance from the Natural Resources Manager and Environmental Manager to the Safety Office and the USDA Wildlife Specialist in wildlife management.	High		
Public Outreach				
PO 1.1	Determine if there are public outreach opportunities with local community groups, state entities, and non-governmental organizations.	Low		

Table 10-5. Summary of McEntire JNGB Management Actions 2022

Objective No.	Projects	Priority Level	Completed (Date)	Notes (include actions and dates)
Natural Resources Program Management				
NRP 1.1	Training and education of installation personnel in applying an ecosystem-management approach to natural resources management decisions and actions.	Medium		
NRP 2.1	Coordinate a yearly meeting of installation stakeholders to identify operational needs relative to natural resources management.	High		
NRP 2.1	On an annual basis, prepare the budget to implement the next fiscal year's actions.	High		
NRP 2.2	Conduct external stakeholder annual meeting and update the INRMP as needed based on pertinent review findings.	High		
Fish and Wildlife Management				
FWM 1.3	Habitat should, at a minimum, be protected within a 985-ft radius from the edge of a wetland or stream. Mowing should be delayed until mid-summer to allow native flowers to grow.	Medium		
FWM 2.1	Support the goals and actions of the SC SWAP and identify possible areas where the installation could support wildlife conservation projects of mutual interest.	Medium		
FWM 3.1	Take efforts to minimize impacts on migratory birds during training or land management activities such as prescribed burning.	Medium		
FWM 3.1	Conduct a survey for powerlines and poles that could be potential bird electrocution hazards.	Medium		
Outdoor Recreation and Public Access to Natural Resources				
OR 2.1	Maintain the hunting and fishing programs in place at McEntire JNGB.	Low		
Conservation Law Enforcement				
CLE 1.1	Continue to implement the MOU between McEntire JNGB and SCDNR for conservation law enforcement.	High		
Management of Threatened and Endangered Species and Habitats				
TE 1.1	On a semi-annual basis, update the list of threatened and endangered species, species of concern, and at-risk species that occur within Richland County.	High		
Protection of Wetlands and Waters of the United States				
WP 1.1	Ensure compliance with all National Pollutant Discharge Elimination System permits and ensure all permits are kept current.	High		
WP 3.1	Maintain a wooded riparian corridor that serves to protect ecosystem functions.	Medium		
WP 4.1	Remain in compliance with Sections 404 and 401 of the CWA.	High		
WP 5.1	Investigate the verified boundaries of Waters of the United States to determine where it may be feasible to establish a buffer.	Medium		

Table 10-5. Summary of McEntire JNGB Management Actions 2022

Objective No.	Projects	Priority Level	Completed (Date)	Notes (include actions and dates)
Grounds Maintenance				
GM 1.1	Avoid erosion and sediment transport into adjacent waters and streams during excavation and grading activities and revegetate with native species.	Low		
Forest Management				
FM 1.1	Continue to manage FAUs using the unit-specific management recommendations set forth in the 2010 Forest Habitat Management Plan.	Medium		
FM 1.1	As loblolly FAUs reach maturity (60± years of age), convert the unit to longleaf pine.	Medium		
Wildland Fire Management				
WFM 1.1	Update and implement the Wildland Fire Management Plan to the maximum extent practicable.	Medium		
WFM 2.1	Continue to implement the controlled-burn plan to prevent the build-up of dangerous fuel loads on the base.	Medium		
WFM 3.1	Strive for zero fire-related injuries or fatalities through effective fire management techniques and policies, proper training of fire personnel, sufficient resources to fight wildfires and to conduct control burns, and sound planning and execution.	Medium		
WFM 4.1	Conduct controlled burns of grasslands on an as-needed basis to promote a mosaic of diverse native vegetation and help reduce invasive species and woody plants.	Medium		
WFM 5.1	Update all interagency Mutual Aid Agreements as necessary to ensure prompt and complete cooperation during wildfire incidents on base lands.	Medium		
WFM 6.2	Conduct regular surveys of firebreaks and access roads to identify areas where soil erosion is occurring.	Medium		
WFM 6.3	Firebreak maintenance—improve the condition of the permanent firebreaks base-wide.	Medium		
Integrated Pest Management Program				
IPM 1.1	Work with the IPMC to ensure natural resources pest management needs are identified and contracted for	High		
Bird/Wildlife Aircraft Strike Hazard				
BH 1.1	Provide support assistance from the Natural Resources Manager and Environmental Manager to the Safety Office and the USDA Wildlife Specialist in wildlife management.	High		
Public Outreach				
PO 1.1	Determine if there are public outreach opportunities with local community groups, state entities, and non-governmental organizations.	Low		

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11. APPENDICES

APPENDIX A:	REFERENCES
APPENDIX B:	LIST OF ACRONYMS AND ABBREVIATIONS
APPENDIX C:	CONSULTATION
APPENDIX D:	LEGISLATION
APPENDIX E:	INTEGRATED PEST MANAGEMENT PLAN AND INVASIVE AND NONNATIVE SPECIES SURVEY AND MANAGEMENT PLAN
APPENDIX F:	BIRD AIRCRAFT STRIKE (BASH) PLAN
APPENDIX G:	WILDLAND FIRE MANAGEMENT PLAN
APPENDIX H:	FISH, AMPHIBIAN & REPTILE SURVEY, REPORT AND MANAGEMENT PLAN
APPENDIX I:	INFORMATION REGARDING THE SPECIES DOCUMENTED AND POTENTIALLY PRESENT AT MCENTIRE JNGB

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12. ASSOCIATED AND COMPONENT PLANS

COMPONENT PLAN A: INTEGRTED CULTURAL RESOURCES MANAGEMENT PLAN

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