U. S. AIR FORCE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

Shaw Air Force Base

(See INRMP signature pages for plan approval date)

ABOUT THIS PLAN

This installation-specific Environmental Management Plan (EMP) is based on the U.S. Air Force's (AF) standardized Integrated Natural Resources Management Plan (INRMP) template. This INRMP has been developed in cooperation with applicable stakeholders, which may include Sikes Act cooperating agencies and/or local equivalents, to document how natural resources will be managed. Non-U.S. territories will comply with applicable Final Governing Standards (FGS). Where applicable, external resources, including Air Force Instructions (AFIs); AF Playbooks; federal, state, local, FGS, biological opinion and permit requirements, are referenced.

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

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

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DOCUMENT CONTROL

Record of Review – The INRMP is updated not less than annually, or as changes to natural resource management and conservation practices occur, including those driven by changes in applicable regulations. In accordance with (IAW) the Sikes Act and AFI 32-7064, *Natural Resources Management*, the INRMP is required to be reviewed for operation and effect not less than every five years. Annual reviews and updates are accomplished by the base Natural Resources Manager (NRM), and/or an Installation Support Team Natural Resources Media Manager. The installation shall establish and maintain regular communications with the appropriate federal and state agencies. At a minimum, the installation NRM (with assistance as appropriate from the NR Media Manager) conducts an annual review of the INRMP in coordination with internal stakeholders and local representatives of the United States Fish and Wildlife Service (USFWS), state fish and wildlife agency, and National Oceanic and Atmospheric Administration (NOAA) Fisheries, where applicable, and accomplishes pertinent updates. Installations will document the findings of the annual review in an Annual INRMP Review Summary. By signature to the Annual INRMP Review Summary, the collaborating agency representative asserts concurrence with the findings. Any agreed updates are then made to the document, at a minimum updating the work plans.

INRMP APPROVAL/SIGNATURE PAGES

DEPARTMENT OF THE AIR FORCE
20th FIGHTER WING (ACC)
SHAW AIR FORCE BASE, SOUTH CAROLINA

SEP 18 2015

MEMORANDUM FOR 20 CES/CC

FROM: 20 FW/CC

SUBJECT: Integrated Natural Resource Management Delegation Letter

1. Per AFI 32-7064, *Integrated Natural Resource Management*, I delegate approval authority for the items identified below IAW higher headquarters guidance:

Delegation Item	AFI Requirement	Paragraph Number	Delegation Level
Shaw AFB Plan 32-7064, Integrated Natural Resource Management Plan (INRMP) Revisions	AFI 32-7064	2.7.1.	20 CES/CC
Shaw AFB Plan 32-7064, Integrated Natural Resource Management Plan (INRMP) Annual Review Certification	AFI 32-7064	2.7.2.	20 CES/CC
Shaw AFB Wildland Fire Management Plan (WFMP)	AFI 32-7064	2.7.7.	20 CES/CC

2. This letter supersedes previous delegation letters, same subject and remains in effect until rescinded.

3. Please direct any questions to Mr. Ronald S. June, Chief, Natural Cultural Resources, 20 CES/CEIEA, at 895-5193 or ronald.june@us.af.mil.

STEPHEN F. JOST, Colonel, USAF
Commander

DEPARTMENT OF THE AIR FORCE
20th FIGHTER WING (ACC)
SHAW AIR FORCE BASE SOUTH CAROLINA

Shaw Air Force Base
Integrated Natural Resources Management Plan
Annual INRMP Review Summary

In accordance with Air Force Guidance for meeting the Sikes Act Improvement Act requirements, we annually review our Integrated Natural Resources Management Plan (INRMP) with the cooperation of the United States Fish and Wildlife Service (USFWS) and South Carolina Department of Natural Resources (SCDNR). The signatures below indicate the mutual agreement regarding the implementation of this INRMP as stated in AFI 32-7064, *Integrated Natural Resources Management*, section 3.5, that:

- Currently have sufficient professionally trained natural resources management staff available to implement the INRMP, even though 20 CES/CEIEA does have a vacant position in process of being filled.
- Significant changes have not been identified to the installation's mission requirements or its natural resources.
- Projects identified in the INRMP as "must fund" have been budgeted for and implementation is on schedule.
- All required federal, state and installation coordination has occurred.
- 20 CES/CEIEA established and maintained regular communications with the USFWS and the SCDNR.
- INRMP accomplishments since the last annual review are documented to include but are not limited to the following:
  - Continued collaborative work with USFWS for Red-cockaded Woodpecker recovery
  - Completed plantings of native grasses on Poinsett Range to improve RCW habitat
  - Conducted acoustical surveys, mist-netting, capturing and banding to detect and monitor birds and bats, including listed species
  - Continued collaborative work with SCDNR to provide hunting, fishing, and recreational opportunities to the military and public to include youth only hunts and access to disabled on Poinsett Electronic Combat Range
  - Continued work with the U.S. Department of Agriculture (USDA) Wildlife Services to control nuisance wildlife species
  - Maintained BASH depredation permits and assisted and advised on wildlife control
  - Completed forest timber sale on Poinsett Range for stand health and RCW/wildlife habitat improvements
  - Continued invasive plant species control across Poinsett Range through contract
  - Utilized the Air Force Civil Engineering Center (AFCEC) Wildland Fire Center to accomplish 2,496 acres of prescribed fire

Agile Combat Power

- Developed Annual INRMP Work Plans
- Re-formatted INRMP to standardized AFCEC environmental management plan format with minimal substantive changes or updates to keep it current in operation and effect for the management of installation natural resources.
- An environmental assessment is scheduled to be completed in FY19 to evaluate any changes in the INRMP and ICRMP. The last EA was completed in 1999 and although, there have been substantive changes in INRMP implementation, new regulations have been promulgated and a new EA is necessary to be prepared for potential future mission changes.

We request your review on the effectiveness of the INRMP and invite you meet with 20 CES/CEIEA installation staff should you like to discuss or are interested in participating in execution of any projects. Please provide us with any questions, comments or concerns on The Shaw AFB INRMP implementation within 30 days of receipt of this letter.

X

Alvin A. Taylor
Director, SC Department of Natural Resources

Date: 8-28-17

X THOMAS MCCOY Digitally signed by THOMAS MCCOY Date: 2017.07.24 09:31:57 -04'00'

Thomas D. McCoy
Field Supervisor, SC Ecological Services Field...

Date: July 24, 2017

DEPARTMENT OF THE AIR FORCE
20th FIGHTER WING (ACC)
SHAW AIR FORCE BASE SOUTH CAROLINA

26 Sep 2017

MEMORANDUM FOR 20 CES/CEIEA

FROM: 20 CES/CC

SUBJECT: Shaw AFB Integrated Natural Resource Management Plan (INRMP)

1. The Shaw AFB INRMP has been updated in accordance with the Sikes Act and AFI 32-7064 in cooperation with AFCEC, the U.S. Fish and Wildlife Service (USFWS) and the South Carolina Department of Natural Resources (SCDNR). There are no significant changes to the Air Force mission or implementation of this INRMP since the last annual review. This INRMP and annual work plans provide the basis for accomplishing the goals for the next five years.

2. The signature below certifies that the Shaw AFB INRMP is valid and current and appropriately staffed to ensure implementation.

AAMOLD.CHRISTOPHER.B.1231432554
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Date: 2017.09.26 08:19:22 -04'00'

DBCE for
ROBERT E. GROVER, Lt Col, USAF
Commander, 20th Civil Engineer Squadron

Agile Combat Power

EXECUTIVE SUMMARY

This Integrated Natural Resources Management Plan (INRMP) was developed to provide interdisciplinary strategic guidance for natural resources management on Shaw Air Force Base (Shaw AFB), Poinsett Electronic Combat Range (Poinsett Range) and Wateree Recreation Area (WRA) for a period of 5 years, for calendar years 2018 through 2022. The INRMP is a dynamic document that contains information pertinent to every office or agency assigned to Shaw AFB. The INRMP is integrated with other planning functions, including general, comprehensive range, cultural resources, bird aircraft strike hazard and pest management plans. Natural resource categories addressed in this INRMP are: fish and wildlife, outdoor recreation, threatened and endangered species, wetland and water resources protection, urban forestry and grounds maintenance, forestry, wildland fire, invasive species and bird/wildlife air strike hazards.

Natural resources management, as a result of the implementation of this INRMP, will support the military mission through adaptive management to provide the capability to build, equip, train and deploy air force support anytime anywhere. Natural resources managers will implement the principles of multiple use and sustained yield, using scientific methods and an interdisciplinary ecosystem approach. The conservation of natural resources and the military mission shall not be mutually exclusive.

This INRMP is focused on the achievement of ten specific goals for the protection and improvement of the natural environment:

Goal 1: Integrate all natural resources management functions to support and enhance the military mission at Shaw AFB and Poinsett Range.

Goal 2: Maintain and restore native ecosystems compatible with the military mission.

Goal 3: Manage landscape for enhanced biodiversity compatible with the military mission.

Goal 4: Develop and implement invasive/exotic/nuisance species management programs.

Goal 5: Develop and implement monitoring, inventory and information management systems to assess ecosystems.

Goal 6: Manage wildlife populations for health, sustainable human usage and compatibility with ecosystem management principles and the military mission.

Goal 7: Promote planning and coordination of military activities to minimize ecosystem impacts.

Goal 8: Develop and maintain support mechanisms and infrastructure to achieve ecosystem management goals.

Goal 9: Develop partnerships in the management of natural resources.

Goal 10: Evaluate ecosystems to provide adaptive management flexibility and strategic feedback.

These goals were formulated from a comprehensive analysis of regulatory requirements, the conditions of the natural resources on Shaw AFB, Poinsett Range and WRA and consideration of the value of these resources to the people who live and work on the installation. Chapter 8 identifies the specific objectives of each goal and projects that will be implemented to achieve each objective. There will be no significant changes in management direction as a result of implementation of these INRMP goals since the last major revision approved by the 20 Fighter Wing Commander in 2007. Implementation of the INRMP is consistent with the Air Force mission and the management direction of the installation to positively impact the environment through ecosystem enhancements.

Implementation of the INRMP will ensure that Shaw AFB continues to support present and future mission requirements while preserving and enhancing its ecosystem integrity. Over the long term, implementation of the INRMP will help guide base staff to sustain healthy ecosystems at Shaw AFB, Poinsett Range and WRA while supporting military operations.

1.0 OVERVIEW AND SCOPE

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

1.1 Purpose and Scope

This INRMP is a road map for natural resources management at Shaw AFB, Poinsett Range and the WRA, South Carolina. This plan is based on an interdisciplinary approach to ecosystem management. Input from a wide variety of operational organizations on Shaw AFB and various local, state and federal agencies were incorporated into this plan. The U.S. Fish and Wildlife Service (USFWS) and the South Carolina Department of Natural Resources (SCDNR) were consulted during the development of the INRMP and all associated work plans.

Natural resources management is the practical application of ecosystem management, habitat conservation and sustainable land management for the conservation of natural resources. "Natural" resources are living organisms (plants and animals) and non-living material (water, air, soil and minerals).

The Air Force's conservation strategy is to ensure that all aspects of natural resource management are successfully integrated with the Air Force's mission. INRMPs are crafted to provide a military landscape that supports the Air Force mission, while protecting the land and its resources. Shaw AFB is committed to managing resources using a multiple-use approach for planning on the ecosystem level. This integrated management approach seeks to address the multiple use demands on our natural resources, as long as these uses do not exceed the constraints of the ecosystem or conflict with the military mission.

Shaw AFB is trustee to over almost 16 thousand acres of land including a variety of habitats and extraordinary biodiversity. These natural resources are priceless assets of the American people and a great source of strength, providing capability to build, equip, train and deploy the world's most powerful and agile Air Force. Through the application of prudent ecosystem management practices, the Air Force protects and preserves the health, diversity and productivity of our environmental resources that serve as the natural infrastructure upon which the Air Force operates. The marriage of mission objectives with effective environmental stewardship ensures military readiness and safeguards America's natural resources for generations to come.

1.2 Management Philosophy

This INRMP integrates all natural resource management elements to provide good stewardship of all natural assets found on Shaw AFB properties. Per AFI 32-7064, *Integrated Natural Resources Management*,

INRMPs are to be "living documents" incorporating all aspects of natural resources management and ensuring they are compatible with each other and with the Air Force mission. This holistic approach of ecosystem management not only strives to maintain biological diversity on Shaw AFB land, but also incorporates the surrounding landscape in support of the military mission.

1.3 Authority

The Sikes Act (16 United States Code [U.S.C.] 670), as amended, requires the preparation and implementation of INRMPs on military installations. Air Force Policy Directive (AFPD) 32-70, *Environmental Quality* (20 July 1994) and Department of Defense Instruction (DoDI) 4715.3, *Natural Resource Conservation Program* (18 March 2011), state that natural resources at military installations will be managed through effective planning. In AFPD 32-70, the Deputy Undersecretary of Defense (Environmental Security) states that "ecosystem management of natural resources draws on a collaboratively developed vision of desired future ecosystem conditions that integrates ecological, economic and social factors." To effectively integrate ecological, economic and social factors along with the military mission into an effective ecosystem management program, the policy directive further states: "On DoD installations, ecosystem management will be achieved by developing and implementing the Integrated Natural Resource Management Plan and insuring that it remains current." AFI 32-7064 implements these directives by establishing the installation INRMP as the primary planning document for natural resources at Air Force installations. The INRMP assures compliance with statutes, Executive Orders (EOs), Dodo's and AFPDs as detailed in AFI 32-7064.

Installation-Specific Policies (including State and/or Local Laws and Regulations)	
N/A	

1.4 Integration with Other Plans

The INRMP is referenced in the Shaw AFB Base Comprehensive Plan (BCP). The BCP will ensure all Shaw AFB agencies are aware of the INRMP and stress the importance of including INRMP guidance early in planning stages. Construction projects and proposed mission changes that could impact natural resources management and the goals and objectives of this plan are coordinated through 20 CES/CEIEA to ensure INRMP considerations are addressed.

2.0 INSTALLATION PROFILE

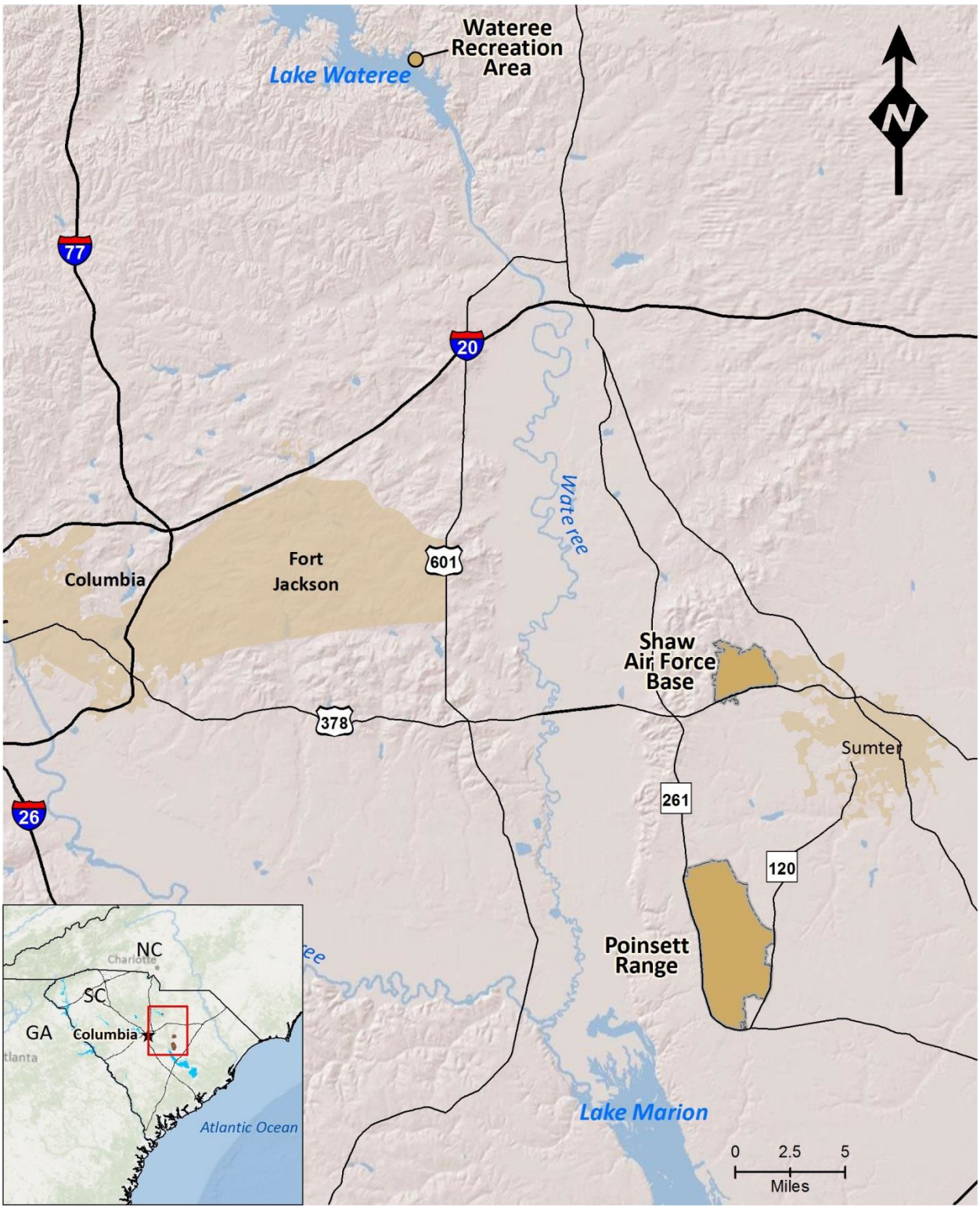
Office of Primary Responsibility	20th Fighter Wing (FW) has overall responsibility for implementing the Natural Resources Management program and is the lead organization for monitoring compliance with applicable federal, state and local regulations
Natural Resources Manager/POC	20 CES/CEIEA 20 Operation Group (OG)
State and/or local regulatory POCs (For US-bases, include agency name for Sikes Act cooperating agencies)	US Fish and Wildlife Service SC Department of Natural Resources
Total acreage managed by installation	16.024
Total acreage of wetlands	5,044
Total acreage of forested land	12,521
Does installation have any Biological Opinions? (If yes, list title and date, and identify where they are maintained)	No
NR Program Applicability (Place a checkmark next to each program that must be implemented at the installation. Document applicability and current management practices in Section 7.0)	☑Threatened and endangered species ☑ Invasive species ☑ Wetlands Protection Program ☑ Grounds Maintenance Contract/SOW ☑ Forest Management Program ☑ Wildland Fire Management Program ☐ Agricultural Outleasing Program ☑ Integrated Pest Management Program ☑ Bird/Wildlife Aircraft Strike Hazard (BASH) Program ☐ Coastal Zones/Marine Resources Management Program ☑ Cultural Resources Management Program

2.1 Installation Overview

2.1.1 Location and Area

Shaw AFB consists of two properties located in the west-central section of Sumter County and one property in Kershaw County, South Carolina. Shaw AFB is approximately 3,503 acres and is north of SC Highway 378/76 on the west side of the city of Sumter (see General Location Map). Poinsett Range encompasses approximately 12,521 acres and is located about 10 miles south of the main base (see General Location Map). Poinsett Range is bounded by SC Highway 261 on the west side and SC Highway 120 on the east. Local population centers include the community of Wedgefield to the north and Pinewood to the south. Both Shaw AFB and Poinsett Range lie within the Upper Coastal Plain physiographic province. WRA is located approximately 35 miles northwest of Shaw AFB encompassing 24 acres on Lake Wateree in Kershaw County (see General Location Map.).

Shaw AFB is a highly developed, urban installation. Of the 3,429 acres, the airfield covers approximately 1,000 acres, base facilities and infrastructure cover 1,400 acres and the remaining area is forest and wetlands. The primary wildlife habitats on Shaw AFB include pine plantations adjacent to the airfields, a creek with associated wetlands along the north edge of the base and four ponds. Shaw AFB consists of relatively flat land with little relief in topography.



General Location Map

Poinsett Range is an air to ground bomb and gunnery range for military training and is managed for its diverse natural resources. The largest part of Poinsett Range is flat, but there are some rolling sandhills

typical of the upper coastal plain. With the exception of the air-to-ground target areas, the land on Poinsett Range is largely forested uplands and wetlands.

WRA is managed for recreational purposes only. The property includes cabins and facilities for camping, boating and picnicking with minimal undeveloped areas. Operation of the recreation area is managed through the 20 Mission Support Group, Force Support Squadron at Shaw AFB. The adjacent impoundment (Lake Wateree) is managed by Duke Power Company.

Installation/GSU Location and Area Descriptions

Base/GSU Name	Main Use/Mission	Acreage	Addressed in INRMP?	Describe NR Implications
Shaw AFB	Provide combat-ready airpower and combat-ready Airmen to meet any challenge, anytime, anywhere	3,503	*BASH and Wetlands section of INRMP*	Permits may be required
Poinsett Range	Air to ground bomb and gunnery range for military training	12,521	Entire INRMP	All INRMP programs
Wateree Recreation Area	Recreation	24	Outdoor Recreation	Minimal

2.1.2 Installation History

The construction of Shaw Field began on 27 Jun 1941, before the United States entered World War II. Shaw Field was activated as an Army Air Corps basic flying school in August 1941. It is named in honor of First Lieutenant Ervin D. Shaw, a Sumter County resident and army aviator who was killed in combat during World War I while on a long-range reconnaissance mission behind enemy lines but not before downing one of his attackers. During World War II, Shaw was one of the largest flying training fields in the US producing new pilots for the Army Air Force. The first class of aviation cadets entered training eight days after the Japanese Navy attacked Pearl Harbor on 7 Dec 1941.

Throughout World War II, Shaw trained about 8600 pilots and graduated its last class on 9 Mar 1945. Most flew the Vultee BT-13 “Vibrator” and the North American AT-6 Texan. When the primary training mission ended, fighter transition training began. With the new mission came the Republic P-47 Thunderbolts. For a few months starting in March 1945, Shaw Field was also host to up to 175 German prisoners of war. Their compound was across state highway 441 from the base. The Germans left in early 1946.

That year the 20 Fighter-Bomber Group arrived, equipped with P-51 Mustang Fighters. Not long afterwards, the group’s pilots transitioned into their first jets, the F-84 Thunderjets.

On 15 Aug 1947, the 20 Fighter Wing became the host organization and on 13 Jan 1948, Shaw became an Air Force Base instead of a Field.

Three years later, the 20 transferred to Langley AFB, Va. and was replaced here by the 363rd Tactical Reconnaissance Wing (TRW) as the host wing. A larger unit, it greatly increased the population and operations at Shaw.

Next arriving was 9th Air force Headquarters, which transferred from Pope AFB, N.C. in September of 1954 along with the 507th Tactical Group.

Shaw pilots set at least one world's record. On 27 Nov 1957, four McDonnell-Douglas RF-101 Voodoos assigned to the 363rd TRW lifted off from Ontario County Airport, Calif. and headed for New York. Known as Operation Sun Run, the mission broke the transcontinental flight record. Taking three hours and seven minutes, the Voodoos streaked across the continent at an average of 781.74 miles per hour.

Shaw pilots played a major role in the Cuban Missile Crisis of 1962, as it was a Shaw jet from the 363rd TRW deployed to Florida, which photographed Russian nuclear missiles in Cuba. Shaw pilots crisscrossed Cuba in their RF-101s, producing detailed photos of Russian missiles and installations. Once the crisis ended, President John F. Kennedy visited the base to present a Presidential Unit Citation and praise to the Wing.

Modernization arrived with F-16s in 1982 just after the 363rd Tactical Reconnaissance Wing became a tactical fighter wing.

On 1 Jan 1994, the 20 FW returned to Shaw after 40 years in England, first at RAF Wethersfield and the last 24 years at the United Kingdom's Upper Heyford air base. The 363rd TRW inactivated. Today's fighter squadrons, the 55th, 77th and 79th also stood up here on 1 Jan 1994.

Since then pilots from Shaw have taken part in every defensive military action since September 11, 2001 and the attack on the World Trade Center, 20 FW pilots stood alert to guard America's skies against intruders until 15 Nov 2003 and again from 1 Aug 2006 until 6 May 2011.

2.1.3 Military Missions

The 20 Fighter Wing is the USAF's largest F-16 combat wing operating the 55th, 77th and 79th Fighter Squadrons. The stated mission of the 20 Fighter Wing is to: provide combat-ready airpower and combat-ready Airmen to meet any challenge, anytime, anywhere. The function of the Shaw INRMP is to develop strategies to sustain natural resources in support of the mission at Shaw AFB and the training mission at Poinsett Range.

As host wing at Shaw, the 20 FW retains the responsibility for providing facilities, personnel and material for the operation of Shaw AFB. Major associate units at Shaw AFB and their missions are:

- Headquarters Ninth Air Force: The Ninth Air Force exercises control over ten active duty Air Combat Command Wings in the Continental US, as well as, numerous Air Force Reserve and Air National Guard units. The Ninth Air Force also maintains a continuous tactical control support system capable of providing direction to air elements and to direct fire support ground forces. It also provides a deployable combat intelligence capability in direct support of the Air Force Tactical Air Control System.
- Headquarters Third Army: The Third Army is a joint task force-capable headquarters ready for full-spectrum operations, standing ready to conduct operations anytime and anywhere in the U.S. Central Command (USCENTCOM) area of responsibility. The Third Army spans an area of more than 4.5 million square miles, across 20 countries and four time zones.

Shaw AFB is also responsible for Poinsett Range and WRA. Poinsett Range is an auxiliary facility that provides a combat training environment for aircrews. WRA is an auxiliary facility that provides boating, camping and picnicking facilities on Lake Wateree.

Listing of Tenants and NR Responsibility

Tenant Organization	NR Responsibility
Detachment 212, Air Force OSI	Shaw AFB

337th Recruiting Squadron	Shaw AFB
372nd Training Squadron (AETC)	Shaw AFB
Detachment QD 20, Area Defense Council	Shaw AFB
Defense Commissary Agency	Shaw AFB
Detachment 261, Air Force Audit Agency	Shaw AFB
Army Air Force Exchange Service	Shaw AFB
Defense Reutilization and Marketing Office	Shaw AFB
Detachment 212, Air Force OSI	Shaw AFB

2.1.4 Surrounding Communities

The city of Sumter is the county seat of Sumter County, SC and is located in the central sandhills region of the state, 44 miles east of Columbia, the state capital.

Settled circa 1740 by English–speaking Americans from along the Atlantic coast, Sumter originally developed into the first agrarian community in South Carolina away from the coast. The city has a population in excess of 40,000 with the county population exceeding 104,000. Through its agreement to be annexed into the city, Shaw AFB enabled the Sumter community to achieve status as a Metropolitan Statistical Area (MSA) following the 1990 census. Shaw AFB is the largest employer in Sumter and a major job source for central South Carolina.

The city is encircled by three Interstate Highways, I-20 to the north, I-26 to the west and I-95 to the east. The presence of these major interstate highways encourages continued industrialization. U.S. Highway 76/378 provides connector routes to the east and west with U.S. Highway 15 leading north-south.

2.1.5 Local and Regional Natural Areas

Shaw AFB is conveniently located within an hour and a half from several natural areas, including the Francis Marion National Forest. Local natural areas include Manchester State Forest, Poinsett State Park and Congaree National Park. These and other areas provide wildlife watching, hiking, hunting and many other outdoor activities. The following table (see below Proximity of Local and Regional Natural Areas) lists natural areas that are easily accessible from Shaw AFB and their proximity.

Proximity of Local and Regional Natural Areas

Carolina Sandhills National Wildlife Refuge – 55 miles north of Sumter
Congaree National Park – approximately 30 miles west of Shaw AFB
Francis Marion National Forest – approximately 70 miles southeast of Sumter
Goodale State Park – 45 miles north of Shaw AFB near Camden, SC
Lake Wateree State Park – approximately 40 miles north of Shaw AFB
Lee State Park – approximately 25 miles northeast of Sumter near I-20
Lynches River State Park – 40 miles east of Sumter and 12 miles south of Florence, SC
Manchester State Forest – 10 miles south of Sumter, surrounding much of Poinsett Range
Poinsett State Park – 18 miles southwest of Sumter on Hwy. 261 west of Poinsett Range
Santee National Wildlife Refuge – 50 miles southeast of Sumter off I-95 on Lake Marion
Santee State Park approximately 60 miles southeast of Sumter, 3 miles northwest of Santee, SC on Lake Marion
Swan Lake and Iris Gardens – in Sumter

Woods Bay State Park – 25 miles east of Sumter

2.2 Physical Environment

2.2.1 Climate

The climate of Sumter County is broadly classified as Humid Sub-tropical. Summers are generally hot and humid with average maximum temperatures around 90 °F (Jun-Aug). Winters are mild with average minimum temperatures around 37.5 °F (Dec-Feb). Precipitation in Sumter County averages 45 inches per year. The precipitation maximum occurs during the summer months, with average monthly rainfall approximately 5.2 inches. There are two distinct precipitation minima in the region occurring during the spring and fall, with April and November being the driest months averaging 2.75 and 2.85 inches respectively from 1981- 2016 at Wedgefield, SC (Source: National Climate Data Center).

Significant drought has impacted this region on numerous occasions during the 20 Century including the mid-1950s and mid-1980s. Most recently, Sumter County experienced a drought lasting from 1998 thru 2011 with a brief period from 2007-2009 experiencing slightly wetter than normal conditions as well as recent years since 2011. Drought can have widespread and lasting effects on local ecosystems, including increased stress on vegetation, changes in mast production, changes in wetland hydrology and increased wildfire danger. Access to both short and long term drought indices is available through the local National Weather Service Forecast Office, the National Climate Prediction Center, as well as the South Carolina State Climatologist and University of South Carolina. Understanding current and predicted drought mechanisms and variability is vitally important for effective natural resource management. Other extreme events can also have significant impacts on natural resource management. Sumter County has experienced 3 ice storms since 2012. Ice storms can cause significant damage to timber resources, have lasting impacts on wildlife habitat and hamper the ability of personnel to safely work for an extended period of time. Sumter County has also experienced significant impacts from hurricanes over the past 150 years. Hurricanes have brought damaging winds to the region, most notably in 1989 when Hurricane Hugo passed directly over Sumter County. Historical information indicates that Sumter County is subject to hurricane and tropical storm force winds every 5 to 10 years.

Weather and climate play an important role in ecosystem monitoring and management. Natural resource managers must plan management strategies based on climatic norms, but they also must be able to adapt to extreme events and be prepared to adjust management strategies as conditions dictate. Therefore, the Shaw Natural Resources staff actively monitors meteorological conditions through both regional and local source data. Forecast information is available through the National Weather Service Forecast Office (WFO) in Columbia, SC. Regional meteorological data is available through WFO Columbia and the National Climate Data Center. Additionally, 20 CES/CEIEA operate and maintain a network of weather monitoring stations at Poinsett Range. These stations primarily serve the purpose of collecting localized precipitation data used for management activities that are highly moisture dependent such as prescribed fire.

2.2.2 Landforms

Shaw AFB consists of three separate properties; Shaw AFB proper, Poinsett Range and WRA (see Figure General Location Map). Shaw AFB contains the main facilities and airfield operations. Poinsett Range is located approximately 10 miles south of Shaw AFB and provides air-to-ground combat training environments. WRA is approximately 40 miles north of Shaw AFB on the shore of Lake Wateree near Camden, SC. WRA is for recreational purposes only.

Elevation in Sumter County ranges from 80 feet above mean sea level in the floodplains of the Wateree River, to over 400 feet in the Sandhills region. Elevation on Shaw AFB and Poinsett Range varies around 200 feet above mean sea level.

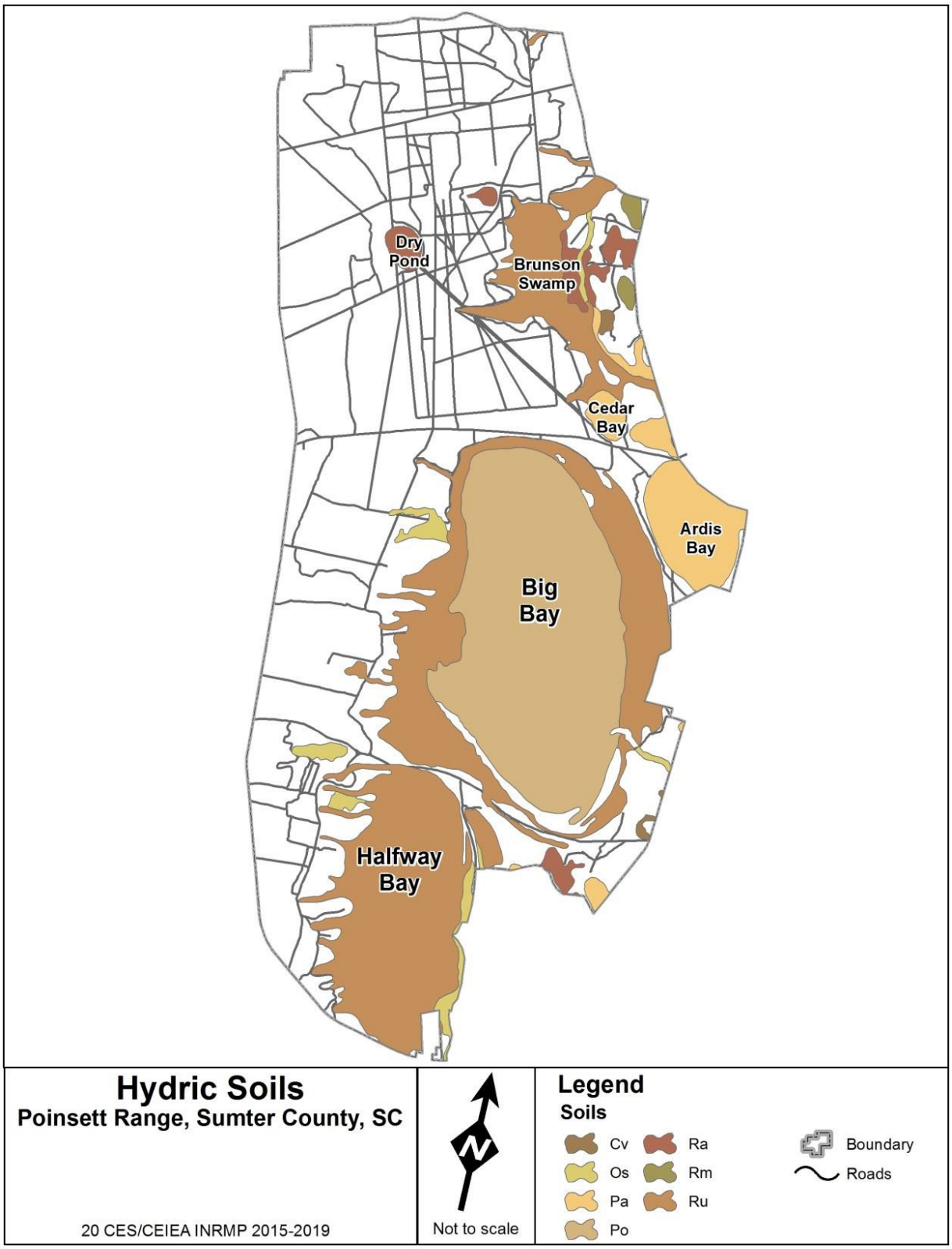
2.2.3 Geology and Soils

In general, the coastal plain of South Carolina consists of Cretaceous to Quaternary age sedimentary rocks overlying a basement complex of Paleozoic age crystalline and Triassic age sedimentary rocks. The dip and thickness of these sedimentary formations increases with depth, forming a wedge as they thicken in a southeast direction. The strike of these formations at the surface is generally northeast. The accumulation of the coastal plain sediments begins at the fall line near Lugoff, South Carolina and increases to more than 3,500 feet at the continental shelf. The thickness of the coastal plain sediments in the area is around 700 feet and consists of unconsolidated gravel, sand, silt, clay and marl. The principle geologic formations consist of Cretaceous age Middendorf formation, Cretaceous age Black Creek formation and Tertiary age Black Mingo formation. The Black Mingo formation is overlain by Quaternary age unconsolidated surface deposits.

Shaw AFB and Poinsett Range soil types are identified in the Sumter County Soil Survey. Detailed soil descriptions are provided in the Appendix Poinsett Range Soil Descriptions. The major soil series and mapping units adjacent to Shaw AFB and Poinsett Range are: Osier Series (Os); Troup Series (TrB); Wagram Series (WgB, WgC); Lucy Series (LuB, LuC); Greenville Series (GrA, GrB); Orangeburg Series (OrA, OrB, OrC); Pantego Series (Pa); and Lakeland Series (LaB).

Of these major series, the Osier, Wagram, Greenville and Pantego Series are classified as hydric soils for Sumter County. Hydric soils are those that are saturated, or flooded for sufficient periods during the growing season to develop anaerobic conditions in the upper layers. Sufficient duration for saturation is generally considered to be one week or more during a period when soil temperatures are above 41 °F (biological zero). The Figure Hydric soils on Poinsett Range are shown below.

The soil profiles for Shaw AFB consist mainly of the Orangeburg-Lucy-Greenville association, which is generally well drained with a sandy or loamy surface layer and loamy or clayey subsoil. Typical soil types within Shaw AFB include Lakeland sand, Troup sand, Lucy sand and Wagram sand. Wetlands of the area are usually dominated by Osier loamy sand.



Poinsett Range Hydric Soils

2.2.4 Hydrology

Aquifers

There are three aquifer systems in the area: the shallow aquifer system, the Middendorf aquifer system and the Black Creek aquifer system. Each aquifer system is isolated from the others by clayey sequences. The shallow aquifer system is located in the vicinity of Shaw AFB and includes unconsolidated sands and clays of the Black Mingo Formation and some unnamed surface deposits.

The Black Mingo formation within the shallow aquifer system is characterized by glauconitic fine-grained quartz sand with beds of gray to light green silty clay and beds of opaline claystone. The opaline claystone primarily acts as a confining bed and inhibits infiltration of surface water. The hydraulic characteristics of the shallow aquifer system are poorly defined. Groundwater in the shallow aquifer occurs under confined, semi-confined and unconfined conditions. Typical yields from wells in this aquifer system range from 100 to 450 gal/min and well depths range from 10 to 100 feet. Groundwater flow within the shallow aquifer is usually controlled by local topography.

The Middendorf aquifer system is the deepest and generally the most productive aquifer in the Sumter Area. In the vicinity of Shaw AFB, it is found at depths of more than 325 feet below the ground surface. Typical Middendorf deposits contain tan, fine-to-course sands interbedded with orange-brown silts and clays. Large-diameter wells produce water from the Middendorf aquifer and yield varying amounts ranging from 500 to 2,000 gal/min in some areas of the county.

The Black Creek aquifer system underlies most of Sumter County and is a significant water source for much of the central coastal plain. The matrix rock of this aquifer under the base consists of medium-to-course sands and gravels layered with clays. In the vicinity of the base, this aquifer system has a thickness of 150 to 200 feet and occurs at a depth of approximately 200 feet below the ground surface. The average yield ranges from 50 to 75 gal/min depending on the well diameter.

Wetlands

The extent and function of wetlands on Shaw AFB contribute value to South Carolina's freshwater. The U.S. Army Corps of Engineers (USACE) and South Carolina Department of Health and Environmental Control (SCDHEC) have jurisdictional authority over the wetlands on Shaw AFB and Poinsett Range. All work affecting wetlands must be performed in compliance with applicable federal and state wetlands legislation and compensatory mitigation could be required for any wetland impacts.

Long Branch is the only naturally occurring wetland feature on Shaw AFB. Regulated wetlands occupy 62.3 acres on Shaw AFB and are mainly located on the north end of the base associated with Long Branch. Surface water features on Shaw AFB consist of four ponds and several canals and ditches associated with runways and taxiways. These drainage systems were created for the purpose of removing storm water runoff from airfield areas. These man-made systems are maintained by active mowing practices and contain very little hydrophytic vegetation.

Poinsett Range has a total of about 5,444 acres wetlands present. Carolina Bays account for about 4,200 acres, or about 78% of the total wetland area occurring on Poinsett Range. Other wetlands are present in Brunson Swamp, the woodlands on the east side of the two larger Carolina Bays and in other locations adjacent to the natural drains on the property. These areas total about 1,200 acres. Numerous, small, often isolated wetlands are present throughout the upland sandhills on Poinsett Range. These wetlands contain vegetation which is significantly different from the plants on the surrounding dry hills. Most of these areas are individually greater than ½ acre in size and total about 44 acres.

Poinsett Range contains nine identified Carolina Bays or bay complexes. The bays range in size from about 6 acres to over 2,600 acres. The bays remain relatively intact functional wetlands, considering the disturbances and alterations that have occurred to other Carolina Bays over the past century. The bays provide an important habitat for a wide variety of vertebrates. Many resident mammals, reptiles and amphibians, as well as, resident and migratory birds depend on the habitat they offer. The bays support diverse flora and the potential for the presence of rare plants is high.

The Carolina Bays are the most striking features in the landscape of Poinsett Range. The Carolina Bays are shallow, poorly drained basins that exhibit several characteristics in common. These unique geomorphic features are all essentially elliptical in shape and are aligned along a northwest-southeast axis. The long axes of all Carolina Bays are parallel and when viewed from the air, these elliptical landforms present a striking image. There has been much debate concerning their origin. Distribution patterns vary, resulting in areas where few bays occur and areas where bays are quite numerous. In areas of high bay density, clusters of bays may be found and appear to overlap neighboring bays. Regardless of size or location, all unaltered bays function as wetlands. Soils typical of wetlands, having developed under conditions of limited oxygen due to periodic or frequent inundation are present. Soils of a bay's interior differ markedly from the soils that occur outside the bay's basin. Soils in the interior of these bays are high in organic matter content and hydric in nature. Most Carolina Bays would be classified as a type of isolated, temporarily flooded wetland.

Floodplains

Sumter County is in the Upper Coastal Plain physiographic region of South Carolina. It is made up of three broad physiographic areas including the Sandhills, the Southern Coastal Plain and the Atlantic Coast Flatwoods. Shaw AFB is in the Southern Coastal Plain and Poinsett Range is in the Sandhills. On Shaw AFB, the land is nearly level to gently sloping, with steeper slopes adjacent to the streams and drainage ways. Generally, drainage is good. Elevation on Shaw AFB varies from approximately 200 to 330 feet above sea level.

The abundant organic material in these characteristic black water streams causes a natural acidic condition. The streams are also susceptible to further decreases in pH from acid precipitation.

A very limited area of Shaw AFB lies within the 100-year floodplain. It is concentrated on the eastern edge of the base adjacent to Long Branch within the runway clear zone. Development within a floodplain area is often expensive and environmentally unsound. Such development is often severely restricted or prohibited by Section 404 of the Clean Water Act and Executive Order 1188.

Watersheds

Shaw AFB contains two major watersheds and Poinsett Range contains four primary drainage basins. The watersheds of Shaw AFB are subdivided into Upper and Lower Watersheds, which both drain into Long Branch (see Figure Watersheds on Poinsett Range). The northwest section of Shaw AFB contains the Upper Watershed, which generally drains northeast to the upper reaches of Spann Branch and Long Branch and it totals about 329 acres. The remainder of Shaw AFB, about 3,100 acres, is in the Lower Watershed, which generally drains southeast into either Long Branch or Mush Swamp. The creeks are part of the headwaters of Pocotaligo Swamp which flows into Black River and then on into Winyah Bay and the Atlantic Ocean near Georgetown, South Carolina.

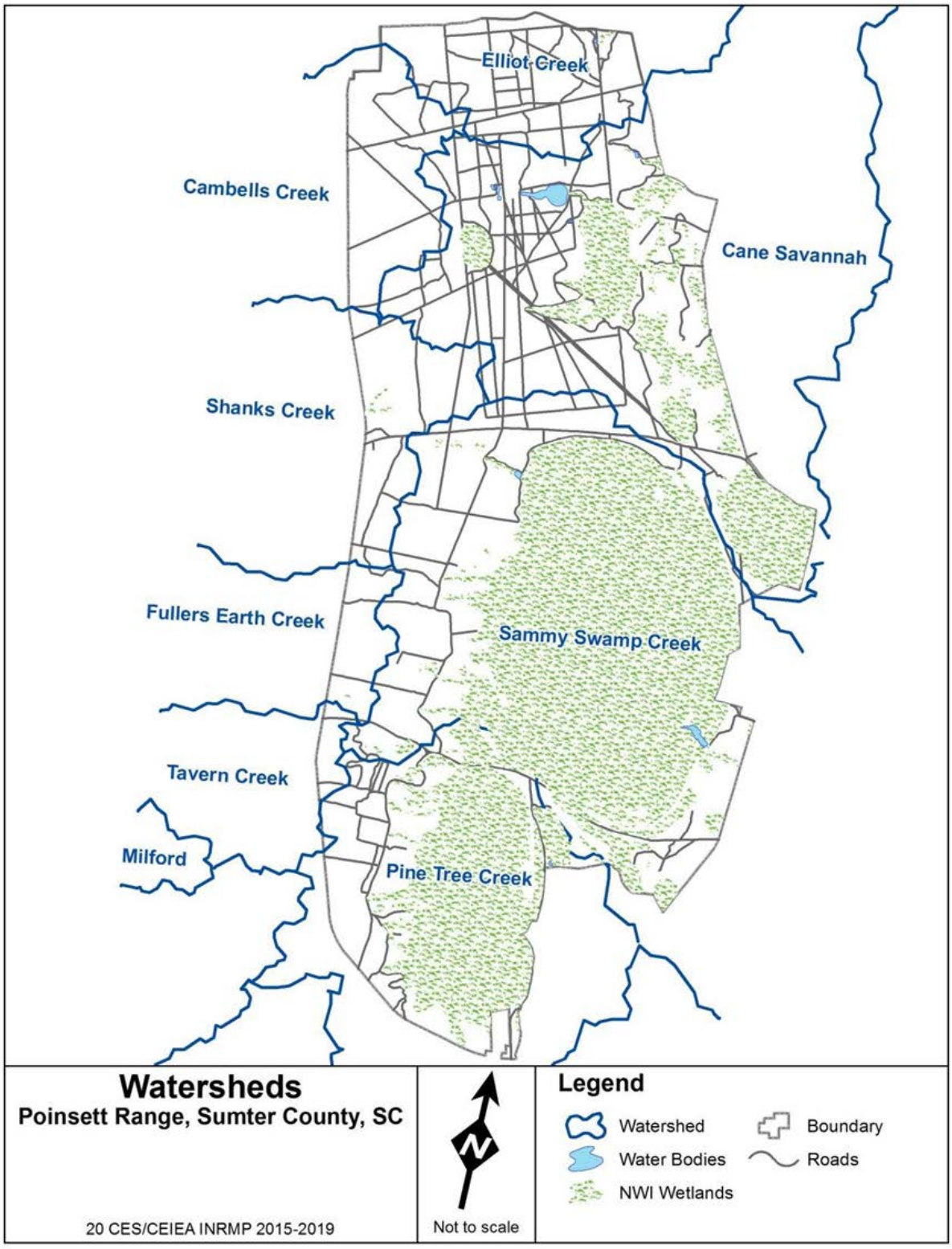
The watersheds of Poinsett Range were subdivided according to drainage into the Wateree River, Pine Tree Creek, Sammy Swamp and Brunson Swamp. The watershed sizes are listed in the table below.

Poinsett Range Watershed Sizes

WATERSHED	ACRES
Wateree River	2,490
Pine Tree Creek	2,150
Sammy Swamp	4,720
Brunson Swamp	2,960
Elliot Creek	200

The Wateree River Watershed supplies water to the Wateree River primarily through subsurface draining. A smaller amount of surface water is generated in springs just north of the Rosemary Fire tower. The springs flow into Shanks Creek, which in turn flows to upper Lake Marion and the Santee/Cooper River Complex, which then enters the Atlantic Ocean near Charleston, South Carolina. The Pine Tree Creek Watershed also transfers water to the Santee/Cooper River Complex. Pine Tree Creek flows into upper Lake Marion near the town of Rimini. The total acreage which drains into the Santee/Cooper River Complex from Poinsett Range is about 4,640 acres.

The remainder of Poinsett Range flows into the same river system as the water from Shaw AFB. Sammy Swamp and Brunson Swamp are also headwaters of the Pocotaligo River system, which reaches the Atlantic Ocean via the Black River and Winyah Bay. The total acreage on Poinsett Range, which flows into the Pocotaligo River, is about 7,880 acres.



Watersheds on Poinsett Range

2.3 Ecosystems and the Biotic Environment

2.3.1 Ecosystem Classification

The Natural Hierarchical Framework of Ecological Units, also known as Bailey's Ecoregions, was adopted by the U.S. Forest Service (USFS) in 1993. The Natural Hierarchical Framework is a recognizable classification and mapping system that links soils, physiography and habitat types to stratify the landscape into progressively smaller areas.

The broadest unit, the "Ecosystem Domain," places Shaw AFB, Poinsett Range and WRA in the Humid Temperate Domain. The Humid Temperate Domain contains forests of broadleaf deciduous and needle-leaf evergreen trees.

Variability in winter frost determines the next unit, "Division", which places Shaw AFB, Poinsett Range and WRA in the Subtropical Division, one of six divisions across the continental United States. The humid subtropical climate, marked by high humidity (especially in summer) along with the absence of really cold winters, prevails in the Southern Atlantic and Gulf Coast States. Soils in moister, warmer parts of the humid subtropical regions are strongly leached Ultisols. Rich in oxides of iron and aluminum, these soils are poor in many of the plant nutrients essential for successful agriculture production. This division is mainly vegetated in second growth forests of pines.

The third largest unit of measure is the "Ecosystem Province." Shaw AFB and Poinsett Range are located on the western border of the Outer Coastal Plain Mixed Forest Province. This province comprises the flat and irregular Atlantic and Gulf Coastal Plains down to the sea. Well over 50 percent of the province is gently sloping. Most of the region's numerous streams are sluggish; marshes, swamps and lakes are numerous. Shaw AFB and Poinsett Range occur in the sandy uplands portion of this province; indicated by the forest of loblolly and longleaf pine and pond cypress, the dominant tree in the swamps at Poinsett Range.

Wateree Recreational Area in Kershaw County is in the southern mixed forest province. WRA is located in the Piedmont with 80% of the area sloping gently toward the sea and local relief of 300-1000 ft. Most of the numerous streams and lakes are also sluggish. At least 50% of the trees are loblolly pine, shortleaf pine and southern yellow pine species. The remaining trees are mostly hardwoods such as oak, hickory, sweetgum, blackgum, red maple and winged elm.

2.3.2 Vegetation

2.3.2.1 Historic Vegetative Cover

In general, Sumter County is characterized by a mixture of agriculture, forest and wetlands, with a population center in Sumter. Agricultural areas include a combination of farmland and pasture, with approximately 36% of Sumter County used for cultivated crops. The economy of Sumter County remains dependent on principal crops such as tobacco, cotton, corn, wheat/oats and soybeans. Forest products are also an important source of income for Sumter County. Land use adjacent to Shaw AFB (which was annexed into Sumter city limits in 1989) is comprised of agriculture, light industrial, residential and undeveloped lands. Within the boundaries of Shaw AFB, land use corresponds to habitat types and community types.

2.3.2.2 Current Vegetative Cover

Vegetative community types found within Sumter County include: Cypress-Gum Swamp, Stream Head Pocosin, Upland Pine-Wiregrass Woodland, Xeric Sandhill Scrub, Bottomland Hardwoods, Small Stream Forest, Pond Pine Woodland, Pond Cypress Pond, Pond Cypress Savanna, Pocosin, Pine-Scrub Oak Sandhill, Pine Flatwoods, Pine Savanna, Non-alluvial Swamp Forest, Oak-Hickory Forest and Mesic Mixed Hardwood Forest. Approximately, 800 vascular plant species occur in Sumter County. Diversity of wetland plant species at Shaw AFB is fairly limited due to rather extensive disturbances that have occurred in the past.

Bottomland Hardwoods/Small Stream Forest

Several natural and disturbed community types are identified at Shaw AFB. The community types and approximate percentage of Shaw AFB covered by each type, include: Bottomland Hardwoods/Small Stream Forest (1%); Pond/Pond Margin/Stream head Pocosin (<1%); Oak/Hickory Forest (<1%); Pine Plantation (13%); and Disturbed/Urbanized Communities (84%).

Examples of true bottomland hardwood forests are absent at Shaw AFB, but several areas can be described as Small Stream Forests. These two communities share several features (e.g., both communities are periodically flooded, have similar soils and contain several of the same tree species). The areas around the confluence of Spann Branch Creek and Long Branch Creek were initially thought to be Small Stream Forest; however, past disturbances of Long Branch Creek and the subsequent invasion by exotic plant species precludes its definition as this community type. On the other hand, Mush Swamp still retains a reasonably well-developed hardwood canopy of native tree species such as red maple, ash, laurel-leaf oak and hackberry, as well as an understory of shrubs such as the non-native Chinese privet, Japanese privet and the native wax myrtle. Its floodplain has been extensively invaded by a number of exotics, yet the herbaceous diversity is quite low compared to better examples of Small Stream Forest elsewhere in the coastal plain.

Pond/Pond Margin/Stream Head Pocosin

There are no natural ponds on Shaw AFB. Three artificial ponds developed on the golf course offer wetland habitat for a large number of wetland species. Mowing of the golf course keeps the margins open enough to support naja, water-spider orchid, meadow beauty, bugle-weed, ludwigia, downey lobelia, smartweed and other native wetland plants. Healthy examples of stream head pocosins are not present on Shaw AFB. The draws leading uphill (upstream) from the ponds are primarily filled with non-native shrubs.

Oak/Hickory Forest

Examples of the Oak/Hickory Forest community in successional transition occur on the north portion of Shaw AFB adjacent to the housing areas. Native species still present in this community include: loblolly pine, white oak, pignut hickory, mockernut hickory, sparkleberry, flowering dogwood and winged elm.

Pine Plantation

The pine plantations in the southeastern corner of Shaw AFB consist primarily of 30- to 40-year- old loblolly pine trees. The basal area is approximately 90 to 200 square feet per acre and the trees are 40 to 70 feet tall. The trees are on 8-ft by 10-ft or 8-ft by 8-ft spacing and are generally too small, young, close and isolated to provide appropriate red-cockaded woodpecker (RCW) habitat.

2.3.2.3 Turf and Landscaped Areas

The majority of the land on Shaw AFB is characterized as semi-improved or improved and is intensively landscaped and maintained. On Poinsett Range, only a small percentage of the landscape is maintained. These areas are around the offices, observation towers, maintenance facilities.

2.3.3 Fish and Wildlife

Shaw AFB, Poinsett Range and WRA contain suitable habitats for a wide variety of fauna. Animals known to occur on each property are listed in the Appendix Lists and Flora and Fauna. Fish and Wildlife will be discussed in detail in the section Fish and Wildlife Management.

2.3.4 Threatened and Endangered Species and Species of Concern

The threatened and endangered (T/E) species program focuses on maintaining mission readiness through the management of federally listed T/E species on Shaw AFB, Poinsett Range and/or WRA. Under Section 7 of the Endangered Species Act (ESA), the U.S. Air Force (USAF) is required to protect and manage federally listed T/E species on installations where they occur and to develop site-specific plans to preserve those species and their habitats. AFI 32-7064 further directs USAF installations to protect and conserve, when practical, state-listed species and species that are candidates for federal listing and to prepare and maintain a current inventory of T/E species and habitats as part of the base habitat inventory. To date, no federally listed T/E species have been documented at Shaw AFB or WRA and the Red-cockaded Woodpecker (RCW) is the only federally endangered species known to occur at Poinsett Range. The American alligator, which is federally listed as threatened because it can be mistaken for the federally endangered American crocodile, also occurs at Poinsett Range.

The T/E program emphasizes the recovery of the RCW population at Poinsett Range and the restoration of the longleaf pine ecosystem it inhabits. Additional program objectives include conducting periodic surveys to locate rare or listed species that could potentially occur at Shaw AFB, Poinsett Range or WRA and providing proactive ecosystem management to support existing mission requirements as well as future mission changes or expansions. T/E species will be discussed in detail in the section Management of Threatened and Endangered Species, Species of Concern and Habitats.

2.3.5 Wetlands and Floodplains

Shaw AFB and Poinsett Range supports many natural wetland-dependent communities. An approximate delineation was completed in 2016 for 62.3 acres a jurisdictional wetlands occurring on Shaw AFB. Poinsett Range contains about 5,044 acres of wetlands according to the 1993 national wetland inventory. Wetlands identified on Poinsett Range include: Cypress-Gum Swamp, Small Stream Forest, Streamhead Pocosin, Atlantic White Cedar Forest, Non-Alluvial Swamp, Depression Meadow, Bay Forest and Pocosin. The Xeric Sandhill Shrub community, although an upland type, is present on several sand rims of Carolina Bays and on those sites it is dependent on the existence and integrity of surrounding wetland communities such as Pocosin.

Floodplain delineations of areas affecting Shaw AFB, Poinsett Range and WRA are maintained in Shaw's geographic information system (GIS). Flood insurance rate maps (FIRM) acquired from Federal Emergency Management Agency (FEMA) were used to estimate floodplain areas. Floodplain data and maps for Sumter County can also be obtained from the http://www.sumtersc.gov website. Wetlands are further discussed in the section Water Resource Protection.

2.3.6 Other Natural Resource Information

A large number of studies and reports have been performed on Shaw AFB and Poinsett Range since 1994 when Poinsett Range expanded and the 20 CES/CEIEA, Natural Cultural Resources Management section at Shaw AFB began. Most of the data from these studies and reports are incorporated into the development of this document.

A long-term ecosystem monitoring program has been in continuous operation at Shaw AFB and Poinsett Range since 1996. Patterned originally after the U.S. Army Land Condition-Trend Analysis (LCTA), the program provides a baseline and updates on the status of the overall ecosystem at Shaw AFB and Poinsett Range. It is a highly useful tool for assessing current project impacts on ecosystems and for forecasting future impacts and monitoring of these projects. Forest inventory studies at Poinsett Range have helped the Endangered Species Manager and the Forester develop appropriate management strategies for their respective sections of this INRMP. Long term ecosystem monitoring is discussed further in the section Long Term Ecosystem Monitoring.

2.4 Mission Impacts on Natural Resources

2.4.1 Natural Resource Constraints to Mission and Mission Planning

Current impacts to the environment at Shaw AFB result primarily from flight training activities. Impacts at Poinsett Range principally result from flight training and training ordnance dropped at Poinsett Range. Typical impacts resulting from the Shaw AFB mission include: noise from overflights and training ordnance, fire resulting from ordnance use, ground disturbance resulting from range maintenance activities such as target placement and road repair and bird and wildlife strikes with aircraft.

Bird and Wildlife Aircraft Strike Hazards (BASH) are likely to continue at a similar level to recent years. The base has adopted an aggressive response to birds and other animals that may impact the flying mission. These efforts are detailed in section Bird/Wildlife Aircraft Strike Hazard (BASH) of this plan as well as the Shaw AFB BASH Plan 91-212.

2.4.2 Land Use

Shaw AFB consists of two properties in addition to the main base, one located in the west-central section of Sumter County and one property in Kershaw County, South Carolina. Shaw AFB consists of about 84% improved lands whereas Poinsett Range is about 95% unimproved lands and WRA is 95% improved. The land on Shaw AFB is used primarily to support the Air Force mission. Poinsett Range is mostly forested uplands and wetlands that are managed for their natural resources to support the Air Force training mission as an air to ground bomb and gunnery range. WRA on Lake Wateree in Kershaw County is used for recreational purposes.

2.4.3 Current Major Impacts

Hazardous Waste

The 20 FW at Shaw AFB generates a large quantity of hazardous waste under Environmental Protection Agency (EPA) identification number SC7570024466. The primary source of hazardous waste generated at Shaw AFB originates from the maintenance and operation of jet aircraft. Typical hazardous waste includes: waste paint, paint contaminated rags and debris, cleaning solvents and excess hazardous materials. Most of the waste generated at the facility is disposed through the Defense Logistics Agency – Disposition Services (DLA-DS), except for waste fuel, oil filters and oils and POL absorbents, which are recycled by a local contractor.

Hazardous wastes are collected in 30-gallon drums or other suitable containers at various generation points throughout the base and transferred to the “less than 90 day storage area”, also known as the centralized accumulation point (CAP). There are two types of accumulation points, satellites and the CAP. A satellite accumulation point can collect up to 55-gallons of waste and then has 3 days to transfer that waste to the CAP, which consolidates wastes from all over the base prior to shipment off-site for disposal. Currently, Shaw AFB has 27 satellite accumulation points and 1 CAP. The satellite areas are managed by designated Accumulation Point managers, trained by 20 CES/CEIEC. The CAP is a contracted operated facility, with oversight by 20 CES/CEIEC.

Shaw AFB currently maintains a RCRA Corrective Action Permit, issued by SCDHEC for management of Environmental Restoration Program and RCRA Corrective Action sites.

Poinsett Range operates as a conditionally exempt small quantity generator of hazardous waste under EPA identification number SC9570090002. The primary source of hazardous waste generated at Poinsett Range originates from the operation of an electronic combat radar site and range clearance operations. Typical waste streams are waste batteries, fuels, fluorescent light bulbs and used M-60 igniters. These wastes are collected and are managed by designated accumulation point managers. When the container is full, the accumulation point manager contacts 20 CES/CEIEC to process the container through DLA-DS. A contractor then picks up the waste at Poinsett Range. Hazardous waste is not transported to Shaw AFB for storage or disposal.

Installation Restoration Program (IRP)

Before the 1970s, industry commonly disposed of hazardous wastes in numerous ways: some were stored in drums and USTs, some were reused, recycled, or disposed of in approved off-base sites, some were buried in on-base landfills and many were burned in fire training exercises on base. These disposal methods were the standard practice at the time and were not known to generate a threat to the environment or public health. Advancements in technology in the years following the time of these practices allowed scientists to discover that these disposal methods were indeed unknowingly causing environmental harm.

Over the years, the operation and maintenance of aircraft at Shaw has used hazardous materials. These materials included petroleum hydrocarbons from sources such as jet fuel, motor gasoline and diesel; fuel contaminants such as benzene, toluene, ethyl benzene and xylene; polynuclear aromatic hydrocarbons; chlorinated solvents such as trichloroethylene or perchloroethelyne; and pesticides and herbicides.

The disposal of these materials has caused contamination of groundwater in specific areas of the base and outside the base. In some cases, contamination has resulted from leaking drums, underground storage systems or pipelines. Shaw AFB now has established hazardous waste management practices that protect the environment and public health.

Shaw began its restoration program in 1983 with a base-wide records search that identified 13 ERP sites for further investigation at Shaw and Poinsett Range. Further investigations have identified 96 Solid Waste Management Units (SWMUs) and 15 Areas of Concern (AOCs) listed in a RCRA Part B Permit issued to Shaw in 1992 by the SCDHEC. As environmental conditions change on base, including advancement in the RCRA cleanup process, the RCRA Part B permit is modified to reflect such changes. The most recent RCRA Part B Permit modification, November 2014, lists 123 environmental sites at Shaw as follows: 99 SWMUs/AOCs are closed, with remaining 24 open sites under various stages of cleanup.

Industrial uses are concentrated in two areas on Shaw AFB. The first area includes the 9 CSS supply and storage areas and is located in the southwest corner of the installation adjacent to Shaw Drive. The second

area is located on the east side of the base and includes the explosive storage magazines. Additional industrial uses on the east side include the USCENTAF warehouses and Prime BEEF storage building. Additional facilities in this land use classification include the POL storage tanks, elevated water storage tanks and electrical substations. These types of facilities are scattered throughout the base.

Wastewater

Shaw AFB treats both its industrial and domestic wastewater at the on-site wastewater treatment plant located at 331 Aiken Street. Wastewater flows by gravity to the main pump station and is then pumped to the treatment facility. The facility is a conventional biological treatment plant designed to treat wastewater at a maximum flow of 1.2 million gallons per day (MGD). Currently the flow to the plant is approximately 0.50 MGD. The treatment train consists of an equalization basin, 3 extended aeration treatment basins, 3 clarifiers, sand filtration, chlorination, dechlorination and discharge into the Wateree River. The discharge is covered by the National Pollutant Discharge Elimination System (NPDES) permit number SCOO24970. All of the sludge is aerobically digested, thickened and trucked as slurry to the City of Sumter's Pocotaligo River WWTP for disposal.

Noise

Noise level zones are mapped so the installation and interested public can work together employing compatibility guidelines and land use planning techniques to ensure the land uses in these noise-impacted areas are compatible. Noise level zones are mapped as part of the Air Installation Compatible Use Zone (AICUZ). These noise levels are depicted by a series of yearly day-night average sound level (Ldn) contours. The noise contours are defined by three noise zones: Zone I - Acceptable (less than 65 Ldn); Zone II - Normally Unacceptable (65 Ldn - 75 Ldn); and Zone III - Unacceptable (greater than 75 Ldn).

The compatibility zones are used in planning to prevent conflicts with noise-sensitive land uses, such as housing and hospitals. Generally, residential land use is not recommended at noise levels greater than 65 Ldn. Land uses such as commercial, industrial and agricultural (except livestock), are compatible with most noise environments. In some cases, noise impacts can be mitigated by the incorporation of sound attenuation measures in new construction and renovated facilities. Approximately 80% of the area within the installation boundary is within noise level zones II and III. Roughly 15% of the on-base family housing area is located within noise zone level III.

2.4.4 Potential Future Impacts

Shaw AFB is expected to continue as the home of the 20 Fighter Wing, Headquarters for Ninth Air Force and Third Army. Effective natural resource management will help minimize impacts from new weapon systems and allow changes in mission requirements. Shaw AFB will continue to be an important installation, regionally and nationally, for other DoD organizations and the Sumter community.

2.4.5 Natural Resources Needed to Support the Military Mission

All components of the natural resources programs provide direct mission support. The overarching concepts of ecosystem management and biodiversity work to ensure that the air-to- ground and the ground training missions have a quality environment in which to train. The forestry program helps to ensure a healthy forest at Poinsett Range. The wildlife program provides military personnel a “quality of life” experience through wildlife hunting. Proactive endangered species and wetlands programs ensure regulatory compliance so mission impacts do not occur. The current natural resources available at Shaw AFB, Poinsett Range and WRA are sufficient to continue to provide mission support based on the current mission of the 20 FW.

3.0 ENVIRONMENTAL MANAGEMENT SYSTEM

The AF environmental program adheres to the Environmental Management System (EMS) framework and it's Plan, Do, Check, Act cycle for ensuring mission success. Executive Order (EO) 13693, *Planning for Federal Sustainability in the Next Decade*, U.S. Department of Defense Instruction (DoDI) 4715.17, *Environmental Management Systems*, AFI 32-7001, *Environmental Management*, and international standard, ISO 14001:2004, provide guidance on how environmental programs should be established, implemented, and maintained to operate under the EMS framework.

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

4.0 GENERAL ROLES AND RESPONSIBILITIES

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

Office/Organization/Job Title (Listing is not in order of hierarchical responsibility)	**Installation Role/Responsibility Description**
Installation Commander	Approve INRMP or delegate; Control access and use
AFCEC Natural Resources Media Manager/Subject Matter Expert (SME)/ Subject Matter Specialist (SMS)	Technical assistance and guidance
Installation Natural Resources Manager/POC	Implement INRMP/Ronnie June
Installation Security Forces	Security
Installation Unit Environmental Coordinators (UECs); see AFI 32-7001 for role description	Direct environmental aspects
Installation Wildland Fire Program Manager	Oversight of Wildland Fire Program
Pest Manager	Advise and document pesticide use
Range Operating Agency	Coordinate approve all activities on Poinsett Range
Conservation Law Enforcement Officer (CLEO)	N/A
NEPA/Environmental Impact Analysis Process (EIAP) Manager	Coordinate NEPA program
National Oceanic and Atmospheric Administration (NOAA)/ National Marine Fisheries Service (NMFS)	N/A
US Forest Service	N/A
US Fish and Wildlife Service	Contract Sikes Act INRMP implementation assistance

5.0 TRAINING

AF installation NRMs/POCs and other natural resources support personnel require specific education, training and work experience to adequately perform their jobs. Section 107 of the Sikes Act requires that professionally trained personnel perform the tasks necessary to update and carry out certain actions required

within this INRMP. Specific training and certification may be necessary to maintain a level of competence in relevant areas as installation needs change, or to fulfill a permitting requirement.

Installation Supplement – Training

Overall training needs required for implementation of this INRMP are addressed on an annual basis. Training is funded at a minimal level to cover the generic needs of natural resources personnel. However some programs, such as Prescribed Fire, require specialized training that must be taken to meet resource management objectives.

Training and Certification Standards:

All military, civilian, contractor and emergency services personnel participating in wildland fire management activities must possess certifications appropriate for their expected level of involvement. 20 CES/CEF is responsible for controlling and/or suppressing wildland fires and will assist 20 CES/CEIEA with prescribed fires when staffing levels permit. All 20 CES/CEF personnel participating in wildland fire will be certified as a Fire Fighter II by the International Fire Service Accreditation Congress (IFSAC) and will adhere to the DoDI 6055.6, *Fire and Emergency Services Program* and AFI 32-2001, *CE Fire Emergency Services*.

20 CES/CEIEA uses prescribed fire to manage natural resources at Poinsett Range. The minimum NWCG training requirements for 20 CES/CEIEA personnel to participate during a prescribed burn are as follows:

- S-130 Fire Fighter Training
- S-190 Introduction to Fire Behavior
- I-100 Introduction to the Incident Command System
- CPR and First Aid
- SCFS Smoke Management

20 CES/CEIEA personnel that are in the process of obtaining the minimum training required, may assist with prescribed burns on a limited basis under the direct supervision of the Burn Boss or his/her designee. Only personnel certified as a Type 2 Prescribed Fire Boss (RXB2) are qualified to serve as the Burn Boss on a prescribed fire. CEIEA staff members are desired to be certified as a collateral duty fireman. All CES/CEIEA prescribed fire personnel must attend annual refresher training and be certified in cardio-pulmonary resuscitation (CPR) and standard first aid. Prescribed fire personnel also are encouraged to attend the SCFC's smoke management class and pursue certification as a Prescribed Fire Manager by the SCFC. The training records of 20 CES/CEIEA personnel participating in prescribed fire will be maintained by the Natural/Cultural Resources Manager and the Air Force Wildland Fire Center at Eglin Air Force Base.

6.0 RECORDKEEPING AND REPORTING

6.1 Recordkeeping

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

Installation Supplement – Recordkeeping

Click here to enter text.

6.2 Reporting

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

Installation Supplement –Reporting

Click here to enter text.

7.0 NATURAL RESOURCES PROGRAM MANAGEMENT

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

Installation Supplement –Natural Resources Program Management

N/A

7.1 Fish and Wildlife Management

Applicability Statement

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

Program Overview/Current Management Practices

The overall management of fish and wildlife at Shaw AFB, Poinsett Range and WRA is designed to conserve biodiversity and to maintain and improve the sustainability of native ecosystems on military lands while supporting the flying and training mission. This integrated approach to fish and wildlife management allows managers to achieve desired goals and provide quality of life initiatives for military personnel that might not otherwise be possible. Fish and wildlife management supports outdoor recreation for the military and the general public without degradation to other program areas or reduction of any mission capabilities.

Fish Program Management

There are four ponds on Shaw AFB that can be used for recreational purposes. Fishing is partially restricted on ponds near the golf course due to safety concerns from golfers. A South Carolina fishing license is not required to fish in ponds on Shaw AFB because the base ponds are considered private property. Current limits are currently only catch and release; therefore no base permits are required. Enforcement of fishing regulations and permits is the responsibility of Security Forces on Shaw AFB. Although the potential exists, there are no current plans to rehabilitate base ponds for fishing due to budget restraints and manpower requirements to properly administer a fishing program.

Ecosystem Monitoring

The Ecosystem Monitoring Program (EM) was implemented in 1996. Annual surveys have been conducted for flora and fauna since 1996 and have collected and documented, valuable data on species, populations, sex ratios, health and other qualitative and quantitative statistics. Analysis of the data lends its value by providing natural resource managers with current information and population trends that are used to improve land management practices. The EM is capable of detecting slow and otherwise unnoticeable changes (positive or negative) in an ecosystem's condition. It is a tool that allows natural resource managers the ability to identify and eliminate problematic activities by implementing restorative actions at an early stage when costs are lower and chances of success are higher. Results of the monitoring effort are analyzed and used to develop projects that guide management practices. This information is necessary to enhance biodiversity and improve habitat protection to support the expanding 20 FW war fighting and training mission. To date, no negative trends have been noted from the military's use and mission at Poinsett Range.

EM includes surveys for both flora and fauna. Monitored wildlife genera includes; plants, (with an emphasis on identifying invasive and protected species), small mammals, furbearers, herpetofauna, birds, deer and fish. Ecosystems containing wetlands, pocosin, Carolina bays, critical habitats, sensitive ecological areas and known cultural sites, are also monitored for disturbance and are protected in accordance with all Federal, State and DoD Regulations. Lists of plants and animals documented at Shaw AFB, Poinsett Range and WRA are located in the Appendix Lists and Flora and Fauna. In-depth survey results including methodologies, analysis, survey locations, populations, etc., can be found in the annual EM reports located in Shaw's official electronic file record plan.

Animal Surveys

Small Mammals – Intense surveying for small mammal species occurred at Poinsett Range between 1996 and 2010. Small mammal trapping was conducted on established LCTA plots on a 3-year cycle with approximately 1/3 of the plots sampled each year, except in 1996 when only 5 plots were sampled and in 1997 when 26 plots were sampled. The small mammal surveys were conducted on LCTA plots that had been monitored for vegetative changes during the previous year to prevent interference among activities. A less intense surveying effort has been conducted by the CEIEA staff since 2010. These micro-surveys have been site specific and were used for species identification, verification and maintenance of current lists but did not include population estimates. Subsequent small mammal trapping may occur at selected plots or locations as time permits as an effort to validate, maintain and potentially update the list of small mammals occurring on Poinsett Range. If during periods of less intense monitoring, negative trends are indicated or should a catastrophic event occur, small mammal trapping would return to intense monitoring following same protocol used from 1996-2010.

The standard surveying methodology requires two parallel rows of 8 Sherman live traps (Model LFA) placed at 12.5-meter intervals along the line transect and at least 10 meters from the transect centerline. Traps are baited with a mixture of peanut butter, birdseed and rolled oats and placed on wax paper. Traps are set in the afternoon and checked for three consecutive mornings.

Herpetofauna – Herpetofauna (amphibians and reptiles), are a fragile key indicator species that can be useful in alerting biologist of any short or long term trends that may be negatively affecting the overall health of the ecosystem(s) at Poinsett Range. Herpetofauna monitoring is accomplished in accordance with the following methodology:

Amphibians and reptiles are monitored by using series of drift fence arrays and pit fall traps to capture them for identification purposes before being released. A drift fence array consists of three twenty-foot arms (20" aluminum flashing) radiating from a five-gallon bucket (pit fall trap) buried flush with the ground. Five gallon buckets are also buried at the end of each arm. Arrays were established in coordination with four

upland and four wetland LCTA plots. Three arrays were established at each site and were located near the 0, 50 and 100 meter marks and were at least 10-meters away from the center line on alternate sides. Most reptiles and amphibians are nocturnal, moving more at night and as they encounter the drift fence, they migrate along its border until falling into a buried bucket. Individuals are retrieved from the trap the next day and species type is recorded by plot, array and bucket before being released unharmed. Arrays are normally monitored for 4 consecutive days in the months of March, April, May, June and October. Additional plots are to be created or relocated to survey unexamined areas, especially near aquatic areas. Herpetofauna traps are currently scheduled to be monitored in 2019 and 2021 in accordance with the EM annual INRMP work plans.

White-tail Deer – Whitetail deer population trends at Poinsett Range are monitored with deer harvest data and a roadside spotlight survey. The spotlight survey consists of a 10.3-mile route on the west side of Poinsett Range. All deer observed are recorded by sex and age when possible. Visibility estimates are recorded every 0.1 miles to determine area surveyed. Survey routes are repeated and the average taken for improved accuracy. Deer hunting has been conducted since the fall of 1996 at Poinsett Range. All deer harvested are sexed, weighed and aged and the information shared with SCDNR.

Furbearers – Furbearer species counts are conducted at Poinsett Range utilizing scent station survey methodologies. The surveys are conducted in accordance with standard procedures used by the SCDNR Furbearer Project. Wildlife managers typically use the term “furbearer” to identify mammal species that have traditionally been trapped or hunted for their fur. Furbearers are a diverse group, including both carnivores and rodents. Because populations of furbearers typically fluctuate in response to prey abundance and habitat changes, habitat management actions can have an impact on their population. The most common furbearers documented since 1996, when scent station surveys began include: coyote, raccoon, fox and bobcat. Less frequently observed were opossum, rabbit, gray squirrels and fox squirrels. The abundance of predator species of furbearers per year is a growing concern as they affect deer, turkey and other game animal populations. Survey results, complete analysis and survey methodology can be found in the Long Term Habitat Monitoring Report in Shaw’s official file record system. Scent Station Survey’s for furbearers should be conducted at minimum every five years and are currently forecasted in the 2019 EM Work Plan.

Fish – There are four ponds located on Shaw AFB and one pond at Poinsett Range. Pond names and acreages at Shaw AFB are: Hole 1 Pond (5.5 acres), Hole 8 Pond (7.3acres), Memorial Pond (5.5acres), Chapel Pond (2.0 acres) and at Poinsett Range: Weeks Pond (6 acres). Management of ponds located on Shaw AFB is currently an interdisciplinary effort performed by 20 CES Entomology, Carolina Skies Golf Course and the 20FSS. Angled fish are “catch and release” only and fishing licenses are not required by anglers with legal access to Shaw AFB.

In 2009 Geo-Marine, Inc., Southland Fisheries Corporation and biologists from the 20 CES/CEIEA conducted surveys for fish populations in the four ponds located on Shaw AFB. Fish populations were assessed in each lake using a 220 volt electro-shocker mounted onboard a 12-foot Jon boat. Electro-shock was used in this effort as opposed to nets to increase survey accuracy by employing different mythology. The electro-shocker had an effective 6-foot radius and was positioned off the bow of the boat. In each pond a circular track around the pond’s perimeter was made while intermittently applying electrical pulses to stun the fish. Each electro- shocking effort lasted approximately 30 minutes. Electro Shock is the recommended methodology for fish sampling and surveys at Shaw AFB and Poinsett Range because of the relative small pond acreages and minimized mortality rate to targeted and non-targeted species.

Species composition and general size characteristics were recorded for each pond. Water quality parameters recorded included: clarity, hardness and alkalinity and submerged aquatic vegetation abundance. The most

frequently observed fish species in the ponds surveyed at Shaw AFB were bluegill, largemouth bass, eastern mosquito fish, black crappie, golden shiner, red-ear sunfish and catfish.

Water quality samples taken indicated that the water alkalinity ranged from 20 parts per million (ppm) to 30 ppm and the hardness was 40 ppm in all of the ponds. Hardness and alkalinity levels above 20 ppm are generally recommended for well managed recreational fisheries.

Birds – Many bird species are closely associated with specific vegetation types and monitoring their populations can provide valuable insight into habitat quality and ecosystem health. The DoD is committed to the conservation of migratory and resident birds that occur on their lands and is an active participant in the Partners in Flight (PIF) program (Department of Defense 2006). Accordingly, installations are encouraged to develop projects that promote the conservation of birds and their habitats.

In the past, the occurrence of most bird species at Shaw AFB and Poinsett Range were documented by casual observations. Exceptions include the red-cockaded woodpecker (RCW), Northern bobwhite and raptors, which are monitored through species specific surveys.

In 1997, Shaw AFB partnered with the Cornell Laboratory of Ornithology and Partners in Flight to conduct a songbird point count in conjunction with the Birds in Forested Landscape (BFL) Project. All identifiable birds seen and heard were recorded during a 10 minute listening period at a specific site of the BFL survey area. A second survey was conducted at eight LCTA plots in various habitats at Poinsett Range for a select group of species (wood thrush, Cooper's hawk and sharp-shinned hawk) during their respective breeding seasons. No further bird surveys were conducted in association with the LCTA plots, although incidental observations were recorded and added to a base bird list.

In 2007, 20 CES/CEIEA expanded their bird monitoring effort to include a MAPS (Monitoring Avian Productivity and Survivorship) banding station at Poinsett Range. The MAPS program, which is organized by the Institute for Bird Populations, uses constant-effort mist netting at stations throughout North America to gather and process data on bird populations. DoD currently supports about 100 MAPS stations, which is approximately 20% of the entire MAPS network (Department of Defense 2006). The station at Poinsett Range contributes to the continent-wide conservation of birds and also provides valuable information on local bird populations and habitats.

In 2008, three new survey routes were established in the three major habitat types on Poinsett Range. Route 1 (8.1 miles long), was established in open pine forests and mixed forest habitat managed for RCW. Route 2 (2.91 miles long), was located in a swamp wetland/bottomland hardwood forest, secondary forest and open field forest edge habitat. The point count surveys along Routes 1 and 2 were taken at 0.5-mile intervals. Route 3 (Halfway Bay Trail) was a transect survey that traversed the Carolina Bay (pocosin) habitat and was 0.86 mile long. All 3 routes were re-surveyed during the summer of 2009 to monitor changes in breeding bird populations and during the 2009 fall season to monitor migratory bird usage. Several survey methods were used to collect data from dominant and small unique habitats on Poinsett Range during the 2008-2009 surveys. Point count and strip transect surveys were used to survey birds in the dominant vegetation communities and area searches were conducted for birds in the small and unique habitats. A qualified avian biologist surveyed each route and recorded all birds heard or observed (observations were made with Swarovski 8 X 42 binoculars). All birds heard or observed were recorded on a micro-cassette player; all data were transcribed onto a data sheet after the survey was completed. In addition to recording the identity and number of individuals detected, the ornithologist also recorded notes regarding the breeding status of birds during the summer breeding bird survey period. Weather conditions (i.e., temperature, wind direction and speed, percent cloud cover) were recorded at the beginning and end of each survey.

In addition to the summer and fall surveys conducted in 2008-2009, the ornithologist conducted a general winter survey in December, 2009. This survey was conducted over a 2-day period at Shaw AFB and WRA to determine occurrence and abundance of migrant/winter resident birds. WRA was surveyed again in June 2010 by base natural resources personnel. A general road- based and pedestrian avian survey method was used to collect baseline winter season avian data.

Raptors are birds of prey that mostly include hawks, owls and falcons. These birds are good indicators for healthy ecosystems but in larger numbers may present an increase in flying safety risks associated with BASH. Monitoring for raptors is done annually at Poinsett Range normally in the summer months.

Roadside surveys are conducted at Poinsett Range in an attempt to detect woodland hawks and owls. The survey involves playing taped vocalizations of the great horned owl and red- shouldered hawk along two 4.5-mile roadside transects with listening stations located every 0.5 mile. Observers record auditory and visual raptor contacts at each station for 10 minutes. During the first five minutes of the 10-minute set, great horned owl vocalizations are broadcast every 45 seconds in 15-second set duration (total of five sets) with surveyors listening for 30 seconds between each broadcast. After the great horned owl listening time, red-shouldered hawk vocalizations were played for one minute (with a two-minute listening time). Observers recorded auditory and visual raptor contacts at each station for 10 minutes. Survey results can be found in EM reports in Shaw's official file record system.

A whistling cock survey is conducted annually at Poinsett Range to monitor bobwhite quail population trends. The surveys are conducted over two routes, each 5.5-mile in length. Surveys begin at sunrise and surveyors record individual quail heard at 0.5-mile intervals along each route. Surveys are normally conducted in June but may continue through September. Wild quail populations are currently low at Poinsett Range and throughout the southeast. Population decline is attributed to drought, predation and lack of quality habitat.

Bird surveys are scheduled for 2019 and raptor and quail surveys will be conducted annually in accordance in accordance with the EM annual INRMP work plans.

Description of Current Monitoring

In 1995, a long-term habitat condition monitoring system was implemented at Shaw AFB and Poinsett Range, with limited studies conducted at WRA to evaluate the effects of military and other land use activities. The habitat monitoring system at Shaw AFB and Poinsett Range is now entering its 20th year of study. Throughout the study period, information on plant species, density of woody vegetation, vertical stratification and percent cover of vegetation, along with percent ground cover and ground disturbance, have been recorded on long-term monitoring plots.

This period also included wildlife surveys for herpetofauna, birds, furbearers, small mammals and fish. Analysis from the vast amounts of data collected is a very useful tool for land managers forming the basis for future management decisions.

Herpetofauna monitoring alone produced over 4,000 individual captures and incidental sightings, comprised of 21 amphibian and 19 reptile species to date. Frogs and toads comprise about 50 percent of the total captures, followed by lizards with 35 percent, salamanders at 9 percent and snakes at about 6 percent. A list of all amphibians and reptiles identified on Poinsett Range can be found in Appendix B. Lists of Flora and Fauna.

Between 1997 and 2016, over 140 bird species were documented at Shaw AFB, Poinsett Range and WRA. The greatest number of observed species, (55), was classified as permanent residents and can be found in

the region throughout the year. There were 34 summer resident species, which come to the area in the spring and remain through the breeding season. Forty-five species can be seen during spring or fall migration or use the area for-over wintering.

A number of rare plant and wildlife species have been observed during the long-term monitoring study at Poinsett Range. Included are 9 plant species that are identified by SCDNR as species of concern, ranging from critically imperiled, to imperiled, to rare or uncommon in the South Carolina. Included are the Awned Meadowbeauty, Carolina Wild Petunia, Coastal Plain Thoroughwort, Dwarf Burhead, LeConte Flatsedge, Muhlenberg Maidencane, Robbins Spikerush, Slender Arrow-head and West Indian Meadowbeauty. One rare snake, the scarlet kingsnake/eastern milksnake, was captured in 2004 and again in 2010 at Poinsett Range. It is listed as imperiled state-wide and a state species of concern by the SCDNR. Also the Southern hognose snake (Heterodon simus) is a state threatened species. The American alligator, which is federally listed as threatened because it can be mistaken for the federally endangered American crocodile, also occurs at Poinsett Range. A total of 19 bird species have been documented at Poinsett Range and/or Shaw AFB that are listed as rare or birds of conservation concern (BCC) by the USFWS.

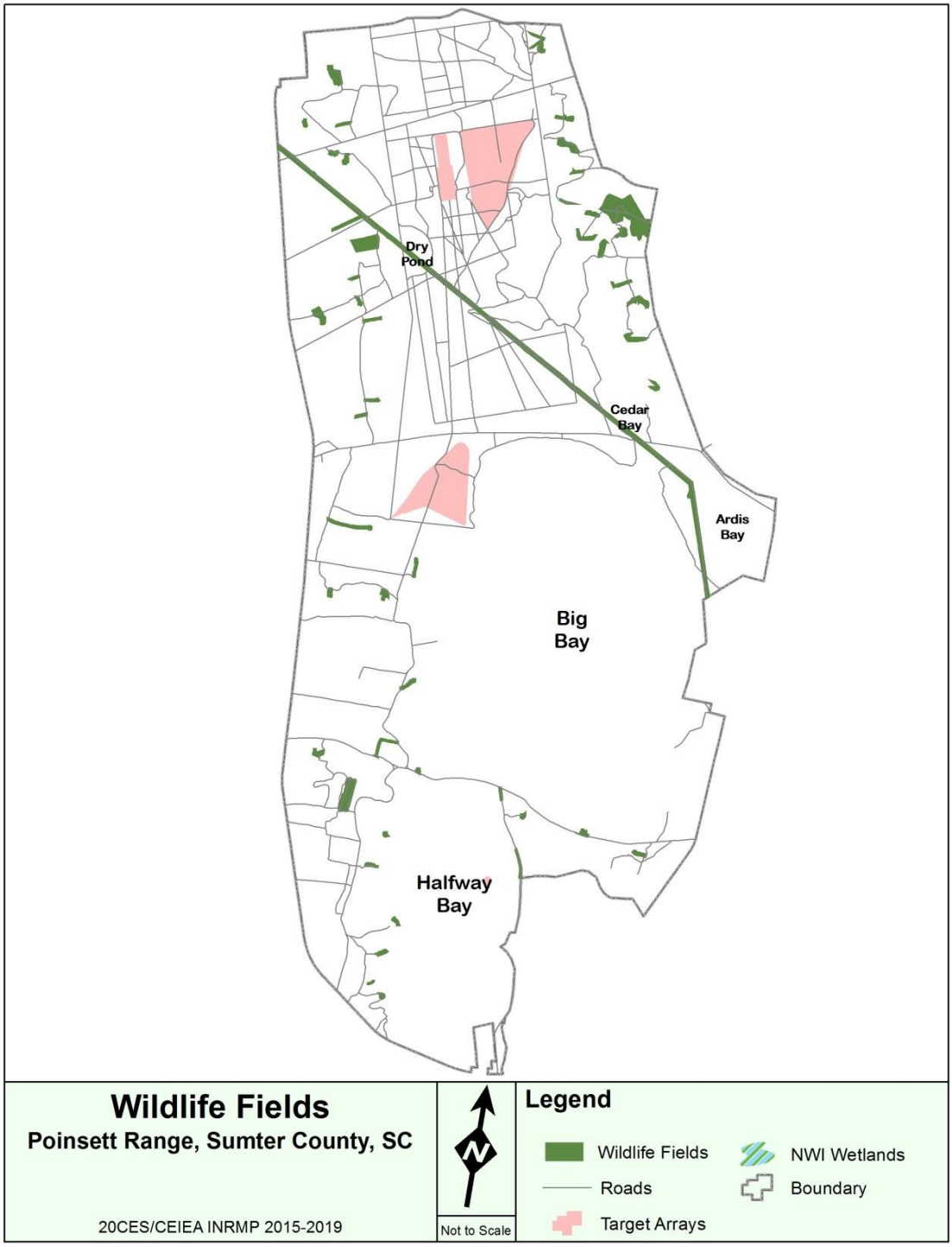
Wildlife Program Management

Shaw AFB and WRA do not have suitable habitat for most large game species management. They do have sufficient habitat for non-game and small game species such as rabbit and squirrel. Poinsett Range contains diverse woodland and old-field habitats suitable for intensive wildlife management such as hunting. Currently, deer and turkey hunts are conducted on Poinsett Range to manage wildgame populations and provide outdoor recreational opportunities for the base and community, enhancing their quality of life.

The hunt program is managed by 20 CES/CEIEA wildlife biologist and volunteers known as “Hunt Masters”. Permits are sold individually for each hunt on Poinsett Range. Deer hunts occur only on Saturdays, September through December and turkey hunts on Saturdays throughout the month of April. Shaw AFB participates in SCDNR Antlerless Deer Quota Program to provide tags to harvest antlerless deer. Antlerless deer are harvested along with antlered deer for the overall benefit of the herd. Handicap accessible stands are provided for individuals who are permanently or temporarily impaired. In addition, a youth-only hunt is usually conducted on the first Saturday in November. The youth only hunt is conducted in cooperation with SCDNR and receives participation from youth all over the state. Youth and parents often are repeat customers for deer hunts due to the safety precautions that are employed and the positive outdoor experience enjoyed during hunts on Poinsett Range.

In addition to deer and turkey, management for small game species is also promoted when feasible. Hunting opportunities for dove, squirrel, rabbit and quail are not currently available but may be provided as populations and resources dictate. Habitat enhancements are planned to increase forage, nesting and escape cover for small game and will be incorporated as budgets allow.

Wildlife management is closely integrated with forest and wildland fire management schedules. Wildlife areas (see Figure Wildlife Fields at Poinsett Range) are created and enhanced through forestry and wildland fire practices conducted at Poinsett Range. Wildlife areas and wildlife travel corridors provide the diversity of habitat required for healthy wildlife populations. These enhancement practices are part of an ecosystem approach to natural resource management whereby forestry, wildlife and endangered species programs not only coexist but complement one another.



Wildlife Fields at Poinsett Range

Wildlife Areas

Currently, there are about 250 acres of existing wildlife areas on Poinsett Range. Portions of roads and the power line right-of-way are also being managed as wildlife openings in some areas. SCDNR recommends that at least 5% of the non-wetland areas, or about 600 acres of Poinsett Range, be maintained in managed

wildlife areas (see Figure Wildlife Fields at Poinsett Range). The goal of the wildlife manager is to create approximately 30 acres of additional wildlife areas each year for the next five years. Additionally, the wildlife manager will consider existing areas that can be designated as wildlife areas such as old logging decks. Although these sites may be used for the forestry program again in the future, they can provide valuable early successional habitat for wildlife. Management and types can vary considerably but managed wildlife areas on Poinsett include the following acreages and types: 30 acres of early successional wildlife openings, 100 acres of perennial food and cover sites, 80 acres of annual food/cover sites and 40 acres of roads/firebreaks.

The absence of cool-season forage is one factor that limits the health, growth and expansion of many wildlife species. Poinsett Range lacks significant quality late winter forage plants. Highly useful plantings which are adapted to the soil and weather conditions on Poinsett Range include wheat, rye, wild game mixtures and browntop millet. The establishment of cool-season forage will help support many species of wildlife on Poinsett Range such as dove, quail, songbirds, turkey and deer.

Plantings for wildlife should be no less than 50 feet from woodland or brushy cover. Areas may be planted immediately adjacent to cover so as to encourage use by small animals. Areas that will be tilled annually should preferably be located on soils with slopes of less than 3 percent to avoid the opportunity for erosion. Annual wildlife areas should range from 2 to 5 acres in size. Long, linear plots are preferred over short, square plots.

Soil tests should be taken to determine soil nutrient needs for plantings. Most soils will require about 2 tons of lime initially, with 1 ton per acre applied every other year afterward. Most soils will also require about 600 pounds per acre of 10-10-10 fertilizer or the equivalent. Soil tests will verify precise needs.

Early Successional Wildlife Areas – Early successional wildlife areas are open areas, without significant overstory trees, that allow species of plants that appear first from the seed bed in the vegetation reclamation process to flourish. Sunlight on the floor of the opening is an important key to this process and at least 60% sunlight during the growing season is necessary to promote bio-diversity. Many of the early-successional plants and shrubs will provide either seed or fruit that will be consumed by many wildlife species while others plants attract insects which are important food sources as well. Early successional areas also provide structural habitat and diversity offering crucial nesting, escape, or resting cover for many wildlife species.

Early successional areas can be created by removing overstory trees in key areas creating openings to provide habitat diversity and improve wildlife habitat values. The trees may be felled and left in place or be sold, cut and removed. Understory shrubs may be left intact and stumps need not be removed from the sites. The most cost-effective time to create openings is during timber harvest when the overstory is cut and sold.

The size of early successional wildlife areas should range from 1 to 10 acres. The shape should be irregular and generally long and linear as opposed to short and square. The larger the area, the more diverse and irregular the borders should be. Early successional wildlife areas on Poinsett Range will be useful in increasing bio-diversity among the larger, homogeneous pine stands and will improve habitat for numerous wildlife species through ecosystem management.

Early successional areas should be maintained with disking, herbicides, mowing and/or fire, with the simple objective of promoting early successional vegetation. Stumps should remain on site when possible to provide herpetofauna habitat. Some type of maintenance disturbance every 3 to 4 years will be needed. Maintenance should be completed before April to avoid disturbance to ground nesting birds.

Perennial Wildlife Areas – Perennial wildlife areas are sites that support woody plants (trees and shrubs) that persist each year to provide food and/or cover for animals. Wildlife at Poinsett Range is dependent on the perennial vegetation for consistent known food sources and cover sites. Certain areas with productive hardwoods and shrubs should be protected from fire because of their wildlife values.

Hardwood Trees – The most common trees that exist on Poinsett Range that are valuable to wildlife are the turkey oaks found in the midstory of pine stands. Other trees of value such as white oaks, persimmons, cherry trees and American hollies are often found in the "windrows" where site-preparation years ago for the planting of pines resulted in piled stumps and debris that became fertile soil as it decayed. Many of the hardwoods remain small and unproductive for hard mast (acorns/nuts) as the result of prescribed fires used to enhance habitat for the RCW. This results in a reduction of the carrying capacity of the area to support animals such as raccoons, squirrels, deer and wild turkey which depend upon the hard mast. However, the loss may be mitigated by the careful protection of selected, small sections of oaks and key hardwood sites throughout Poinsett Range. Firebreaks should be installed around the edges or perimeter of the existing perennial tree sites to be protected. These protected areas would also serve as valuable wildlife travel corridors. Increasing the width of firebreaks to allow a transition zone of at least 15 feet in width would allow for the staging of grasses and shrubs to provide cover and nesting habitat for numerous birds and wildlife. The protection of select hardwoods is coordinated with the forestry, endangered species and wildland fire managers utilizing an environmental review process (Form 7.1.).

Several sites should be planted with native oaks in key areas to provide hard mast. Plants which may be used in mast orchards include live oak, laurel oak, redbud, dogwood, honey locust, crabapple, persimmon and wild cherry. Sites for planting should be designated and protected as wildlife management compartments. As pine stands are harvested in the future, additional sites should be selected during the planning stage for reforestation. Such mast orchards should be established in areas that have been cleared, though the stumps need not be removed. The taller species should be planted on the northern side of the mast orchard and the shorter species planted on the southern side, to permit access to sunlight.

Shrubs – Existing shrub stands are present throughout Poinsett Range. Shrubs that should be protected for their benefit to wildlife include chickasaw plum, hawthorne, winged sumac and various vacciniums. Perennial shrubs provide perches for birds and cover for wildlife whether hunting or hiding as well as providing soft mast such as berries and fruit. Lespedeza patches are a valuable wildlife species but they are non-native and therefore should not be promoted.

In areas with few existing perennials, shrubs should be planted to enhance habitat diversity and provide additional wildlife protection and nutrition. Planted shrubs in conjunction with mast orchards should be created to provide a variety of both soft and hard mast producing species.

Roads and Firebreaks – Roads and firebreaks provide important wildlife habitat values to wildlife for many reasons. They serve as travel corridors for most species, provide grit and dusting areas important to many bird species and can be a valuable food source of native grasses and legumes. They also can be planted with small grains and selected road borders should be widened and managed with either natural vegetation or wildlife plantings. When properly managed, firebreaks can provide a transition zone between ecosystems as well as escape cover if borders are allowed to grow up in low lying vegetation. This border vegetation can also serve as a fire break bringing fire closer to the ground due to the absence of overstory vegetation.

Species Management

Whitetail Deer – The whitetail deer population on Poinsett Range is healthy and sustained. Population estimates are determined through nocturnal spotlight surveys. Population estimates average about 15 deer

per square mile on Poinsett Range. Harvests have remained relatively constant over the past 5 years with a buck/doe take ratio of about 50:50 as preferred.

The factor that will limit the expansion and health of the deer herd on Poinsett Range is the lack of browse. Winter browse or other green food is especially lacking. Browse may be increased by both natural and artificial means.

Natural browse may be produced by thinning the pine woodlands on a regular basis. A reduction of the basal area of trees will allow sunlight to penetrate to the forest floor. This in conjunction with prescribed fires used on a 3 to 4-year rotation will promote valuable native herbaceous vegetation to volunteer. A proper thinning and burning program will blend well into a framework for habitat enhancement for the RCW. Also, selected wildlife areas should be protected to promote natural browse in areas where it is most lacking.

Artificial browse may be established by the planting of food plots throughout Poinsett Range. Plantings should emphasize the use of small grains such as wheat and rye grain, mixed at a ratio of 3:1. Rye grows quickly and provides excellent browse. Wheat grows somewhat slower, but it provides good green vegetation for deer throughout the winter and it also produces valuable seed that will be eaten by many species of wildlife.

Turkey – The abundance of natural foods for turkeys may also be increased by thinning and burning the woodlands as described for deer habitat management. The reduction of the basal area in pine plantations and the production of herbaceous vegetation on the ground will have a substantial, positive influence on the turkey population.

As recommended for deer habitat management, the establishment of wheat and rye will improve habitat values for turkey. Turkeys will use cool season forage extensively and they will also benefit from the seed produced by wheat. Wheat and rye plantings will attract an abundance of insects which are the primary food item for turkey poults in late spring and early summer.

Hardwood mast is also important for fall turkey food. Acorns are a preferred food when they are available. Quality mast-producing hardwoods should be protected from fire and harvests whenever possible. As recommended for deer habitat management, the establishment of mast orchards will also benefit turkeys.

The Brunson Swamp and the other swamps and bays provide excellent roosting habitat for turkeys. The protection of the larger pines in the swamps and bays should be considered to retain quality turkey roost sites. Turkeys will also use the more open sections of the swamps for loafing and feeding. The swamp edges are especially good habitat, as the margins support many mast-producing shrubs and trees.

All personnel who work on Poinsett Range are asked to participate in an annual turkey poult count survey. An annual turkey poult survey consists of participants noting all poults observed as well as the size, age and sex of all other turkeys encountered on the property. The results of these surveys are helpful in determining annual reproduction. Results are shared with SCDNR to help with statewide management decisions as well as Poinsett Range.

Mourning Doves – Mourning doves are another potentially abundant game species present at Poinsett Range. Pine plantations offer excellent roosting and nesting sites and the sandy soils are used extensively by doves to obtain the "grit" necessary for food digestion. Doves can provide an excellent source of recreation if fields are managed properly for dove hunting. In order to effectively manage for doves, funding must be received before the spring planting season.

The mourning dove has four basic habitat needs; food, cover, water and grit. The last three are abundant and fairly well distributed on Poinsett Range. The remaining need is an abundance of choice seeds available since doves normally feed twice a day; in early morning and from mid-to- late afternoon. Seeds make up 98% of a dove's diet and come from either agricultural crops or grasses and weeds associated with open land. Grass seeds are especially important, as they make up more than half of the dove's diet.

The mourning dove seldom, if ever, scratches for its food. Occasionally, it perches on larger seed heads such as grain sorghum and sunflower where it picks mature seed directly from the seed heads. The dove is a weak-footed bird, therefore, foods must be on relatively bare ground and must be plainly visible. If not, they are of little value to doves. Corn, sunflowers, browntop millet and wheat may be used to attract doves. Doves prefer to consume corn during cold weather and prefer wheat and millet during warmer weather.

Due to the intense management effort required to cultivate a productive dove hunting field, there are no dove hunts currently planned for Poinsett Range.

Bobwhite Quail – Bobwhite quail are primarily feeders of fields and open forests. Their diet is mainly vegetable and composed largely of seeds and small fruits. Insects are an especially important food source of protein for young quail. Quail habitat should include escape cover, nesting cover and foraging areas within a 30-acre area which is typically associated with the home range of a covey.

Quail are present on Poinsett Range, but not in numbers that would sustain much hunting pressure. Soil quality is the limiting factor for bobwhite quail on Poinsett Range. The soils are not capable of producing abundant food and cover plants and the young pine plantations offer little quality ground cover due to canopy closure.

Dense, shrubby areas should be maintained throughout well managed areas to provide adequate escape cover. At least one, 1/8-acre patch of dense cover per 3 acres is desirable. Management practices that may be implemented to improve habitat include regular prescribed burning of pine woodlands and establishment of annual food plots. An ideal size plot for quail is about 20 feet wide and 400 feet long. Pine stands divided with firebreaks into units of 25 to 50 acres to allow a patchwork of different-aged ground cover is necessary for nesting habitat and food production. Annual summer grain plots such as browntop millet, proso millet, Egyptian wheat and grain sorghum may be planted in field borders or woodlands. Native grasses and legumes should also be encouraged by late winter ground disturbances. The existing agricultural fields near Brunson Swamp and abundance of open pine sawtimber stands also provide attractive habitat.

Squirrel – Limited populations of squirrel exist at Poinsett Range and regular hunting is not feasible at this time. However, sections of hardwoods should be protected to insure the population does not decrease. As protected hardwood stands mature, squirrel populations should increase. Plans are being considered to allow youth only squirrel hunts on Poinsett Range in select areas in cooperation with SCDNR.

Rabbit – Rabbits could thrive in selected areas at Poinsett Range, notably the wetland areas and agricultural fields near Brunson Swamp. These areas should be managed to provide forage and cover borders around wetlands, fields and woodlands. Enhancing these borders by allowing early successional growth of vegetation to develop in stages by cutting them on a 3 year rotation should increase rabbit populations. Providing brush piles, vines and thick overgrowth in certain areas would provide the cover needed for healthy populations.

Issues and Concerns Regarding Wildlife Management

There are no current issues or concerns regarding the management of wildlife at Poinsett Range and Shaw AFB. Implementation of INRMP work plans will continue to improve and maintain a very healthy

ecosystem. Work plans will be revised as needed to adapt to changes that occur in natural resource aspects, (ecosystem dynamics, personnel, funding, mission requirements, etc.), to enhance and improve the integrated programs.

Wildlife projects will be maintained and updated in cooperation with AFCEC IST staff to assure funding is available to support the work plans and projects associated with this INRMP.

Enforcement of Fish and Wildlife Laws

The hunting program at Poinsett Range is managed in such a manner that little enforcement action is required because range access is restricted. All hunters pay a permit fee (currently $20.00 per hunter per hunt), must have a valid hunting license and comply with all applicable South Carolina hunting regulations and Poinsett Range hunt requirements. Failure to do so results in the loss of the privilege to hunt. All hunters must also sign a release from liability form that has been coordinated with 20 FW/JA and a CEIEA staff member is always on Poinsett Range during any activity.

Law enforcement meetings are conducted annually to facilitate communication in case additional law enforcement is needed. SCDNR is the primary agency responsible for enforcing game regulations on Poinsett Range.

Demand for Hunting, Fishing and Non-Consumptive Resource Uses

The demand for hunting at Poinsett Range is beyond the resources available. Due to safety constraints and oversight requirements, only a limited numbers of hunters are allowed on Poinsett Range at any one time. Currently, hunters are limited to numbers that can be safely transported utilizing authorized government owned vehicles (GOVs).

Fishing on Shaw AFB is limited by the resource itself. The ponds are fairly small and are used by recreational fisherman, often accompanied by children. The quality of fisheries on base could be improved but the general public demand would not be expected to improve greatly except through special events such as fishing rodeos.

Other non-consumptive activities such as bird watching and photography are also limited on Shaw AFB and Poinsett Range due to access security restraints. Unsupervised activities are not permitted at Poinsett Range. Due to such restrictions, non-consumptive activities are conducted on Poinsett Range by scheduled tours only. Planned activities will be coordinated and supervised by the Natural and Cultural Resources section.

Students and other working groups may be used to enhance the natural resources of Poinsett Range while educating them on natural resources management. The groups provide labor for a variety of projects including wildlife management, soil and water conservation, forestry, outdoor recreation and general natural resources management. The groups will be supervised by 20 CES/CEIEA at all times. All activities associated with the working groups will be in coordination with the military mission on Poinsett Range.

Wildlife Education and Interpretation Programs

A natural and cultural resources interpretive center is being considered on Poinsett Range. This center serves as a special interest area for the display and interpretation of many valuable archeological, botanical, ecological and geological features that warrant special protection and access control. The “Rosemary Natural and Cultural Resource Interpretive Center” is located in the historic fire ranger’s house associated with the Rosemary Fire Tower Complex. The house, tower and outbuildings are all eligible for the National Register of Historic Places. This interpretive center emphasizes the protection of the unique resources

through interpretive displays and education programs and serves as a public meeting place for guided tours on Poinsett Range.

By utilizing the Rosemary Fire Tower ranger's house, the center would not only serve as a display area for wildlife, natural land features and cultural artifacts but also comply with cultural resource regulations mandating the continued use of existing historic structures thereby preserving and protecting them as well. Mounted animals, snake skins, historic artifacts and printed, descriptive materials could be made available to help promote public education and outreach opportunities in the area. A hiking trail in the near vicinity of the Fire Tower could also be developed with small signs erected to aid in interpretation of the local environment.

Wildlife Pest Problems and Diseases

There are a variety of diseases effecting wildlife in North America that are now known to occur in Sumter County, SC, including Poinsett Range. The North American Amphibian disease has been positively diagnosed in amphibian species at Poinsett Range. The "White-nose Syndrome" in bat species has been documented in South Carolina and the high mortality rate occurring in bee species is nationwide. Monitoring population counts and species occurrence through surveys will determine to what extent these diseases may affect wildlife at Poinsett Range (see Appendix Common Wildlife Diseases).

Wildlife Pest Problems

A growing concern on Poinsett Range is feral hogs. Feral hogs were first observed in numbers in the fall of 2013. Occasional sightings of individuals had been documented in the previous 5 years. Feral hogs have only been observed in numbers on the south end of Poinsett Range near a wildlife plot called "Long Field". Approximately 30 hogs were observed on several occasions and did considerable damage to the wildlife habitat and the adjacent forests. In 2014, a sounder (males, females and young) of feral hogs was again observed and U.S. Department of Agriculture, Wildlife Services (USDA/WS) was contracted for their control. Several pigs were removed through hunting and trapping and control efforts are ongoing.

There is also a population of coyotes on Poinsett Range. Coyotes were historically found in the western half of the United States, but were introduced in South Carolina through translocation by 'hounds men' groups. Coyotes are not historically native to SC and tend to replace the native fox and bobcat population because they are a higher order carnivore on the food chain. Coyotes are being closely monitored so the population can be maintained at acceptable levels to allow native wildlife populations to remain at sustainable levels to provide a balanced ecosystem.

Wildlife Diseases

Mortality and morbidity in wild animals will usually occur as the result of viral, bacterial, rickettsial (spotted and typhoid fever), parasitic and mycotic (fungal) diseases as well as toxins (poisons), cancer, stress, trauma or senility (old age).

The arena of wildlife mortality, morbidity, causative agents and epizootiology is very diverse and complex. In many cases, science has yet to uncover and explain the complexity of many causes of mortality. The discussion of all causes of mortality and morbidity is beyond the scope of this plan.

Through the ecosystem monitoring conducted, the effects of any harmful disease should be detected early in indicator species, allowing for a proper response to control further harm when cost is minimized and effectiveness is maximized.

However, when handling wildlife, whether dead or alive, precautions must be taken to ensure protection of one's health from wildlife diseases that could be communicable to humans.

Policies, Programs and Methods Used to Control Feral Animals

In accordance with Shaw AFB Pest Management Plan, Section 3.7.1., 20 FSS is responsible for all stray animals on base and in the housing areas. Pest management is also responsible for trapping and removing wild animals (skunks, raccoons, opossums and squirrels, etc.) that become a problem or a threat. All trapping, relocating or destroying of wild animals is coordinated through 20 CES/CEIEA.

Requirements for Fish and Wildlife Habitat Improvement

Fish and wildlife habitat improvement requires communication among natural resource staff, base community planners, construction and project engineers, contractors, range management staff, airfield mangers, BASH planners, pest management staff, Services squadron and other cooperating partners including outside agencies such as USFWS, SCDNR, SCFC, USACE and USDA/WS. This is accomplished on Shaw AFB through the environmental review process (Form 7.1.) and our National Environmental Policy Act (NEPA) coordination procedures as well as informal consultations which have proven beneficial in establishing professional relationships with all partners. Through true integration of the different program areas and agencies, the greatest benefit is realized. An integrated ecosystem approach to management provides the most efficient use of limited resources such as manpower, finances and the natural environment.

Measures to Protect Significant Fossil Resources

No fossil resources are known to exist on Shaw AFB, Poinsett Range or WRA. Cultural resources do exist and protection is described in the Integrated Cultural Resource Management Plan (ICRMP).

7.2 Outdoor Recreation and Public Access to Natural Resources

Applicability Statement

This section applies to all AF installations that maintain an INRMP. Shaw AFB **IS** required to implement this element.

Program Overview/Current Management Practices

Areas Suitable for Outdoor Recreation Activities

The areas suitable for outdoor recreation are classified into three classes of use based on outdoor recreation potential and ecosystem sustainability.

Class I – Developed Recreation Areas

Class I areas contain facilities designed to accommodate intensive recreational activities such as sports fields, campgrounds, picnic areas, paved walking/jogging/ cycling trails, winter sports areas, marinas, developed swimming beaches and other water sports areas.

WRA – WRA is the primary focus for Class I activities such as camping, cabin rentals, boating, fishing and other water sports on Lake Wateree. WRA is managed by the 20 FSS.

Shaw AFB – Shaw AFB contains numerous sports fields, swimming pools, a campground and a golf course that are included in the Class I area managed by the 20 FSS.

Poinsett Range – Poinsett Range is mostly unimproved lands and therefore not an acceptable Class I area.

Class II – Dispersed Recreation Areas

Class II areas are those areas that are suitable to support dispersed recreational activities such as hunting, fishing, primitive camping, bird watching, boating, hiking and sightseeing.

WRA – WRA is suitable for limited Class II activities such as fishing and bird watching.

Shaw AFB – Shaw AFB is suitable for limited Class II activities such as fishing and bird watching.

Poinsett Range – Poinsett Range has excellent Class II recreational opportunities, however, due to the safety and security concerns, hunting is currently the only outdoor recreation activity regularly conducted at Poinsett Range. All activities require close supervision and occur only in accordance with written rules and during specific seasons and times. Guided interpretive tours are conducted on a limited basis for special interests groups such as boy-scout troops and school or college students.

Class III – Special Interest Areas

Class III areas are recreation areas that contain valuable archeological, botanical, ecological, geological, historic, zoological, scenic, or other features that warrant special protection and access control. Class III areas emphasize the protection of the unique resources and public use such as interpretive displays and education programs.

WRA – WRA has no Class III resources.

Shaw AFB – Shaw AFB has limited Class III resources, namely Hangar 611, a historic structure eligible for the National Registry of Historic places and two eligible archaeological sites.

Poinsett Range – Poinsett Range contains a diverse array of resources that continue to be explored and realized. The natural and cultural resources at Poinsett Range are abundant and largely undisturbed. Because of the rich resources at Poinsett Range and the fact that it is an air to ground bombing range, safety and security are emphasized for the protection of these unique resources. Public use through guided tours is encouraged and a center for interpretive displays and education programs is being pursued through restoration of the Rosemary Fire tower complex.

Red-cockaded Woodpecker – The red-cockaded woodpecker, a federally endangered species, inhabits Poinsett Range and is of great interest to the public. Information on the importance of prescribed fire in the management of RCWs and the southern pine ecosystem is made available to the public upon request and during outreach events such as Earth Day and Arbor Day.

Carolina Bays – Poinsett Range possesses many Carolina Bays which are unique land features of the southeastern US. Interpretation of Carolina Bays and the flora and fauna they support are important factors in developing their appreciation by the public. Once described properly, the general public develops an immediate interest in Carolina Bays. Because of the hot climate and abundance of insects during the summer, bay visits are generally more pleasant in the spring or fall. A program to display the bays of Poinsett Range could be developed. Such a program would need to be supervised closely and would likely be best implemented as scheduled, educational tours.

Historic/Archaeological Resources – Over 140 historic and archaeological sites have been identified on Poinsett Range and 33 are eligible for the National Register of Historic Places (NRHP) including the Rosemary fire tower/ranger house complex. As more knowledge of these cultural resources develops, the

exhibition of those areas for public benefit may be considered. The "Rosemary Natural and Cultural Resources Interpretive Center" discussed below is an ideal concept to provide public access to the many diverse resources at Poinsett Range.

Rosemary Natural and Cultural Resources Interpretive Center – A natural and cultural resources interpretive center is being considered on Poinsett Range. This center serves as a special interest area for natural and cultural resources education and outreach efforts. The Rosemary Natural and Cultural Resource Interpretive Center" is located in the historic fire ranger's house associated with the Rosemary Fire Tower Complex. The house, tower and two outbuildings are eligible for listing on the NRHP. This interpretive center would emphasize the protection of the unique resources through interpretive displays and education programs and serve as a public meeting place for guided tours on Poinsett Range.

By utilizing the Rosemary Fire Tower ranger's house, the center is not just educational, but also achieves compliance with cultural resource requirements to continue the use of existing historic structures as a means to preserve and protect them. Displays of a historic artifacts and printed materials could be made available to the general public and help promote public education and outreach opportunities in the area.

Current Use of Installation Unimproved Lands for Dispersed Outdoor Recreation

Riding Tours

Guided, riding tours are organized upon request for small groups to permit observation of the habitats for flora, fauna and endangered species on Poinsett Range. Tours utilize GOVs equipped with four wheel drive to traverse the sandy soil condition that exists on Poinsett Range.

Hunting

Deer and turkey are currently the only game species on Poinsett Range for which hunting is allowed.

Hunting and Fishing Program Organization and Management

All hunting season requests for Poinsett Range will be planned by 20 CES/CEIEA and fully coordinated with the Range Operations Officer. Final approval for specific hunting dates for all seasons will be set through coordination between 20 CES/CC and 20 OSS/CC. The seasons will fall within the dates established by the SCDNR. Hunt dates will be coordinated with 20 OSS prior to the opening of the season. All hunts are subject to change or cancellation at any time.

Volunteers known as "Huntmasters" help implement the hunt programs on Poinsett Range. Preference is given to active duty military for volunteers but other persons also serve as volunteers as needed.

Hunting and Fishing Policy, Regulations and Fee Structures

Hunting permits will be sold in accordance with policies and regulations to sustain a balanced ecosystem and provide recreational opportunities for Shaw AFB personnel and the general public. All permits will be sold for individual hunts at the same price to all hunters. There will be no season permits for sale at this time. The cost for hunting permits may be different for each species, but the cost of all permits within a specific game species will remain consistent.

The harvesting of game animals will be in strict accordance with all game laws of South Carolina and will be evaluated to ensure the species are being properly managed while providing a resource for the base and community residents.

Hunting Permits

All hunting permits are issued by 20 CES/CEIEA staff. Hunting permits are sold for specific hunts during open seasons for individual species. Typically, hunt permits are administered from the Rosemary Fire tower complex on Poinsett Range by calling (803) 494-3239. All state licensing and game regulations apply when participating in outdoor recreational activities on Shaw AFB and Poinsett Range.

Poinsett Range Vehicle Traffic

Poinsett Range is closed to unofficial vehicle traffic to include personal owned vehicles (POVs), utility vehicles (UTVs) and all-terrain vehicles (ATVs). Designated areas such as wildlife food plots, sensitive habitats for endangered species management and significant cultural resources are closed to all vehicle traffic. The Range Control Officer, Ranger Operations Officer, or Natural Resource Manager must approve all visitors and vehicles. Entry onto Poinsett Range constitutes consent to inspection and search of the person, vehicle, trailer, conveyance, container, game bag, or creel. All vehicles must adhere to range procedures established for the protection from invasive species.

Camping

A primitive camping area on Poinsett Range could be established near the southern end of Week's Pond for overnight or weekend excursions. Canoeing and kayaking could be enjoyed in the pond and a hiking trail with interpretive signs should also be considered there in the cypress- gum swamp.

Demand for Outdoor Recreation Opportunity on Shaw AFB

The demand for outdoor recreation exceeds the opportunities available due to inherent safety, security and access restrictions on Shaw AFB and Poinsett Range. Tours and field exercises for educational purposes will be conducted for schools, universities and organizations by request.

The purpose of the tours is to educate students on the uniqueness of the natural resources of Poinsett Range and demonstrate the military’s stewardship of the land. Poinsett Range may be used as an outdoor classroom for education and research consistent with the military mission.

All tours will be in coordination with 20 OSS/OSO (Range Operations) at Poinsett Range. Requests for tours must be submitted to 20 CES/CEIEA at least two weeks in advance of the tour date. Tour groups shall be accompanied at all times by a representative of 20 CES/CEIEA. Range orientation and safety briefings will be given to each group before entering the range.

Interface with Air Force Personnel Center, Directorate of Services Outdoor Recreation Programs

The 20 Force Support Squadron (FSS) operates the WRA located on Lake Wateree in Kershaw County, South Carolina. The 20 FSS and 20 CES/CEIEA staff coordinate to ensure rules and regulations are understood. Children's fishing rodeos have been conducted on base ponds and opportunities exist to partner with SCDNR for the "Take One - Make One" program for kids.

Outdoor Recreation Policy, Regulations and Fee Structures

Outdoor recreation policy is set by the 20 FSS for WRA and some activities on Shaw AFB. The fishing program is a joint effort between 20 FSS and 20 CES/CEIEA staff and has the potential for much improvement. 20 CES/CEIEA determines the policy, regulations and fee structure for hunting at Poinsett Range as described in the Wildlife section of the INRMP.

Policy on Off-Road Vehicle Use on Installation Lands

Off-Road Vehicles (ORV) are not allowed on WRA, Shaw AFB or Poinsett Range for recreational purposes.

Issues Related to Public Access for Outdoor Recreation and Access Restrictions

Access Categories

Access to properties under the control of Shaw AFB is addressed below. The specific rules and procedures for outdoor recreation access on Class I, II and III recreation areas that are not under the direct control of 20 FSS are explained. Outdoor recreation resources by the general public is allowed and encouraged when compatible with the military mission and does not exceed the recreational carrying capacity of the land.

Open Areas – Open areas are defined as unrestricted areas on Shaw AFB where hunting, fishing and outdoor recreation are permitted for all participants.

Shaw AFB has no open areas on unimproved lands. Shaw AFB has limited restricted areas that persons with access on base are permitted to utilize. These areas are accessible to restricted non- consumptive activities such as bird watching, hiking and photography only during force protection control (FPCon) Alpha. Any higher order force protection on Shaw AFB would qualify the base as an Off Limit Area, even during exercises.

Restricted Areas – Restricted areas are areas designated by the commander where hunting, fishing and other outdoor recreation activities are permitted to certain categories of participants or under special arrangements as defined by the commander.

Poinsett Range is mostly unimproved land. However, due to safety and security issues, no open areas exist. There are numerous restricted areas that can be used for hunting and non- consumptive outdoor recreational activities such as photography and bird watching. These activities can only be conducted under the supervision of 20 CES/CEIEA staff during real-time FPCon Alpha and exercise FPCon Bravo. During real-time FPCon Bravo or higher order FPCon, Poinsett Range would be off limits to any outdoor recreational activity.

Off Limits Areas – Off limits areas are areas designated by the commander as being off limits to recreational hunting, fishing, trapping and dispersed outdoor recreation by any person at any time. These are areas where mission security and safety concerns will not allow such use. Off limit areas exist on Shaw AFB and Poinsett Range in the ordinance disposal and detention areas.

Participant Categories

The established criteria and protocols regarding user access and conduct for open and restricted access areas for the following categories of participants are as follows:

- Active duty military including reserve and National Guard on active duty or full time manning
- Department of Defense civilians
- Active duty military dependents and family members
- Military retirees
- Employees of installation prime contractors
- General Public

Anyone with access onto Shaw AFB may participate in the recreational opportunities that are accessible. Access is enforced by 20 SFS.

Access to outdoor recreation on Poinsett Range is only provided through coordination with 20 CES/CEIEA.

Watchable Wildlife Areas

The purpose of the watchable wildlife areas is to increase opportunities for people to observe native wildlife in their natural habitats and to support wildlife habitat preservation. When compatible with the installation mission, watchable wildlife areas should be designated on Shaw AFB, Poinsett Range and WRA. Although access is restricted, access by the general public is permissible through scheduled appointments. The natural resources staff will coordinate all scheduled excursions.

7.3 Conservation Law Enforcement

Applicability Statement

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

Program Overview/Current Management Practices

Conservation Law Enforcement requirements at Shaw AFB and Poinsett Range are minimal. All state and federal regulations regarding base natural resource conservation are applicable.

Law enforcement on Shaw AFB is conducted by 20 SFS.

Law enforcement at Poinsett Range for wildlife issues is generally conducted by SCDNR. Other agencies may also have authority, depending on the violation. 20 CES/CEIEA, 20 SFS, 20 FW/JA and 20 OSS/OSO are currently working with the SCDNR, Manchester State Forest and the USFWS to develop a Memorandum of Agreement to determine responsibilities, access and involvement. The most current issues have been poaching, trespass associated with adjacent dog drive deer hunts and vandalism to deer stands and wildlife plots. There are no conservation law enforcement officers in 20 CES/CEIEA. 20 CES/CEIEA staff support the military mission through proactive natural resource management and will have the base Security Forces, SCDNR, the USFWS, or other trained approved law enforcement personnel perform any law enforcement activities required.

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

Applicability Statement

This section applies to AF installations that have threatened and endangered species on AF property. This section **IS** applicable to Shaw AFB.

Program Overview/Current Management Practices

Under Section 7 of the Endangered Species Act (ESA), the U.S. military is required to protect and manage federally listed threatened and endangered (T/E) species on installations where they occur and to develop site-specific plans to preserve those species and their habitats. AFI 32- 7064 further directs Air Force installations to protect and conserve, when practical, state-listed species and species that are candidates for federal listing.

The primary objective of the T/E program is to maintain mission readiness through the conservation and management of federally listed species that occur at Shaw AFB, Poinsett Range or Wateree Recreation Area (WRA). A secondary objective of the program is to conserve and manage other rare taxa that have the

potential to impact the military mission if they become federally listed. Rare taxa include federal candidate species, state-listed species, state priority conservation species (SCDNR 2005), birds of conservation concern (BCC) (USFWS 2008) and species with a state natural heritage rank of critically imperiled (S1) or imperiled (S2) (http://www.natureserve.org/).

Status of T/E Inventories

Numerous wildlife and plant surveys have been conducted at Shaw AFB, Poinsett Range and WRA including USAF (1994, 2003, 2005), USACE (1994, 1996a, 1996b, 1997, 2001) and Nelson (2002). These documents, as well as all listed species survey and monitoring data, are kept on file in the 20 CES/CEIEA office at Shaw AFB.

In addition, a long-term monitoring program has been in operation since 1996. The program includes surveys for, fish, amphibians, reptiles, birds, mammals and plants. 20 CES/CEIEA personnel also document casual field observations of flora and fauna. A comprehensive listing of the birds, fish, amphibian, reptile, bird, mammals and plant species known to occur at Shaw AFB, Poinsett Range and WRA can be found in the Appendix Lists and Flora and Fauna.

As of 2016, no federally listed T/E species had been documented at Shaw AFB or WRA and the red-cockaded woodpecker (RCW) was the only federally endangered species at Poinsett Range (see Table Federal T/E Species, Federal Candidate Species and State-Listed Species Occurring or Potentially Occurring at Shaw AFB, Poinsett Range and Wateree Recreation Area). The American alligator, which is federally listed as threatened because it can be mistaken for the federally endangered American crocodile, also has been observed at Poinsett Range. Two federally endangered plants, American Chaffseed and Canby's Dropwort, could occur at Shaw AFB or Poinsett Range but have not been found on either property. One federal candidate species, Georgia Aster, potentially could occur at WRA (see Table Federal T/E Species, Federal Candidate Species and State-Listed Species Occurring or Potentially Occurring at Shaw AFB, Poinsett Range and Wateree Recreation Area).

Bald eagles, which are protected by the federal Bald and Golden Eagle Protection Act and listed as threatened by the state of South Carolina, have been observed at Poinsett Range and WRA and the state-threatened least tern has been observed at Shaw AFB. Two other species listed as endangered by the state, swallow-tailed kite and Rafinesque's big-eared bat, have the potential to occur at Poinsett Range. In addition, 44 rare but unlisted vertebrate species (see Table Rare Vertebrate Species Occurring at Shaw AFB, Poinsett Range and Wateree Recreation Area) and nine rare but unlisted plant species (see Table Rare Plant Species Occurring on Shaw AFB, Poinsett Range and Wateree Recreation Area.) have been documented at Shaw AFB, Poinsett Range and/or WRA.

Federal T/E Species, Federal Candidate Species and State-Listed Species Occurring or Potentially Occurring at Shaw AFB, Poinsett Range and Wateree Recreation Area

Common Name	Scientific Name	Legal Status[a]	Confirmed		
			Shaw AFB	Poinsett Range	WRA
Reptiles					
American alligator	*Alligator mississippiensis*	FTSA		X	
Birds					
Bald eagle	*Haliaeetus leucocephalus*	BGEPA/ST		X	X
Least tern	*Sternula antillarum*	ST	X		

Common Name	Scientific Name	Legal Status[a]	Confirmed		
			Shaw AFB	Poinsett Range	WRA
Red-cockaded woodpecker	*Picoides borealis*	FE/SE		X	
Swallow-tailed kite	*Elanoides forficatus*	SE			
Mammals					
Rafinesque's big-eared bat	*Coryorhinus rafinesquii*	SE			
Plants					
American chaffseed	*Schwalbea americana*	FE			NAb
Canby's dropwort	*Oxypolis canbyi*	FE			NAb
Georgia Aster	*Symphyotrichum georgianum*	FC	NAb	NAb	

a - FTSA = federally threatened due to similarity of appearance, BGEPA = Bald and Golden Eagle Protection Act, FE = federally endangered, FC = federal candidate, SE = state endangered, ST = state threatened.

b - NA = not applicable (species not known to occur in the county where the property is located).

Rare Vertebrate Species Occurring at Shaw AFB, Poinsett Range and Wateree Recreation Area

Common Name	Scientific Name	SPCS[a]	BCC[b]	State Rank[c]	Shaw AFB	Poinsett Range	WRA
Fish							
American eel	*Anguilla rostrata*	Highest			X		
Amphibians							
Northern cricket frog	*Acris crepitans*	Moderate		S5		X	
Pickerel frog	*Lithobates alustris (Rana palustris)*	High				X	
Reptiles							
Common snapping turtle	*Chelydra serpentina*	Moderate				X	
Eastern milk snake/scarlet kingsnake	*Lampropeltis triangulum*	Highest		S2		X	
Southern hognose snake	*Heterodon simus*	Highest				X	
Birds							
Acadian flycatcher	*Empidonax virescens*	High				X	
American kestrel	*Falco sparverius*	Highest	BCC			X	
American woodcock	*Scolopax minor*	Moderate				X	
Bachman's sparrow	*Aimophila aestivalis*	Highest	BCC			X	
Black- thoated blue warbler	*Setophaga caerulescens*	High				X	
Black- throated green warbler	*Setophaga virens*	Highest	BCC			X	
Brown- headed nuthatch	*Sitta pusilla*	Highest	BCC		X	X	
Chestnut- sided warbler	*Setophaga pensylvanica*	Moderate				X	
Chuck- will's-widow	*Antrostomus carolinensis (Caprimulgus carolinensis)*		BCC			X	

Common Name	Scientific Name	SPCS[a]	BCC[b]	State Rank[c]	Shaw AFB	Poinsett Range	WRA
Dark-eyed junco	*Junco hyemalis*	Moderate			X	X	X
Eastern meadowlark	*Sturnella magna*	Highest			X		
Eastern wood pewee	*Contopus virens*	Highest			X	X	
Field sparrow	*Spizella pusilla*	Highest				X	
Golden- crowned kinglet	*Regulus satrapa*	Moderate			X	X	X
Great blue heron	*Ardea herodias*	Moderate			X		X
Great egret	*Ardea alba*	Moderate					X
Green heron	*Butorides virescens*	Moderate			X		
Kentucky warbler	*Geothlypis formosus (Oporornis formosus)*	Highest	BCC			X	
Little blue heron	*Egretta caerulea*	Highest				X	
Loggerhead shrike	*Lanius ludovicianus*	Highest	BCC		X	X	
Mallard	*Anas platyrhynchos*	Highest			X	X	X
Northern bobwhite	*Colinus virginianus*	Highest				X	
Painted bunting	*Passerina ciris*	Highest	BCC		X	X	
Pied-billed grebe	*Podilymbus podiceps*	Highest					X
Prairie warbler	*Setophaga discolor*	Highest	BCC			X	
Prothonotary warbler	*Protonotaria citrea*		BCC				
Red-breasted nuthatch	*Sitta canadensis*	Moderate				X	
Red-headed woodpecker	*Melanerpes erythrocephalus*		BCC		X	X	
Ruby- throated hummingbird	*Archilochus colubris*		BCC			X	
Sharp- shinned hawk	*Accipiter stratus*			S3		X	
Swanson's warbler	*Limnothlypis swainsonii*	Highest	BCC			X	
Upland sandpiper	*Bartramia longicauda*	Highest	BCC			X	
Wood duck	*Aix sponsa*	Moderate				X	
Wood thrush	*Hylocichla mustelina*	Highest	BCC			X	
Worm-eating warbler	*Helmitheros vermivorus*	Highest	BCC			X	
Mammals							
Black bear	*Ursus americanus*	Highest				X	
Eastern fox squirrel	*Sciurus niger*	Moderate				X	
Star-nosed mole	*Condylura cristata*	High				X	

a SPCS = state priority conservation species (SCDNR 2005).
b BCC = bird of conservation concern for Bird Conservation Region 27 (Southeast Coastal Plain) (USFWS 2008).
c S1 = critically imperiled state-wide , S2 = imperiled state-wide, N = non-breeding population (http://www.natureserve.org).

Rare Plant Species Occurring on Shaw AFB, Poinsett Range and Wateree Recreation Area

Common Name	Scientific Name	State Rank[a]	Shaw AFB	Poinsett Range	WRA
Awned meadowbeauty	*Rhexia aristosa*	S3		X	
Carolina wild petunia	*Ruellia caroliniensis* spp.*ciliosa*	S1		X	

Common Name	Scientific Name	State Rank[a]	Shaw AFB	Poinsett Range	WRA
Coastal plain thoroughwort	*Eupatorium recurvans (E. mohrii?)*	S1?		X	
Dwarf burhead	*Echinodorus tenellus*	S2		X	
LeConte flatsedge	*Cyperus lecontei*	S1		X	
Muhlenberg maidencane	*Amphicarpum muehlenbergianum*	S2S3		X	
Robbins spikerush	*Eleocharis robbinsii*	S2		X	
Slender arrow-head	*Sagittaria isoetiformis*	S3		X	
West Indian meadowbeauty	*Rhexia cubensis*	S1		X	

a - S1 = critically imperiled state-wide, S2 = imperiled state-wide, S3 = rare or uncommon in state (http://www.natureserve.org).

T/E Monitoring and Management Programs

Red-cockaded Woodpecker

Description – The RCW is a small bird about the size of a cardinal (7.5-8.5 inches in length) and is readily identified by its black cap and nape, black and white barred back, white under parts and large, white cheek patches. The red cockade, which is only present on adult males, consists of a small streak of red feathers above each cheek patch. Because the male's cockade is rarely visible even with binoculars or a spotting scope, adult males and females are difficult to distinguish in the field. However, juvenile males can be identified by a patch of red feathers on the crown, which is absent in juvenile females. Juvenile males retain their red crown patch for several months until their first molt.

The RCW is a non-migratory, territorial cooperative breeder that lives in social units known as groups. A typical group consists of a breeding pair and one to four additional non-breeders, which are referred to as helpers because they assist with the incubation, brooding and feeding of the breeding pair's young. Not all groups include helpers, but when helpers are present they usually are male offspring of at least one of the breeders.

RCWs are unique among North American woodpeckers because they excavate their cavities in the trunks of living pine trees. They also have a peculiar habit of drilling small holes, called resin wells, in their cavity trees. These holes, which are typically concentrated around the cavity entrance, penetrate the cambium and cause the resin to flow and accumulate on the trunk of the tree. The condition of the resin wells and accumulated resin is indicative of a cavity tree's status. In general, active cavity trees have reddish resin wells and clear, sticky resin, whereas inactive cavity trees have grayish resin wells and white, dried resin. The accumulation of fresh resin on an active cavity tree serves as a deterrent to nest predators such as tree-climbing snakes.

Each member of an RCW group typically roosts alone at night in its own cavity year-round and the aggregate of active and inactive cavity trees defended by a group is called a cluster. Within a typical active cluster (i.e., a cluster with at least one active cavity tree) some cavities are under construction (i.e., starts), some are completed and in use (i.e., active) and others have been abandoned or usurped by other cavity-dwelling species (i.e., inactive).

RCWs are monogamous and nest from mid-April through late July. The breeding female lays an average of two to four eggs in the breeding male's roost cavity. The incubation period is about ten days and may begin before the clutch is complete. Hatching is asynchronous and brood reduction is common. Nestlings fledge 26 to 29 days after hatching and either remain with their natal group as helpers or disperse before

the next breeding season. Most groups fledge 1-2 young and groups with helpers typically fledge more young than groups without helpers.

Fledgling dispersal patterns vary considerably between the sexes. Juvenile females typically disperse within one year of fledging to search for a breeding vacancy. Some juvenile males also disperse but more often they remain on their natal territory as helpers until a breeding opportunity arises in the immediate vicinity. Findings from North Carolina suggest that mortality is greater for juvenile females (68%) than juvenile males (57%) during the first year (Walters et al. 1988). Dispersing females that survive typically attain breeding status in another territory or become floaters that are not definitively associated with a specific group of birds or cluster of cavity trees. Dispersing males also may become breeders or floaters, or they may establish and defend a territory and remain solitary. Although both sexes are capable of breeding at one year, reproductive success improves with increased age (Walters 1990).

RCWs feed primarily on ants, roaches, beetles and other arboreal arthropods which they locate by scaling the bark on pine trees. Home range size is variable (100 to 400 acres per group) and is related to the amount and quality of available foraging habitat. In general, more acres are needed if the quality of the available foraging habitat is poor. A group's home range size also may be relatively large if it is not constrained by the presence of neighboring groups.

The two most similar woodpecker species in South Carolina are the hairy woodpecker, which is slightly larger than an RCW and the downy woodpecker, which is slightly smaller. Both of these species have white backs and lack white cheek patches. Adult male hairy and downy woodpeckers also have a patch of red feathers on the back of the head that is easily seen without binoculars or a spotting scope.

Distribution – The RCW is a resident of mature pine forests in the southeastern United States. Once considered common, the species' current distribution is highly fragmented and restricted to areas where suitable habitat remains. The species has been extirpated from six of the 17 states where it previously occurred and is currently more abundant on public than private lands. The largest remaining populations are on federal and state properties where extensive tracts of mature pine occur (USFWS 2003a).

Habitat – RCW habitat is dependent on fire for the removal of undesirable vegetation and to provide fire retardant plant species such as old-age living pines required for cavity excavation. Although cavities are excavated in at least seven different pine species, longleaf pine is considered to be preferred where it occurs (USFWS 2003a). The minimum tree age for cavity excavation is between 60 and 80 years and cavity trees throughout the species' range currently average between 80 and 150 years old. Cavity trees have thinner sapwood and greater heartwood diameter than other mature pines and typically are infected with *Phellinus pini*, a fungus that decays the heartwood and facilitates cavity excavation. Cavity construction time varies from several months to several years, but once completed a cavity may be used for several decades. RCWs always construct their cavities in live pines; however, after a cavity tree dies the birds may continue to use it for several years. Typically, there are 1-2 cavities per cavity tree.

Under ideal conditions, RCW clusters occur in open, mature pine stands with sparse midstory vegetation. Historically, these conditions were maintained by the natural fire regime. Although differences in habitat, geography and/or silviculture account for some variation, the overstory pine basal area in most active clusters is typically less than 80 ft^2/acre (USFWS 2003a). RCWs do not tolerate a well-developed midstory and have abandoned clusters where the hardwood and pine midstory basal area exceeded 25 ft^2/acre (Conner and Rudolph 1989, Loeb et al. 1992).

RCWs forage in pine-dominated habitats and typically prefer to forage on the largest living pines. Although the birds exhibit some flexibility in their requirements, the highest-quality foraging habitat consistently has

some large old pines, a low density of small and medium pines, little to no hardwoods in the midstory and groundcover with an abundance of forbs and bunchgrasses. The definition of high-quality foraging habitat is quantified in the 2003 RCW recovery plan (USFWS 2003a) and is the management standard for all federal properties where RCWs occur.

Reasons for Federal Protection – The RCW was listed as a federally endangered species in 1970 (35 Federal Register 16047) but did not receive protection until 1973 when the ESA was passed. Prior to European settlement the species was common and contiguously distributed across the southeastern United States, but by the time of listing the range-wide population was highly fragmented and characterized by a preponderance of relatively small, isolated populations. The primary cause of the species' decline was loss of the original southern pine forests due to logging, agriculture and silviculture practices. Former and potential RCW habitat also has been degraded or rendered unsuitable due to fire suppression, alteration in frequency or season of burns, excessive thinning and removal of mature pines.

Despite its protected status, the RCW continued to decline until the 1990s when new management techniques, coupled with an increased understanding of the species' population dynamics, yielded a more comprehensive approach to RCW management. Many previously declining populations stabilized or grew in response to aggressive management programs that included increased application of prescribed fire, artificial cavity provisioning and translocation. In 2000 there were an estimated 14,068 RCWs living in 5,627 active clusters in 11 states (USFWS 2003a).

Conservation Efforts – Since the species was listed as federally endangered in 1970, the USFWS has prepared three RCW recovery plans (USFWS 1979, 1985, 2003a). In the first two plans, number of birds and/or active clusters was the standard used to measure RCW abundance. A new standard, number of potential breeding groups, was established in the 2003 recovery plan because it is a more accurate reflection of the health and reproductive potential of a population. A potential breeding group refers to an active cluster inhabited by at least two RCWs that have the potential to nest and produce young (i.e., one adult male and one adult female). In most populations, active clusters outnumber potential breeding groups by a factor of 1.1 to 1.4 (USFWS 2003a).

The recovery criteria established in the 2003 recovery plan are based on 11 recovery units that were defined according to ecoregions. This approach was taken to ensure adequate representation of the genetic and geographic variation throughout the species' range. RCW populations within these recovery units have been designated as primary core, secondary core or support populations based on the number of potential breeding groups they can support. Regardless of their designation, land managers are encouraged to increase their RCW populations to the maximum extent possible by employing the various management strategies and techniques described in the plan. If the 2003 recovery plan is fully implemented, the species could be down listed by the year 2050 and delisted by the year 2075.

Status and Management History at Poinsett Range

Population Status – The RCW population at Poinsett Range has been monitored since 1994 and extensive records have been kept since 2001. Between 1994 and 2001 the population was critically small and fluctuated between three and five active clusters. An aggressive RCW management program was initiated in 2001 and since then there has been a 540% increase in the number of active clusters. During the 2016 nesting season, there were 29 active clusters, 29 potential breeding groups and one unoccupied recruitment cluster (see Table RCW Population and Nesting Data for Poinsett Range, 2001-2017).

Poinsett Range is adjacent to the Manchester State Forest (MSF), where RCWs also occur (see Figure Location of Primary Core, Secondary Core and Other RCW Populations Relevant to Poinsett Range.).

Biologically, the RCWs at Poinsett Range and MSF are part of the same population and birds frequently move between the two properties. In fact, Poinsett Range and MSF routinely share one or more active clusters. The South Carolina Forestry Commission manages the RCW habitat at MSF and the 20 CES/CEIEA Endangered Species Manager monitors the birds, which facilitates the RCW monitoring work at Poinsett Range. In 2016, MSF supported five active clusters (one shared and four independent). With the exception of the MSF, Poinsett Range is geographically isolated from other RCW populations. The closest RCW population is at Fort Jackson, which is approximately 20 miles to the northwest (see Figure Location of Primary Core, Secondary Core and Other RCW Populations Relevant to Poinsett Range).

Several notable RCW events have occurred at Poinsett Range. Pioneering has occurred once (in 2004) and budding has occurred twice (in 2006 and 2013). There have been two cases where a group raised two broods in one year; the first occurred in 2004 and the second occurred in 2006. In each case only one nestling fledged from both the first and second broods. Poinsett Range also has been involved in three long-distance dispersal events. In 2005 a second-year female from the Sand Hills State Forest dispersed to Poinsett Range; in 2011 a second-year female from the Savannah River Site dispersed to Poinsett Range and a second-year male from Poinsett Range dispersed to Fort Jackson. The distances between Poinsett Range and the Sandhills State Forest, the Savannah River Site and Fort Jackson are approximately 60 miles, 70 miles and 20 miles, respectively (see Figure Location of Primary Core, Secondary Core and Other RCW Populations Relevant to Poinsett Range).

Cluster Distribution and Translocation – Spatial configuration is an important component of RCW population viability and models have shown that closely aggregated territories reduce the risk of extinction in small populations (Letcher et al. 1998, Walters et al. 2002). Accordingly, a concerted effort has been made to increase the number and improve the spatial arrangement of the RCW clusters at Poinsett Range. Between 2001 and 2010, 13 abandoned clusters were reconditioned by installing artificial cavities and reducing the height of the midstory vegetation and eight recruitment clusters were created in strategic locations. This work, coupled with a successful translocation program, has yielded a larger and more spatially aggregated RCW population.

Augmentation, or the translocation of juvenile RCWs from recovered and/or expanding populations, is an effective tool for increasing critically small RCW populations. To this end, 27 RCWs were translocated to Poinsett Range from the Brosnan Forest between 2001 and 2006 and four RCWs were translocated to Poinsett Range from the Francis Marion National Forest in 2010. Most of these birds were released as pairs (i.e., an unrelated male and female) in reconditioned or recruitment clusters to promote the formation of new potential breeding groups. Since 2006, eight RCWs have been translocated on-site at Poinsett Range and two have been translocated to Fort Jackson in exchange for two of their RCWs. As of the 2014 nesting season, 24 (58%) of the 41 RCWs translocated between 2001 and 2011 had bred at least once at either Poinsett Range (N=22) or MSF (N=2).

RCW Population and Nesting Data for Poinsett Range, 2001-2017

Parameter	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Managed Clusters	5	13	16	19	21	22	21	21	22	24	27	27	28	28	29	29	29
Active Clusters (ACs)	5[a]	8[a]	8[a]	11[a]	16[b]	19[a]	17[a]	20[a]	20[a]	22[a]	26[a]	26[a]	27[a]	27[a]	28	29	29
% Annual Growth Rate of ACs	--	+60	0	+38	+45	+19	- 11	+18	0	+10	+18	0	4	0	4	4	0
Solitary Males	0	1	0	0	1	2	1	3	1	1	2	0	0	0			
Potential Breeding Groups (PBGs)	5	7	8	11	15	17	16	17	19	21	24	26	27	27	28	29	29
% PBGs per AC	100	88	100	100	94	89	94	85	95	95	92	100	100	100	100	100	100
% PBGs Nesting[c]	80	100	100	100	94	100	100	94	95	95	100	96	100	100	100	100	100
Adults in ACs[d]	13	--[e]	17	27	42	46	48	55	53	61	64	70	81	80			
Adults per AC[d]	2.6	--[e]	2.1	2.5	2.6	2.4	2.8	2.8	2.7	2.8	2.5	2.7	3.0	3.0			
Fledglings	5	--[e]	15	21	22	28	31	23	33	35	48	45	47	56	59	56	
Fledglings/PBG	1.0	--[e]	1.9	1.9	1.5	1.6	1.9	1.4	1.7	1.7	2.0	1.7	1.7	2.1	2.1	1.9	

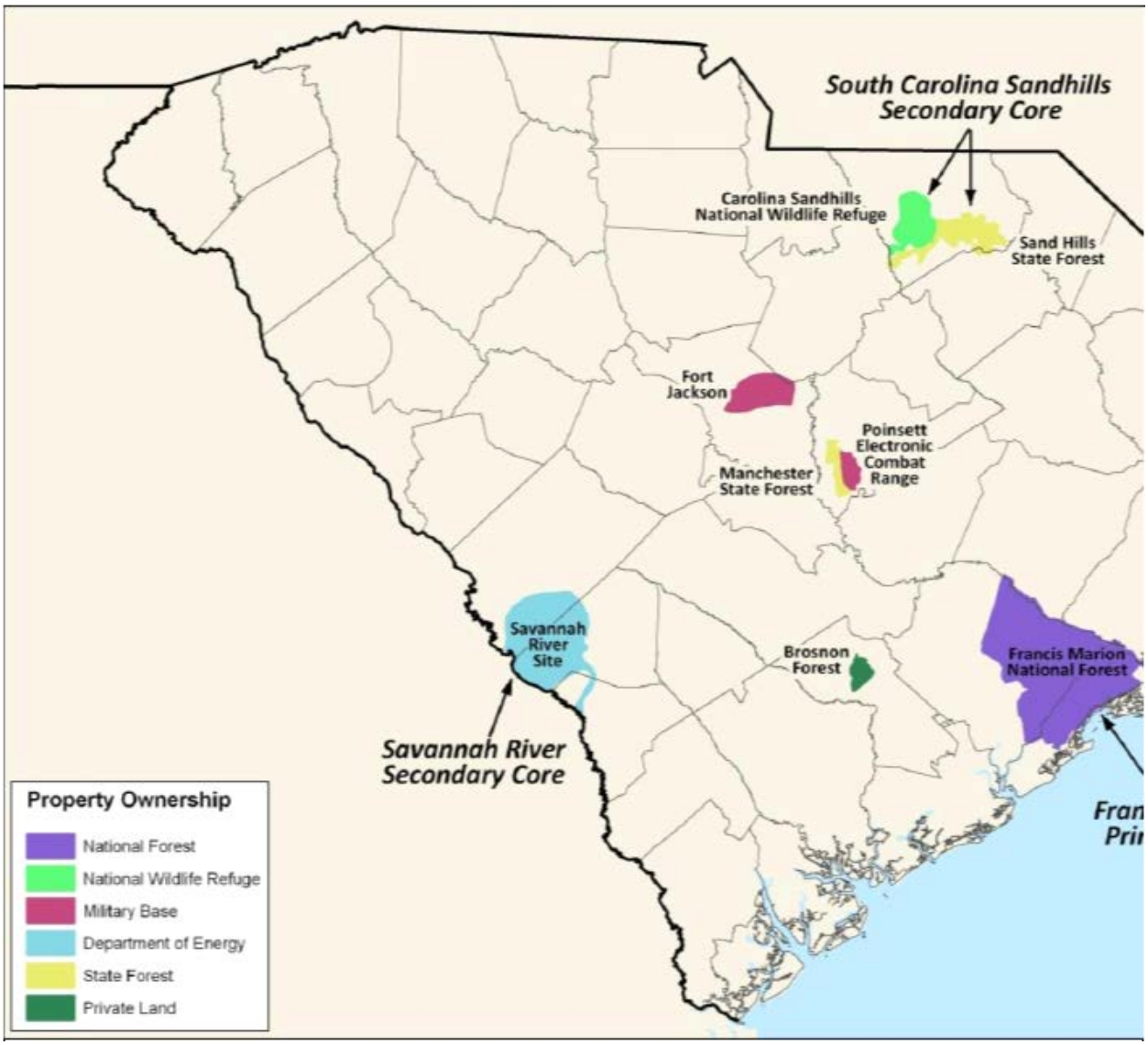
a One active cluster shared with Manchester State Forest.

b Two active clusters shared with Manchester State Forest.

c Includes potential breeding groups that fledged young and potential breeding groups that laid eggs but did not fledge young.

d Does not include floaters (i.e., adult RCWs not associated with an active cluster or potential breeding group).

e. Insufficient data.



Location of Primary Core, Secondary Core and Other RCW Populations Relevant to Poinsett Range

Artificial Cavities – Artificial cavities are known to benefit RCW populations when natural cavities are limited. Between 2001 and 2016, 221 artificial cavities were installed at Poinsett Range to recondition abandoned clusters, create recruitment clusters and/or maintain a minimum of four suitable cavities per cluster. The majority (95%) of these cavities were inserts. Given the lack of appropriate trees, only five drilled cavities and four drilled starts were constructed during the same time period. Although the use of artificial cavities has facilitated population growth, it also has created a situation where there are more suitable artificial cavities than natural cavities. In 2014, only 46 (23%) of the 201 suitable cavities available during the nesting season were natural and 20 (69%) of the 29 attempted or successful nests were in artificial cavities. However, because all of the existing managed clusters (active and recruitment) are in stands over 60 years old, the ratio of natural to artificial cavities should improve in the future as the birds begin to excavate their own cavities. As of the 2014 nesting season RCWs had initiated or completed at least one natural cavity in each of the 27 active clusters. Because artificial cavities can become degraded and unsuitable over time, managers have begun replacing existing inserts in lieu of creating new cavity trees. Sixty-six inactive insert cavities have been replaced with new inserts at Poinsett Range since 2011.

Prescribed Fire – Since the beginning of public ownership in the 1950s and for the next 40 years, prescribed fire was not used for resource management purposes at Poinsett Range. Although there is no documentation, any wildfires that occurred during that time period probably were suppressed as soon as possible. The use of prescribed fire to manage RCW habitat began in 1995 (see Table History of Prescribed Fire to Manage RCW Habitat at Poinsett Range, 1995-2017) and initially focused on burning large acreages in an effort to ameliorate years of fire suppression. Unfortunately, these burns were not always conducted under the best environmental conditions and substantial pine mortality occurred in some areas. From 1997 through 2005 the number of acres burned annually was highly variable due to a variety of factors including weather conditions, soil and fuel moisture, the military training schedule and a lack of qualified prescribed fire personnel. The program was evaluated in 2005 and several important changes were made. A prescribed fire manager was retained on a contractual basis. Also, additional 20 CES/CEIEA personnel received wildland fire training and equipment was either upgraded or replaced. The Wildland Fire Management Plan also was revised and incorporated into the INRMP. These improvements have gradually increased the amount of RCW habitat burned annually and laid the foundation for establishing a 2-3 year prescribed fire rotation. Although growing season burns are a more effective way to control hardwoods and promote herbaceous groundcover in RCW habitat, most of the burning at Poinsett has been done during the dormant season to reduce fuel loads and prepare for future growing season burns. Several small growing season burns were conducted between 2006 and 2011 and 2012 marked the first year when more acres were burned during the growing season than the dormant season. In 2013 the program underwent another review and subsequent transformation. With the establishment of the Air Force Wildland Fire Center, the use of contractors to conduct prescribed burns was curtailed and plans were made to base a regional wildland fire team at Poinsett Range. This team will be responsible for conducting prescribed burns at Poinsett Range and once fully staffed their presence should result in more acres being burned annually.

History of Prescribed Fire to Manage RCW Habitat at Poinsett Range, 1995-2017

Year	Acres		
	Growing Season[a]	Dormant Season	Total
1995	0	1,812	1,812
1996	0	1,874	1,874
1997	0	738	738
1998	0	0	0
1999	0	589	589
2000	0	1,234	1,234
2001	0	177	177
2002	0	156	156
2003	0	0	0
2004	0	232	232
2005	0	116	116
2006	51	179	230
2007	0	1,073	1,073
2008	178	688	866
2009	118	981	1,099
2010	301	914	1,215
2011	160	627	787
2012	1,011	188	1,199
2013	631	724	1,355

Year	Acres		
	Growing Season[a]	Dormant Season	Total
2014	290	624	914
2015	1684	660	2344
2016	1793	703	2496
2017	342	567	909

a Growing season = March 15 through September 15.

Hardwood Control – Given the years of fire suppression at Poinsett Range, many pine stands have developed a dense and/or tall hardwood midstory that cannot be controlled with fire. Accordingly, it has been necessary to use alternative methods such as mechanical clearing, herbicides and hand clearing to treat hardwoods in RCW habitat (see Table Other Methods Used to Manage RCW Habitat at Poinsett Range, 1995-2017). Three mechanical methods have been used: a low-ground-pressure tracked machine with a flail-head cutter (e.g., a Gyro Trac), a heavy-duty rotary mower attached to a tractor (e.g., a Brown Tree Cutter) and commercial fuel-chipping timber harvests. Detailed information on herbicide use prior to 2002 is limited, but since then most treatments have been foliar spray applications of an imazapyr- based herbicide (e.g., Arsenal AC). Hand clearing has been used on a limited basis and only in clusters as needed.

Pine Straw Raking – In 2010 and 2011 pine straw was raked in several longleaf pine stands that had not been burned for at least 14 years (see Table Other Methods Used to Manage RCW Habitat at Poinsett Range, 1995-2017). Although the raking generated some revenue for the 20 CES/CEIEA Forestry Program, its primary purpose was to reduce excessively heavy fuel loads in preparation for future prescribed burns.

Timber Management – Since 1998 4,259 acres of upland pine habitat have been row-thinned or selectively thinned at Poinsett Range to reduce basal areas, release suppressed pines and improve RCW habitat conditions (see Table Other Methods Used to Manage RCW Habitat at Poinsett Range, 1995-2017). In addition, 14 different areas of either slash pine, loblolly pine or sand pine totaling 169 acres have been clear-cut and replanted with longleaf pine. The average size of these clear-cuts was approximately 12 acres.

Foraging Habitat Monitoring – The first comprehensive foraging habitat inventory at Poinsett Range was conducted in 2005. Stand data were collected in accordance with the federal recovery standard (USFWS 2003a) to assess RCW foraging habitat conditions using a fixed-plot sampling method. Tenth-acre plots were used to collect overstory and midstory data and 100th- acre plots were used to collect groundcover data. Approximately 6,000 acres were surveyed on a 7x7-chain grid for an overall sampling rate of approximately 2%.

A new inventory was initiated in 2008 with a modified sampling protocol that uses a 10-factor prism to collect overstory data, 10th-acre plots to collect midstory data and 100th-acre plots to assess ground cover conditions. Stands were cruised on a 3x3-chain grid for on overall sampling rate of approximately 10%. This inventory was completed in 2012 and is tentatively scheduled to be repeated in 2018 to document changes related to timber harvests, mechanical midstory removal, prescribed fire and other management activities.

Other Methods Used to Manage RCW Habitat at Poinsett Range, 1995-2017

Year	Acres					
	Mechanical[a]	Herbicide	Hand	Pinestraw	Thinning	Total
1995	0	0	0	0	0	0
1996	0	0	0	0	0	0

1997	0	0	17	0	0	17
1998	0	351	0	0	236	587
1999	0	252	0	0	122	374
2000	0	0	0	0	257	257
2001	75	290	0	0	96	461
2002	113	389	0	0	322	824
2003	213	569	0	0	169	951
2004	0	462	0	0	341	803
2005	103	45	21	0	353	522
2006	14	50	12	0	153	229
2007	24	0	10	0	177	211
2008	40	0	50	0	276	366
2009	346	0	0	0	260	606
2010	271	0	0	101	445	817
2011	320	108	0	78	280	786
2012	52	574	0	0	495	1,121
2013	14	203	0	0	253	470
2014	253	0	0	0	24	277
2015	28	228	49	0	264	519
2016	0	74	326	0	352	752
2017	36	36	0	0	239	311
Total	1,838	3,293	110	179	4,259	9,679

a - Includes mowing and fuel chipping

Population Goal

The RCW population at Poinsett Range is designated as a significant support population in the 2003 RCW recovery plan. Significant support populations contribute to the regional and range- wide recovery of the species in several ways. They are important reservoirs of genetic resources, they help represent natural variation in RCW habitats and they support larger core populations as a source of immigrants and as a buffer against stochastic losses. The RCW population at Poinsett Range has the potential to provide support for several core populations including the Francis Marion Primary Core, the South Carolina Sandhills Secondary Core and the Savannah River Secondary Core (see Figure Location of Primary Core, Secondary Core and Other RCW Populations Relevant to Poinsett Range).

The long-term RCW population goal for Poinsett Range established in the 2003 recovery plan was 30 active clusters. Because detailed stand inventory data were not available, this goal was derived by dividing the best available estimate of existing or potentially suitable foraging habitat (6,000 acres) by 200 acres, which is the generic amount typically assigned to an RCW cluster.

In 2012, data from the foraging habitat inventory were analyzed to determine if the long-term goal of 30 active clusters was valid. The analysis was based on the status of the RCW population in 2012 and consisted of the following five steps.

The RCW Foraging Matrix Application (http://www.fws.gov/rcwrecovery/matrix.html) was used to create a map of existing and potentially suitable RCW foraging habitat. Wetlands, wildlife openings, lowland and upland hardwood stands, training targets, the range office complex and other developed areas were not included. This process identified 5,969 acres of existing and potential foraging habitat for the entire property

(see Figure Managed RCW Foraging Habitat in High (≥ 60) and Low (<60) Site Index (SI) Areas and the Location of Existing and Future Clusters at Poinsett Range in 2012 (P = Poinsett Range Cluster and M = Manchester State Forest Cluster)).

Areas of existing and potential foraging habitat too small to support a cluster and/or separated by more than 200 feet from other existing or potential habitat were considered to be of minimal value to RCWs. Removal of these areas reduced the amount of existing and potential foraging habitat, hereinafter referred to as managed foraging habitat, to 5,447 acres (see Figure Managed RCW Foraging Habitat in High (≥ 60) and Low (<60) Site Index (SI) Areas and the Location of Existing and Future Clusters at Poinsett Range in 2012 (P = Poinsett Range Cluster and M = Manchester State Forest Cluster)).

Digitized Soil Conservation Survey maps (Pitts 1974) were used to determine the location and acreage of high site index areas (≥ 60) and low site index areas (< 60) within the managed foraging habitat (see Figure Managed RCW Foraging Habitat in High (≥ 60) and Low (<60) Site Index (SI) Areas and the Location of Existing and Future Clusters at Poinsett Range in 2012 (P = Poinsett Range Cluster and M = Manchester State Forest Cluster)). In accordance with the federal recovery guidelines (USFWS 2003a), these acreages then were divided by 120 and 200 for high and low productivity sites, respectively, to determined how many clusters each type potentially could support. The results were as follows: the high site index areas could support 27 clusters (3,265 acres divided by 120) and the low site index areas could support 11 clusters (2,182 acres divided by 200). Collectively, this yielded a potential maximum of 38 clusters for the property, which based on the status of the population in 2012 would require the addition of 11 recruitment clusters and their partitions.

The RCW Foraging Matrix Application was used to calculate the amount of managed foraging habitat in the 27 existing half-mile foraging partitions (see Table Site Indices, Managed Foraging Habitat, Recovery Standard (RS) Scores and Conversion Acres for RCW Half-Mile Foraging Partitions at Poinsett Range in 2012). If a partition extended beyond the boundary of Poinsett Range, only the area inside the boundary and thus managed by 20 CES/CEIEA staff, was included. The predominant site index (high or low) also was determined for each existing partition and these data were used to identify existing partitions that might be large enough to accommodate one or more new recruitment clusters and partitions.

Next, through a process of trial and error, the RCW Foraging Matrix Application was used to test if the addition of 11 new recruitment clusters was possible given the spatial arrangement of the existing clusters and partitions. Potential recruitment clusters were located in longleaf pine stands that were between 0.25 and 1 mile away from existing clusters and at least 10 acres in size. Half-mile foraging partitions were created for potential recruitment clusters and classified as having a predominately high or low site index. A potential recruitment cluster location was rejected if the amount of managed foraging habitat in its partition was below the recommended acreage for its site index. A potential recruitment cluster location also was rejected if adding its partition caused more than a 10% reduction in the amount of managed foraging habitat in any existing partition that was already below the recommended minimum.

The above analysis revealed that Poinsett Range could support a maximum of 33 clusters and partitions. However, establishing a long-term population goal of 33 active clusters would not allow for any natural fluctuations in the population and could result in a repetitive cycle of the goal being attained and lost. To avoid this problem, 2 RCW goals have been identified for Poinsett Range. The long-term RCW habitat management goal for Poinsett Range is to achieve and maintain 33 high-quality clusters and partitions on the property and the long-term RCW population goal is to achieve and maintain 30 active clusters. Since 2001 the percentage of potential breeding groups per active clusters at Poinsett Range has ranged from 85% to 100% and averaged 95% (see Table RCW Population and Nesting Data for Poinsett Range, 2001-2017**).**

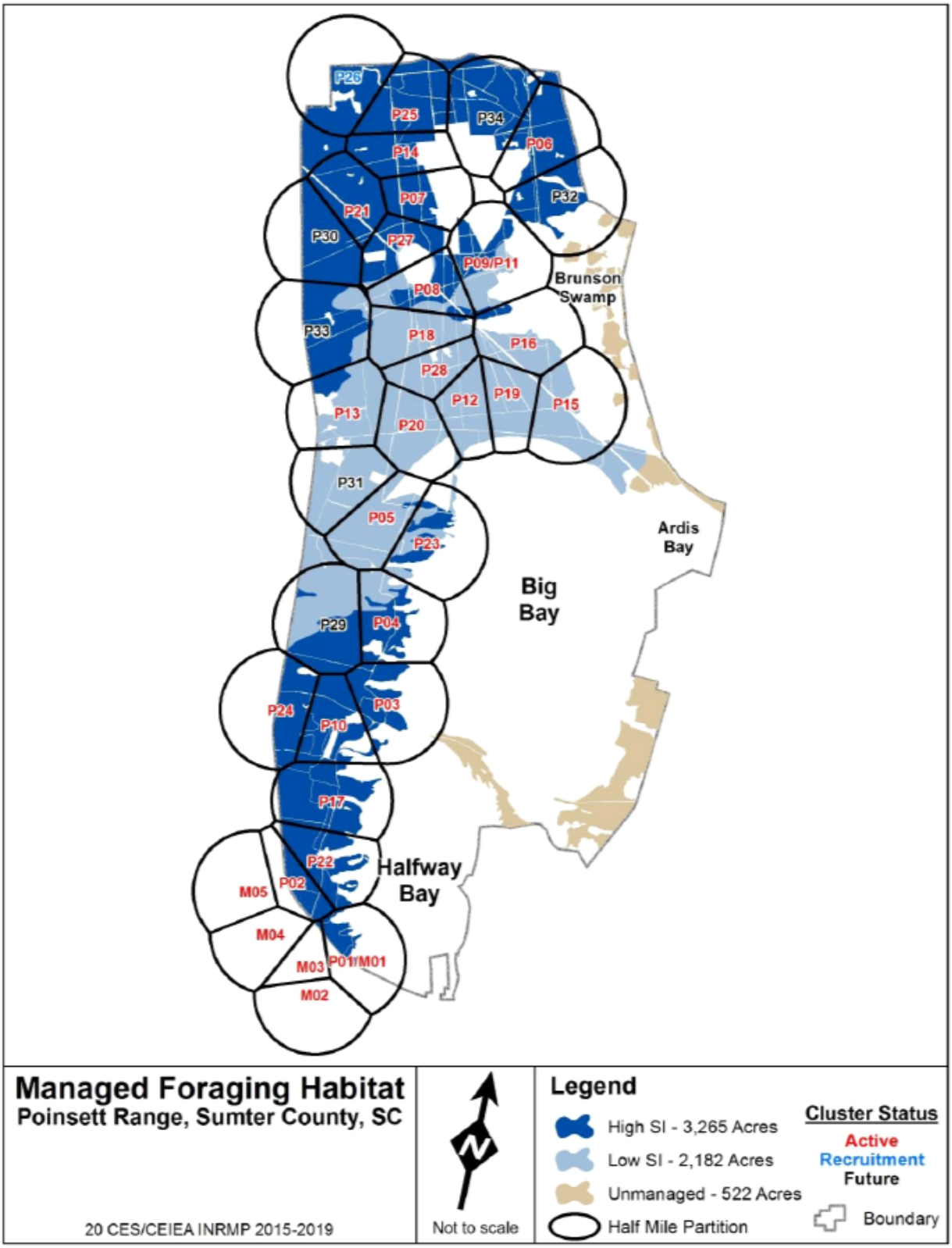
Therefore, 30 active clusters should be able to support at least 26 potential breeding groups in any given year. Based on a minimum recruitment stand age of 60 years, it would take at least until 2030 to reach the long-term population goal of 30 active clusters (see Table Summary of Existing and Future RCW Clusters at Poinsett Range Including Habitat Types, Establishment and Activation Years, Stand Basal Areas, Recovery Standard (RS) Scores and Management Priorities in 2012).

A RCW habitat inventory is planned for FY18. Once completed, cluster habitat data will be updated.

Standard Management and Monitoring Activities

The RCW population at Poinsett Range has been and will continue to be managed and monitored in accordance with the 2003 RCW recovery plan. Given the relatively small amount and contiguous distribution of managed foraging habitat, the property will be managed as a single habitat management unit. The key points of the RCW program at Poinsett Range, which are fairly standard for all smaller properties being managed for RCWs, are summarized below.

Clusters, Cavity Trees and Cavities – Regardless of their status, all clusters will be managed as if they are active. Artificial cavities will be used to maintain a minimum of four suitable cavities per cluster and will be monitored for resin leaks and replaced or screened as necessary. Prescribed fire, mechanical clearing, hand clearing and/or herbicides will be used to control midstory vegetation and clusters in overstocked stands will be thinned to a target basal area of 40-50 ft^2/acre. Dead or dying cavity trees and other snags will be retained in clusters unless they are a safety hazard. With the exception of prescribed fire, no habitat management activities will occur in clusters during the nesting season.



Managed RCW Foraging Habitat in High (≥ 60) and Low (<60) Site Index (SI) Areas and the Location of Existing and Future Clusters at Poinsett Range in 2012 (P = Poinsett Range Cluster and M = Manchester State Forest Cluster)

Site Indices, Managed Foraging Habitat, Recovery Standard (RS) Scores and Conversion Acres for RCW Half-Mile Foraging Partitions at Poinsett Range in 2012

Partition[a]	Site Index[b]	Managed Foraging Habitat (Acres)				2012 Partition RS Score	Convert to Longleaf Pine	
		Recommended Minimum	2012 (27 Clusters)	Goal (33Clusters)	Change		Acres	Percent
0	High	120	44	44	0%	1.0	4	9%
P02 [c]	High	120	67	67	0%	1.0	24	36%
P03	High	120	127	123	-3%	1.2	60	49%
P04	High	120	285	176	-38%	1.7	87	49%
P05	Low	200	308	205	-33%	1.7	160	78%
P06	High	120	317	164	-48%	1.5	57	35%
P07	High	120	92	92	0%	1.0	2	2%
P08[d]	High/Low	160	147	147	0%	1.4	42	29%
P09/P11[d]	High/Low	160	150	141	-6%	1.4	0	0%
P10	High	120	180	171	-5%	1.7	62	36%
P12	Low	200	142	142	0%	1.7	28	20%
P13	Low	200	271	205	-24%	2.1	108	53%
P14	High	120	121	121	0%	1.2	9	7%
P15	Low	200	168	168	0%	1.9	34	20%
P16	Low	200	120	120	0%	1.4	0	0%
P17	High	120	223	223	0%	2.2	180	81%
P18	Low	200	196	184	-6%	1.5	105	57%
P19	Low	200	145	145	0%	1.7	7	5%
P20	Low	200	192	182	-5%	2.1	128	70%
P21	High	120	302	178	-41%	2.0	109	61%
P22	High	120	150	150	0%	1.7	98	65%
P23[d]	High/Low	160	122	122	0%	1.0	53	43%
P24	High	120	140	127	-9%	1.0	38	30%
P25	High	120	234	210	-10%	1.5	55	26%
P26	High	120	133	130	-2%	1.0	100	77%
P27	High	120	135	125	-7%	1.3	84	67%
P28	Low	200	128	128	0%	1.3	39	30%
P29	Low	200		297		2.0	184	62%
P30	High	120		185		2.0	122	66%
P31	Low	200		205		1.3	129	63%
P32	High	120		160		1.0	87	54%
P33	High	120		228		1.4	112	49%
P34	High	120		221		1.0	14	6%

a - P = Poinsett Range cluster, M = Manchester State Forest cluster.

b - High site index ≥ 60, low site index < 60.

c - The partitions for Clusters P01/M01 and P02 include foraging habitat on the Manchester State Forest and are larger than reported.

d - The partitions for Clusters P08, P09/P11 and P23 include approximately equal amounts of high and low index sites. The recommended minimum size for these partitions was calculated by averaging the recommended acres for high and low index sites (200 + 120/2 = 160 acres).

Summary of Existing and Future RCW Clusters at Poinsett Range Including Habitat Types, Establishment and Activation Years, Stand Basal Areas, Recovery Standard (RS) Scores and Management Priorities in 2012

Cluster[a]	Type	Habitat[b]	Stand Number	Establishment Year	First Year Activated	2012 Data				2015-2019 Management		
						Cluster Status	Stand Age	Total Pine BA	RS Score	Prescribed Fire	Midstory Control	Thin
P01/M01	Natural	LP	436	Unknown	Unknown	Active	88	60	4.1	X		
P02	Recondition	LP/SP	360	2001	2005	Active	79	54	4.2	X	X	
P03	Recondition	LP	403	2001	2002	Active	83	41	4.6	X		
P04	Natural	LP	322	Unknown	Unknown	Active	92	36	3.1	X	X	
P05	Recondition	LP	310	2001	2002	Active	87	41	4.5	X		
P06	Recondition	LP	236	2004	2006	Active	88	67	4.6	X		X
P07	Recondition	LP	110	2001	2004	Active	89	39	4.5	X		
P08	Recondition	LP	135	2001	2006	Active	72	36	4.2	X		
P09/P11	Natural	LP	216	Unknown	Unknown	Active	96	45	4.6	X		
P10	Recondition	LP	348	2001	2002	Active	90	64	4.1	X		X
P12	Natural	LP	223	Unknown	Unknown	Active	87	32	4.2	X		
P13	Recruitment	LP	169	2002	2005	Active	70	51	3.7	X		
P14	Natural	LP	110	Unknown	Unknown	Active	89	39	4.5	X		
P15	Recondition	LP	233	2005	2011	Active	75	41	4.4	X		
P16	Recruitment	LP	221	2001	2004	Active	83	61	4.4	X		X
P17	Recruitment	LP	357	2001	2006	Active	75	64	4.9	X		X
P18	Recondition	LP	135	2003	2005	Active	72	36	4.2	X		
P19	Recondition	LP	232	2003	2006	Active	87	28	3.9	X		
P20	Recruitment	LP	160	2003	2004	Active	78	73	4.1	X		X
P21	Recondition	LP	128	2002	2008	Active	79	55	4.7	X		
P22	Recruitment	LP	430	2003	2005	Active	91	50	3.9	X		
P23	Pioneer	LP	443	2004	2004	Active	77	22	3.3	X	X	
P24	Recruitment	LP	344	Unknown	2008	Active	88	63	4.1	X		X
P25	Recondition	LP	104	2009	2011	Active	87	23	3.7	X		
P26	Recruitment	LP	113	2010		Inactive	82	50	4.1	X		
P27	Recruitment	SP/LP	142	2010	2011	Active	63	38	4.4	X		
P28	Recondition	LP	135	2010	2012	Active	72	36	4.2	X	X	
P29	Recruitment	LP	322	2017[c]			92	36	3.1	X	X	

P30	Recruitment	LP	133	2025[d]			47	70	2.8	X		X
Clustera	Type	Habitat[b]	Stand Number	Establishment Year	First Year Activated	2012 Data				2015-2019 Management		
						Cluster Status	Stand Age	Total Pine BA	RS Score	Prescribed Fire	Midstory Control	Thin
P31	Recruitment	LP	307	2030[d]			42	50	2.7	X		
P32	Recruitment	LP	241	2040[d]			32	67	2.7	X		X
P33	Recruitment	LP	145	2040[d]			32	57	2.4	X		
P34	Recruitment	LP	224	2046[d]			26	10	2.7	X		

a - P = Poinsett Range cluster, M = Manchester State Forest cluster.

b - LP = longleaf pine, SP = slash pine.

c - See text for discussion.

d - Based on a minimum stand age of 60 years. Recruitment clusters potentially could be established in stands <60 years of age if pines suitable for artificial cavities are present and the associated foraging habitat partition meets the Managed Stability Standard defined in the RCW recovery plan (USFWS 2003).

Each cavity tree will be marked with a uniquely-numbered aluminum tag and its geographic coordinates will be recorded with a portable global positioning system (GPS) unit and downloaded into the 20 CES/CEIEA geographic information system (GIS) database. In addition, the following data will be collected for all cavity trees when they are found or created: tree species and diameter at breast height (dbh), number of cavities and cavity height and orientation. Searches for new cavity trees in and around clusters will be conducted annually during the nesting season. Other pine stands with trees suitable for cavity excavation will be surveyed once every 10 years. The last extensive cavity-tree survey was done in 2010 and the next one will occur in 2020.

Cavity trees also will be marked with a 6-10 inch band of white paint, but because access to Poinsett Range is restricted and ground training activities are minimal, cluster boundaries will not be marked. No new firebreaks will be established within 200 feet of a cavity tree and heavy equipment will not be used within 50 feet of a cavity tree. To protect against accidental ignition or duff fires, the fuels within a ≥10-foot radius of cavity trees will be raked, mowed and/or sprayed with water or foam prior to a prescribed burn. Any active cavity trees destroyed by a prescribed fire or wildfire will be replaced with an artificial cavity as soon as possible, preferably within 48 hours.

Annual Population Monitoring – During the nesting season, all clusters will be monitored to determine activity status, group size and composition, survivorship, nest initiation dates, clutch and brood size and fledging success. An elevated camera system will be used to determine the excavation stage, activity status, suitability and contents of individual cavities and to search for and monitor nests. Individual RCWs will be uniquely marked with three color bands (size XB) on one leg and a single color band and a U.S. Geological Survey (USGS) aluminum band (size 1A) on the other leg. Most birds will be banded as nestlings when they are 5-10 days old. Fledge checks will be done 2-14 days after the projected fledging date to determine the number of young fledged and the sex of each fledgling.

Kleptoparasites and Predator Control – Cavities often are scarce in fire-maintained communities and competition for RCW cavities can be intense. Southern flying squirrels often usurp cavities and preclude them from RCW use, whereas snakes and flying squirrels may occasionally prey on RCW nests. Accordingly, it may be necessary to remove flying squirrels or other species from RCW cavities to improve reproductive success, provide roosts for RCWs or prepare cavities for translocated birds. Kleptoparasites and predators may be removed from RCW cavities throughout the year, but the most intensive efforts will occur immediately before and during the nesting season.

Translocation – The 2003 recovery plan advocates the use of translocation to achieve RCW management objectives. Although it may be possible to reach the long-term population goal of 30 active clusters through a combination of on-site translocations and natural recruitment, translocating RCWs from off-site donor populations may be required to pair single adults with potential mates or to promote the formation of new potential breeding groups in recruitment or inactive clusters. Off-site translocations also may be required to manage genetic resources (USFWS 2003a). RCW population models suggest that an immigration rate of 1-2 migrants every five years is needed to avoid an excessive loss of genetic variability in small populations (J. R. Walters, personal communication). If necessary, juvenile RCWs from off-site donor populations will be translocated to Poinsett Range to achieve this immigration rate. Guidance on current USAF policies will be sought prior to augmenting the Poinsett Range population with RCWs from off-site properties.

Foraging Habitat – The preferred method of RCW habitat management will be prescribed fire. Because the property has been fire suppressed, most burns will occur during the non-growing season. Growing season burns will be introduced as fuel loads diminish and the habitat re- acclimates to the presence of fire. A 2-3 year burn rotation will be established for the 5,447 acres of managed foraging habitat, with the highest

priority given to stands with clusters. Mechanical equipment, hand clearing, herbicides and/or pine straw raking will be used to control hardwoods in stands that cannot be burned (e.g., too close to a highway) and in stands where the hardwood vegetation cannot be controlled by fire. Overstocked pine stands will be thinned to a target basal area of 40-50 ft^2/acre and favor the retention of the largest, healthiest trees.

Foraging habitat conditions will be assessed at least once every 10 years to evaluate progress and guide future management activities. Hardwood midstory conditions will be assessed at least once every five years to determine where control measures are most needed. Both of these tasks were completed in 2012 and provide the basis for the management priorities discussed below.

2018-2022 Management Priorities

Clusters – The RCW Foraging Matrix Application was used to evaluate the condition of the 33 existing and future clusters at Poinsett Range relative to the federal recovery standard for foraging habitat. On a scale of 1 (poor) to 5 (excellent) all of the 27 clusters present in 2012 had a stand score >3.0 and 21 (78%) had a stand score >4.0. The Table Summary of Existing and Future RCW Clusters at Poinsett Range Including Habitat Types, Establishment and Activation Years, Stand Basal Areas, Recovery Standard (RS) Scores and Management Priorities in 2012 provides a list of specific management priorities for the existing clusters during the next five years. Every existing cluster should be burned at least twice and include at least one growing season burn if possible and six existing clusters (P06, P10, P16, P17, P20 and P24) should be selectively thinned to a basal area of 40-50 ft^2/acre. At least four existing clusters (P02, P04, P23 and P28) will need a mechanical or herbicide treatment to control midstory vegetation; other clusters also may need to be treated mechanically or with herbicides if drought or other weather-related issues restrict the use of prescribed fire.

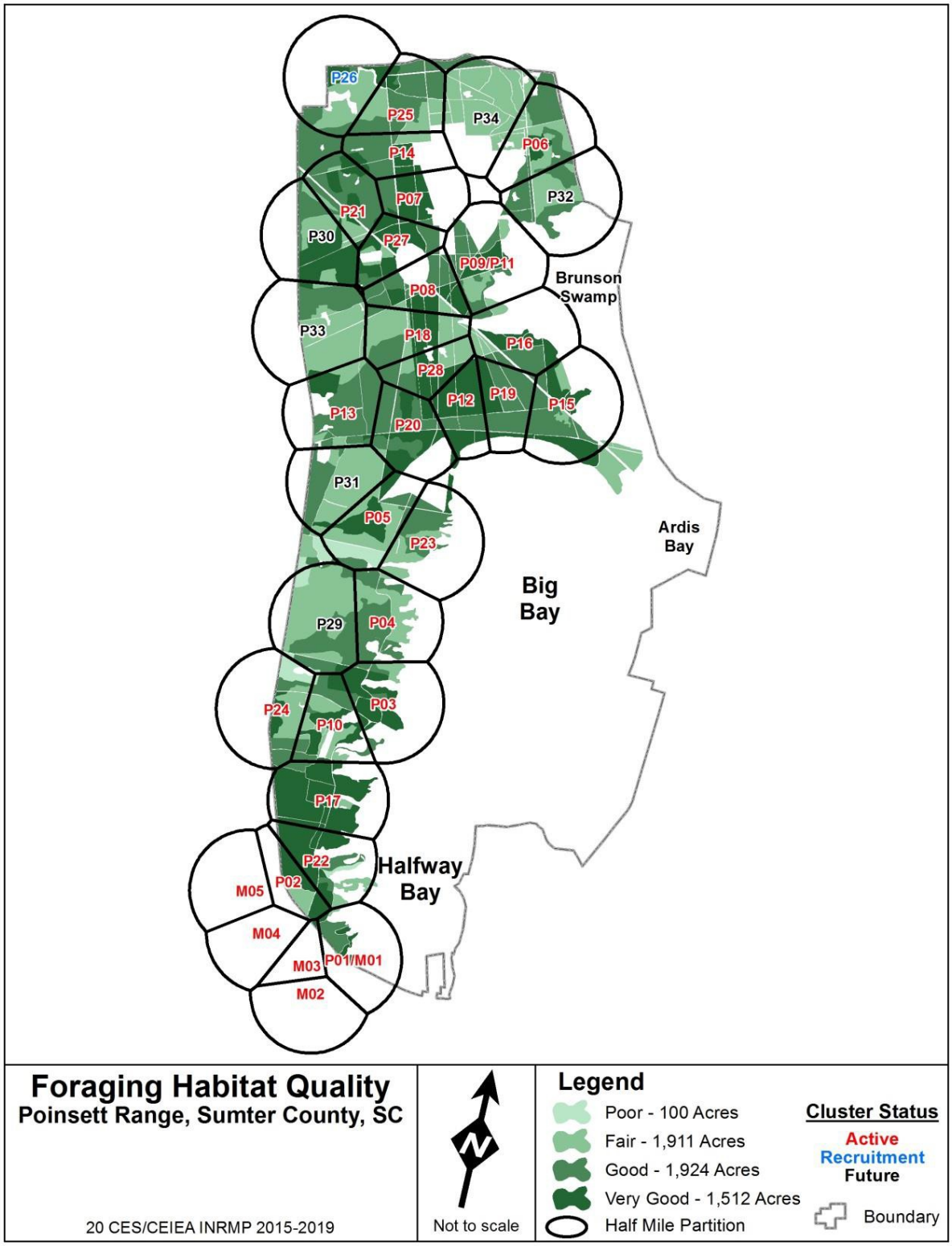
Achieving the long-term RCW management goal of 33 clusters will require the creation of six new recruitment clusters (see Figure Managed RCW Foraging Habitat in High (≥ 60) and Low (<60) Site Index (SI) Areas and the Location of Existing and Future Clusters at Poinsett Range in 2012 (P = Poinsett Range Cluster and M = Manchester State Forest Cluster).). Because the stand selected for Cluster P29 is 92 years old, artificial cavities potentially could be installed there. However, Cluster P29 and its associated foraging habitat will require extensive management prior to cavity installation. Specific management needs within the next five years include using mechanical mowing or herbicides to control midstory vegetation and initiating a 2-3 year prescribed fire rotation. The establishment of Cluster P29 also may be affected by a wildfire that burned the future cluster location and approximately 42% of its foraging partition in May 2012. Although the wildfire was not very intense, there is the potential for widespread pine mortality because the area had not been burned for 12 years prior to the wildfire. In light of these issues, it is doubtful that Cluster P29 will be established before 2019.

Based on a minimum stand age of 60 years, the timeframe for establishing the other five recruitment clusters ranges from 2025 to 2046 (see Table Summary of Existing and Future RCW Clusters at Poinsett Range Including Habitat Types, Establishment and Activation Years, Stand Basal Areas, Recovery Standard (RS) Scores and Management Priorities in 2012). Recruitment clusters potentially could be established in stands <60 years old if pines suitable for artificial cavities are present and the associated foraging habitat partition meets the managed stability standard defined in the RCW recovery plan (USFWS 2003). Future recruitment cluster stands should be burned at least twice during the next five years and include at least one growing season burn if possible. In addition, the stands where clusters P30 and P32 will be established should be selectively thinned to a basal area of 50 ft^2/acre.

Foraging Habitat – The RCW Foraging Matrix Application was used to evaluate the quality of the 33 existing and future foraging habitat partitions relative to the federal recovery standard. On a scale of 1

(poor) to 5 (excellent) no partition scored above 2.2 (see Table Site Indices, Managed Foraging Habitat, Recovery Standard (RS) Scores and Conversion Acres for RCW Half-Mile Foraging Partitions at Poinsett Range in 2012)**.** The primary factors that caused low scores were too many small pines (< 10 inch dbh), not enough large pines (≥ 10 inch dbh), excessive hardwood midstory vegetation, little to no herbaceous ground cover and lack of prescribed burning. Although the ultimate objective is to increase the score of every partition on the property, it will be impossible to correct all of the problems in each partition in five years. Therefore, a prioritized management approach will be required. The first priority will be to maintain the 3,265 acres of managed foraging habitat that scored ≥3.0 (e.g., good and very good (see Figure Quality of Managed RCW Foraging Habitat at Poinsett Range in 2012 Relative to the Federal Recovery Standard (P = Poinsett Range Cluster and M = Manchester State Forest Cluster). In most cases this will be accomplished by conducting a prescribed burn every two to three years, burning during the growing season whenever possible and selectively thinning overstocked stands. The second priority will be to conduct 1-2 dormant season burns in as many stands as possible that were not prescribed burned during the past five years. The third priority will be to use selective thinning, mechanical midstory removal and/or prescribed fire to improve the three stands, totaling 100 acres, that scored <2.0 (e.g., poor). Collectively, these activities will improve the quality of the managed foraging habitat at both the stand and partition level. The fourth priority will be to re-inventory the condition of the designated RCW managed foraging habitat to evaluate progress and plan future management needs in 2019 if funding is available.

In 2012 85% of the managed RCW foraging habitat at Poinsett Range was ≥30 years old and longleaf pine was the most abundant species (see Table Managed RCW Foraging Habitat at Poinsett Range Relative to Dominant Pine Species and Age Class in 2012 and the Figure Distribution of Predominant Pine Species in Managed RCW Foraging Habitat at Poinsett Range in 2012). Because habitat restoration will require the conversion of 2,440 acres of slash and loblolly pine to longleaf sustaining the RCW population during the conversion process will require careful, long-term planning. The percentage of off-site pines per partition currently ranges from 0 to 81% and over 50% of the managed habitat in 12 partitions needs to be converted (see Table Managed RCW Foraging Habitat at Poinsett Range Relative to Dominant Pine Species and Age Class in 2012). Because there are relatively few loblolly pine stands, planning and initiating a strategy to convert them to longleaf will be a high priority during the next five years. The specific methods used to accomplish this task will be developed in consultation with the USFWS and most likely will consist of small clear-cuts and/or selective thinning followed by under planting. Other habitat restoration priorities during the next five years include identifying and testing methods to restore native groundcover vegetation and formulating a plan to convert 2,009 acres of off-site slash pine to longleaf. Again, these activities will be developed in consultation with the USFWS.



Quality of Managed RCW Foraging Habitat at Poinsett Range in 2012 Relative to the Federal Recovery Standard (P = Poinsett Range Cluster and M = Manchester State Forest Cluster)

Managed RCW Foraging Habitat at Poinsett Range Relative to Dominant Pine Species and Age Class in 2012

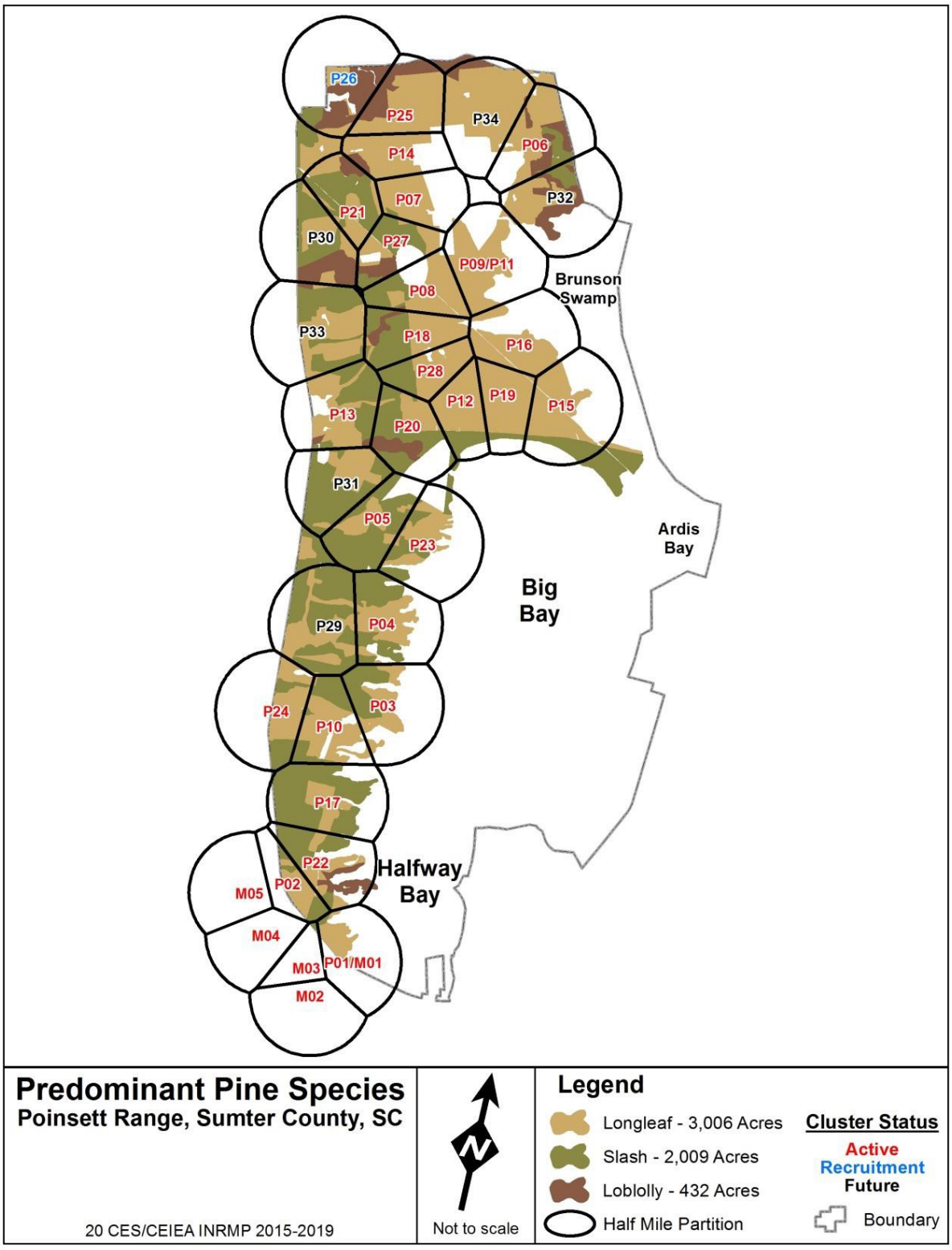
Dominant Species[a]	Acres per Age Class (Years)				
	< 30	30-59	≥ 60	Total	Percent
Longleaf	614	798	1,611	3,023	55%
Slash	0	1,839	170	2,009	37%
Loblolly	200	97	134	431	8%
Total	814	2,734	1,915	5,463	100%
Percent	15%	50%	35%	100%	

a - Includes mixed pine stands dominated by the specified species.

Consultation

Section 7 of the ESA requires all federal agencies to consult with the USFWS prior to initiating any proposed action that may impact a federally endangered or threatened species (50 CFR Part 402). Informal consultations are preferred and are conducted by telephone or written correspondence. If the USFWS determines that a proposed action is unlikely to have a negative impact on a listed species, the proposed action may be implemented without additional consultation. However, if the USFWS concludes that a proposed action may have an adverse effect on a listed species, then formal consultation is required. This process involves the preparation of a Biological Opinion (BO) by the USFWS to evaluate the likelihood of a "take" as defined by the ESA.

The 20 CES/CEIEA Endangered Species Manager has and will continue to consult with the USFWS on a case by case basis on forest management activities that could affect the RCW population at Poinsett Range including timber sales, herbicide treatments, pine straw raking and mechanical or manual control of midstory hardwoods. To date, all consultations have been informal and have not required the preparation of a BO. In 2012, the 20 CES/CEIEA Endangered Species Manager requested and received concurrence from the USFWS to establish a flexible prescribed fire program at Poinsett Range that was adaptable to changing conditions and did not require annual consultation.



Distribution of Predominant Pine Species in Managed RCW Foraging Habitat at Poinsett Range in 2012 (P = Poinsett Range Cluster and M = Manchester State Forest Cluster)

Permits, Reports and Incidental Take

The following permits are required to conduct the RCW program at Poinsett Range: a Section 10(a)(1)(A) Endangered Species Permit from the USFWS, a Federal Bird Banding Permit from the USGS and a Scientific Collecting Permit from the SCDNR. The 20 CES/CEIEA Endangered Species Manager is responsible for obtaining and renewing these permits and for preparing and submitting an annual RCW report to the USFWS and SCDNR.

The level of incidental take at Poinsett Range is expected to be extremely low. Nonetheless, provisions must be in place to cover potential losses. As a Section 10(a)(1)(A) permittee, the incidental take of RCW adults, juveniles, nestlings and nests at Poinsett Range is covered under an existing range-wide BO (USFWS 2003b). Specifically, the opinion covers incidental take related to the following management and monitoring activities: noosing and banding nestlings, capturing and banding adults and juveniles, translocating juveniles, visually examining nest and roost cavities, installing cavity restrictors, installing artificial cavities, installing snake and flying squirrel excluder devices and conducting research.

Incidental take caused by prescribed fire is not covered in the BO for Section 10(a) (1) (A) permittees (USFWS 2003b). Prescribed fire has the potential to kill active cavity trees, destroy RCW nests and/or destroy clusters. The prescribed fire program at Poinsett Range has minimized these risks by adhering to the protective measures outlined in the 2003 RCW recovery plan. The data collected on cavity tree mortality and nesting success at Poinsett Range since 2001 indicate our efforts have been successful; no active cavity trees, nests or clusters have been destroyed by prescribed fire during the past 11 years. Therefore, requesting incidental take for prescribed fire at Poinsett Range is not warranted at this time. In the event an active cavity tree, nest or cluster is destroyed by prescribed fire, the 20 CES/CEIEA Endangered Species Manager will notify the USFWS and SCDNR immediately and the need for incidental take will be reevaluated. Additionally, any active cavity trees destroyed by prescribed fire will be replaced with an artificial cavity as soon as possible, preferably within 48 hours.

Other Species

Amphibians and Reptiles – The northern cricket frog is a South Carolina priority conservation species with a state natural heritage rank of S1. Northern cricket frogs were heard at two separate locations at Poinsett Range in 1995 (USACE 1997). Annual herpetofaunal trapping has occurred at Poinsett Range since 1996 as part of the long-term monitoring program, but northern cricket frogs have never been captured.

The eastern milksnake/scarlet kingsnake is a South Carolina priority conservation species with a state natural heritage rank of S2. Two scarlet king snakes were captured at Poinsett Range between 2004 and 2010 (USACE 2011). The eastern coral snake, which also has a state natural heritage rank of S2, potentially could occur at Poinsett Range but has never been observed or captured.

Birds – Historically, least terns nested in coastal areas with flat, sandy beaches and sparse vegetation, which is also prime real estate for residential and commercial development. The species is opportunistic, however and as its natural habitat declined, it adapted to nest on buildings with gravel-covered roofs. A small nesting colony of state-threatened least terns was found on the gravel roof of the BX building at Shaw AFB in 2001 (Lohr and Ryan 2002). Terns continued to nest on the BX roof through 2010 but the colony remained small ($\leq$ 6 breeding pairs). A few terns were observed on the BX roof in 2011 but they did not nest and no terns were observed in 2012. The BX was demolished in the fall of 2012. Because there are several other buildings with gravel roofs where least terns could nest, annual monitoring will continue for the next five years. However, no effort will be made to attract nesting least terns because the buildings with gravel roofs are located near the flight line where birds are a safety hazard to pilots and aircraft.

No specific surveys are planned for the other bird species included in the Table Rare Vertebrate Species Occurring at Shaw AFB, Poinsett Range and Wateree Recreation Area. The presence or absence of these species will be documented through the long-term monitoring program and casual observations.

Mammals – The black bear is a South Carolina priority conservation species. Evidence of black bears has been documented twice at Poinsett Range. Bear scat was found in the mid-1990s (USACE 1997) and in 2012 bear tracks were confirmed by the 20 CES/CEIEA Long-term Monitoring Biologist. Dispersing bears probably travel through Poinsett Range, but it is unlikely that the property supports a local black bear population.

The Rafinesque's big-eared bat is a state-endangered species that occurs throughout the southeastern United States. Although never considered abundant, available population trend data suggest that the species is declining throughout its' range (http://www.dnr.sc.gov/cwcs/pdf/colonialbats.pdf). Rafinesque's big-eared bats are colonial and roost in a variety of structures including bridges, abandoned buildings and hollow tree cavities. No occurrence data for bat species are available for Poinsett Range, Shaw AFB or WRA. However, funding has been received by the long-term monitoring program to conduct a baseline bat survey at Poinsett Range within the next five years.

Plants – Federally listed plants do not receive the same protection under the ESA as wildlife and are only protected from malicious damage or destruction in areas under federal jurisdiction. No federally listed T/E plants have been documented on Poinsett Range, Shaw AFB or WRA, but nine plant species with a state natural heritage rank of S1 or S2 have been found at Poinsett Range (see Table Rare Plant Species Occurring on Shaw AFB, Poinsett Range and Wateree Recreation Area). The last specific survey for listed or rare plants at Poinsett Range was conducted in 2002. During the next five years, a comprehensive plant survey will be conducted at Poinsett Range through the long-term monitoring program.

Habitats of Concern

The longleaf pine forest is a habitat of concern at Poinsett Range. Although dominated by a single tree species, longleaf forests are one of the most biologically diverse ecosystems outside of the tropics. Historically, longleaf pine dominated the southern landscape and covered an estimated 60 to 92 million acres; today, there are less than 3 million acres of longleaf forest and only about 3% of the remaining acreage is in a relatively natural condition (USFWS 2003a). Several factors contributed to the decline of the longleaf pine forest, including harvesting without replacement and fire suppression. Restoration of the longleaf pine ecosystem is a primary management objective at Poinsett Range that will require the conversion of 2,440 acres of slash and loblolly pine to longleaf. As previously discussed, the primary habitat restoration priorities during the next five years are to start converting the 431 acres of loblolly pine stand to longleaf, to identify and test methods to restore native groundcover vegetation and to develop a plan for converting 2,009 acres of off-site slash pine to longleaf. All of these activities will be done in consultation with the USFWS.

Carolina Bays are another habitat of concern at Poinsett Range. Carolina Bays are geographically isolated depression wetlands that occur along the Atlantic Coastal Plain from New Jersey to northern Florida. They support a variety of communities including Atlantic white cedar swamps, which are ranked as globally imperiled (http://www.natureserve.org). Poinsett Range contains nine Carolina Bays or bay complexes, which range in size from less than 10 acres to over 2,600 acres. These wetlands have been the focus of two important projects: the restoration of Cedar Bay and the Big Bay fire response study.

The Cedar Bay restoration project began in 1999. The Atlantic white cedar stand in Cedar Bay was destroyed by Hurricane Hugo in 1989. The restoration process involved using prescribed fire, herbicides

and mechanical mulching to prepare the site and in 2001 and 2002 approximately 34,000 Atlantic white cedar seedlings were planted. The Cedar Bay project has been very successful and is the largest white-cedar restoration project in South Carolina to date.

The Big Bay project was initiated in 2001 to monitor the effects of a wildfire that occurred at Poinsett Range in April of that year. The fire burned approximately 3,500 acres, including a 2,500-acre wetland known as Big Bay and created a unique opportunity to study the impact of fire on Carolina Bays. The results of the three-year study, which monitored vegetation, amphibians and groundwater levels, are reported in U.S. Air Force (2005).

7.5 Water Resource Protection

Applicability Statement

This section applies to AF installations that have water resources. This section **IS** applicable to Shaw AFB.

Program Overview/Current Management Practices

Surface water resources within Shaw AFB and Poinsett Range are limited. The only two naturally occurring features on Shaw AFB are Spann Branch and Long Branch. Man-made features include primarily canals and ditches associated with runways and taxiways. These ditches were created for the purpose of removing storm water runoff from airfield areas. They are maintained by active mowing practices and therefore contain very little hydrophytic vegetation. On Poinsett Range, surface water features consists of a small creek that passes through Brunson Swamp. The headwaters of Pine Tree Creek and Sammy Swamp of Sumter County, originate in the bay and swamp complexes on Poinsett Range. There are also, numerous drainage ditches present in the agricultural fields on Poinsett Range.

Natural Communities

Much of the natural communities on Shaw AFB have gradually been replaced due to the impacts of man. Many wetland-dependent communities have been lost as well. It is distinctive and fortunate that Poinsett Range supports many natural wetland-dependent communities. Those communities identified on Poinsett Range include: Cypress-Gum Swamp, Small Stream Forest, Stream head Pocosin, Atlantic White Cedar Forest, Non-Alluvial Swamp, Depression Meadow, Bay Forest and Pocosin. The Xeric Sandhill Shrub community, although an upland type, is present on several sand rims of Carolina Bays and on those sites it is dependent on the existence and integrity of surrounding wetland communities such as Pocosin.

Carolina Bays

The Carolina Bays on Poinsett Range are the most striking features in the landscape. Poinsett Range contains 9 Carolina Bays or bay complexes and range in size from approximately 6 acres to over 2600 acres. Carolina Bays are shallow, poorly drained basins, found only in the southeastern US from Georgia to Delaware, which share several attributes in common. The unique geomorphic features are all essentially oval, or elliptical in shape and are aligned along a northwest-southeast axis. The long axes of all Carolina Bays are parallel to one another. When viewed from the air, this image of elliptical landforms, which all point in the same direction, is striking and has led to much debate concerning their origin. Individual bays may range in size from less than one acre to over a thousand acres. Distribution patterns vary, resulting in areas where few bays occur and areas where bays are quite numerous. In areas of high bay density, clusters of bays, many of which appear to overlap neighboring bays, may be found. Regardless of size or location, all unaltered bays function as wetlands. Soils of the bay interior are high in organic matter content and hydric in nature. Soils typical of wetlands, having developed under conditions of limited oxygen due to

periodic or frequent inundation are present. Soils of the bay's interior differ markedly from the soils that occur outside the bay's basin. Unique wetlands on Poinsett Range such as depression meadows have been altered in recent years due to logging activity and the lack of fire. The lack of fire has resulted in colonization of the bays by trees such as sweetgum and pines. These trees alter the hydrology by placing a higher demand on water. In an attempt to restore these unique wetlands, small-scale timber removal and prescribed burning will restore the natural hydrology.

The bays provide important habitat for a wide variety of vertebrates. Many resident mammals, reptiles and amphibians as well as resident and migratory birds depend on the habitat they offer. The bays support a diverse flora as well and the potential for the presence of rare plants is high. Additional study will develop strategies for management of these issues.

Ground Water Monitoring

No ground water monitoring occurs at present in relation to the Ecosystem Monitoring (EM) program. However, in 1996 when EM was established, ground water measuring devices (40 inch deep wells, WL-40) were placed in proximity to LCTA plots to determine depth of soil saturation at these wetlands. Wells were placed in these areas to obtain background hydrologic information for these sites as possible mitigation/restoration sites. Wells were installed and programmed to take readings once daily at 0400. Wells were downloaded bi-annually and data imported into Microsoft Excel. Additional wells were also installed in Cedar Bay, to gain baseline information on hydrology to be used as part of the Atlantic white cedar restoration project.

Issues and Concerns

One important issue is the impact of roads through and around unique wetlands. Roads that could cause significant erosion and interruption of natural water flow should not be used to avoid impacts. Another issue is the long-term effect of the southern target array to the Blackwater Pond Springhead. The target array is situated around a springhead pocosin and has potential to alter the wetland in the long term. The trees growing along this wetland drain are maintained to prevent interference with the camera scoring system for the southern target arrays. A project to delineate these wetlands and plan for continued vegetation maintenance is proposed to avoid further interference with Air Force training mission.

Also, the restoration of small depression meadows is an issue of concern. Unique wetlands on Poinsett Range such as depression meadows have been altered in more recent years due to logging activity and the lack of fire. The lack of fire has resulted in colonization of the bays by trees such as sweetgum and pines. These trees alter the hydrology by placing a higher demand on water. In an attempt to restore these unique wetlands, small-scale timber removal, mechanical clearing and prescribed burning will restore the natural state and hydrology of these depression meadows.

7.6 Wetland Protection

Applicability Statement

This section applies to AF installations that have existing wetlands on AF property. This section **IS** applicable to Shaw AFB.

Program Overview/Current Management Practices

Health of Existing Wetlands

Shaw AFB has a small amount of wetlands along Long Branch, the major northern drainage. These wetlands were sprayed with herbicide in 2014 to reduce woody vegetation. This was necessary due to the number of birds using this area located on the north end of the runways for perching and causing a risk to aircraft. These wetlands continue to function to impede water flow but remain in an early successional state. The Carolina bays on Poinsett Range are the most prominent wetland feature and are currently in a healthy successional state since a major fire in 2001. Roads that can cause significant erosion and interruption of natural water flow impacting wetlands on Poinsett Range are normally graded to facilitate drainage. Unique wetlands on Poinsett Range such as depression meadows have been altered by the lack of fire resulting in the colonization of the bays by trees such as sweet gum and pines. These trees alter the hydrology by placing a higher demand on water. These depression meadows will be improved with fire and mechanical and chemicals as necessary to restore them to a healthy state.

Status of Wetland Inventories and Delineations

Regulated wetlands on Shaw AFB occupy 62.3 acres according to an approximate delineation of jurisdictional wetlands on Shaw AFB conducted in 2016. These wetlands are largely located near the northern boundary associated with Long Branch (see Figure Jurisdictional Wetlands on Shaw AFB). The 1994 national wetland inventory indicates 95 acres of total wetlands on Shaw AFB.

Poinsett Range contains about 5,044 acres of wetlands according to the 1993 national wetland inventory in GIS (see Figure NWI Wetlands on Poinsett Range.). Carolina Bays account for about 4,200 acres or about 83% of the total wetlands occurring on Poinsett Range. Other wetlands are present in Brunson Swamp, the woodlands on the west side of the two larger Carolina Bays and in other locations adjacent to the natural drains on the property. Numerous small isolated wetlands are also present throughout the upland sandhills on Poinsett Range. A project was completed in FY16 to delineate wetlands associated with the target arrays on Poinsett Range.

Existing and Pending Section 404 and 401 Permits

There are no Clean Water Act, Section 404 or 401 permits pending for WRA, Shaw AFB or Poinsett Range.

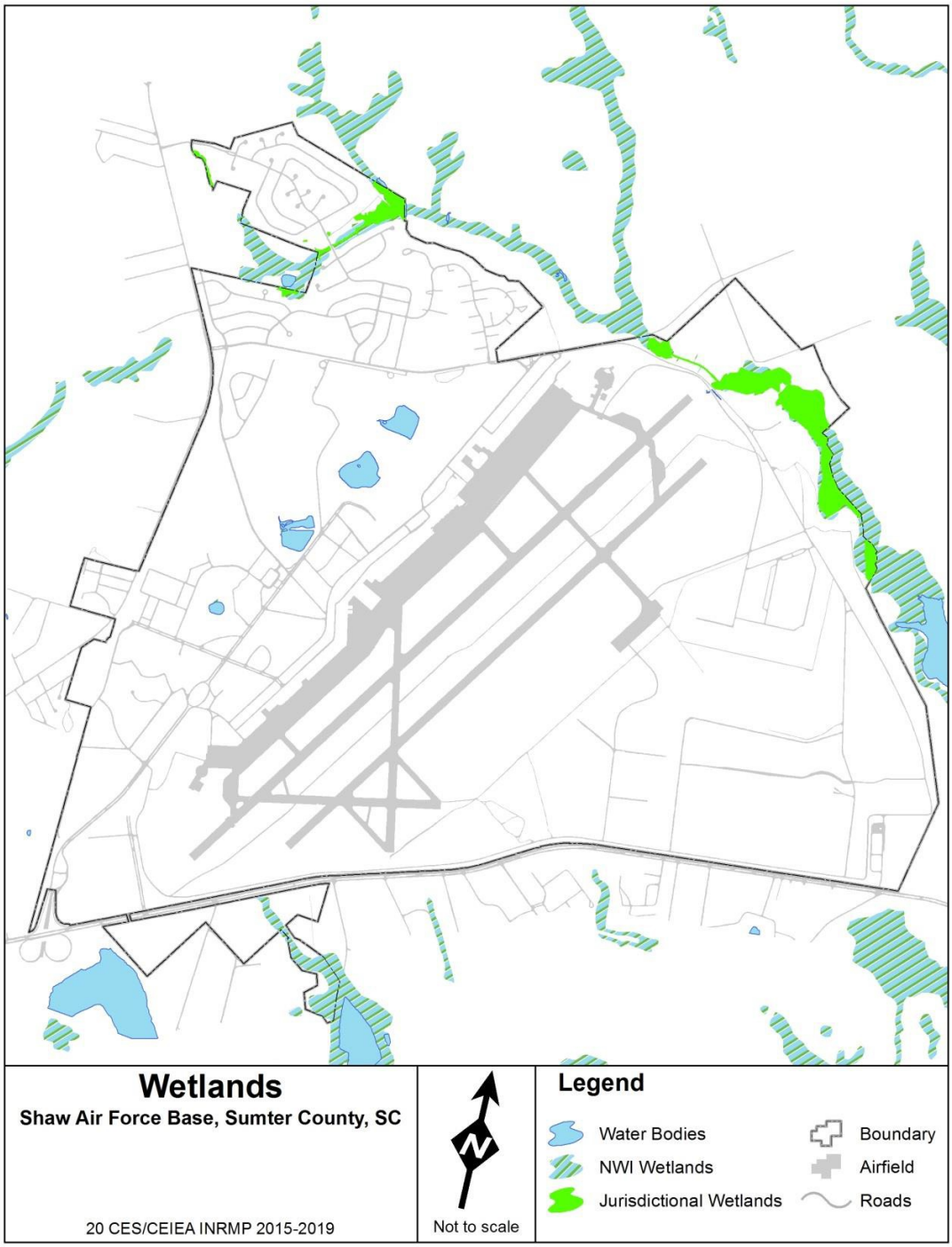
There are no Rivers and Harbor Act, Section 10 approvals pending for WRA, Shaw AFB or Poinsett Range.

Involvement with Local or Regional Wetland Banking

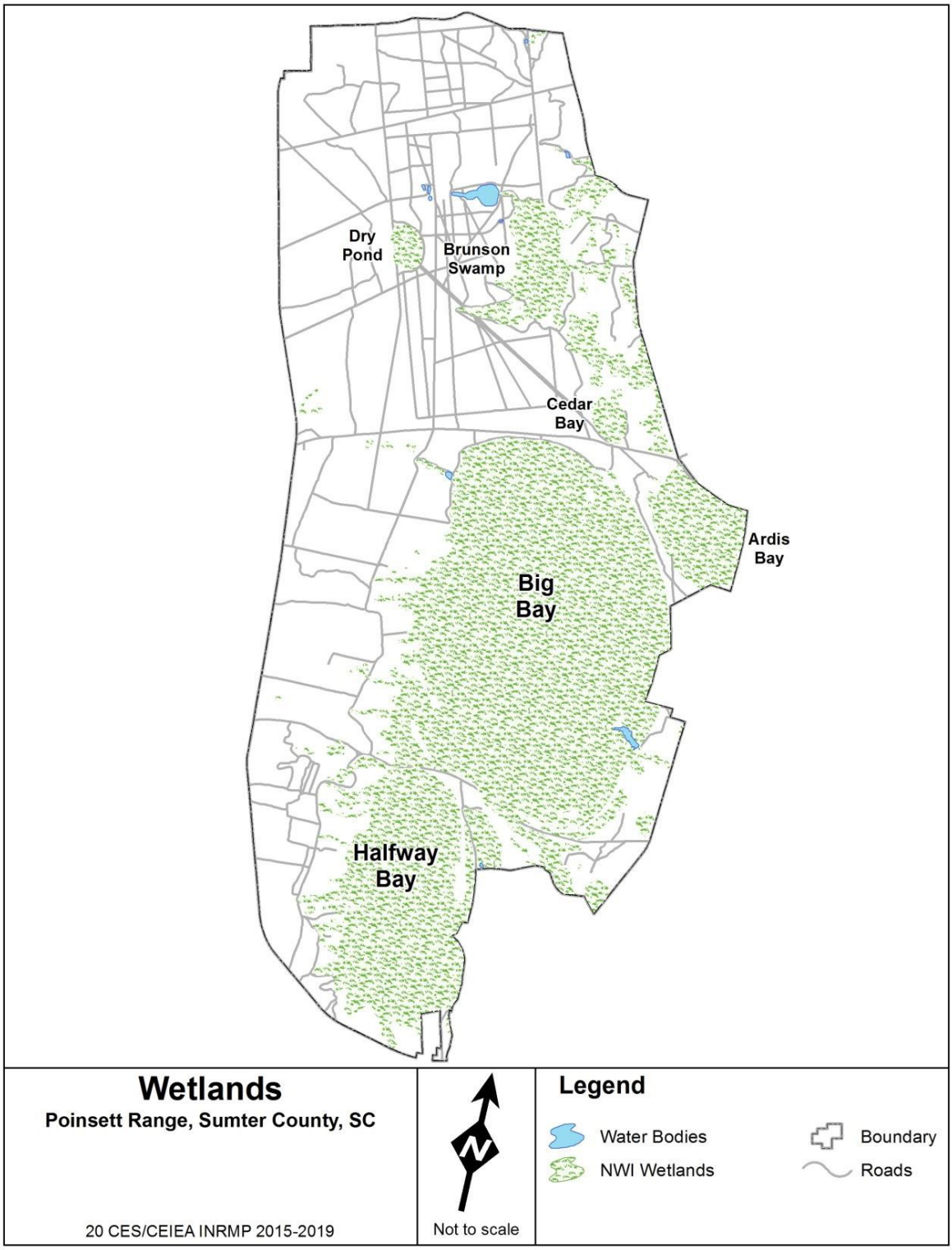
At the request of Shaw AFB leadership, a Wetland Mitigation Bank study was conducted by natural resources personnel in 2007. After a long review process, it was determined that wetlands mitigation was not in the best interest of Shaw AFB or Poinsett Range at this time due to the extensive monitoring and the restrictions required by a permanent conservation easement. No additional wetland mitigation projects are currently being considered.

Wetland Management to Support the Mission

20 CES/CEIEA is involved early in the planning process to review all work orders and projects to ensure wetland protection. NR staff provides comments and advice to base and range planners enabling them to plan, program, design and incorporate the necessary permits, procedures and mitigation actions to ensure no net loss of wetlands. Cooperative efforts with USACE allow the construction of projects in wetlands with project funds paid to a US Army COE approved In- Lieu Fee Mitigation Program Sponsor.



Jurisdictional Wetlands on Shaw AFB



NWI Wetlands on Poinsett Range

7.7 Grounds Maintenance

Applicability Statement

This section applies to AF installations that perform ground maintenance activities that could impact natural resources. This section **IS** applicable to Shaw AFB.

Program Overview/Current Management Practices

The goal of the Grounds Maintenance Program is to maintain a healthy ground cover and aesthetically pleasing landscape that support the Air Force quality of life standards. Improved grounds should make maximum use of regionally native plants, avoid invasive exotic species, prevent pollution and reduce maintenance inputs in terms of energy, water, manpower, equipment and chemicals.

The Grounds Maintenance program at Shaw AFB is the primary responsibility of 20 CES/CEO. Within the CE Operations Flight, several sections and personnel work the various aspects of the overall ground maintenance program.

The Grounds Maintenance contract is prepared annually to facilitate the management of the improved grounds of Shaw AFB, South Carolina. This contract follows the guidelines and philosophy of AFI 32-7064 and is prepared to facilitate the implementation of the INRMP.

Urban Forestry

Shaw AFB natural resource managers provide proper care and maintenance of the Base's urban forest. These efforts help Shaw AFB retain eligibility for the National Arbor Day Foundation's "Tree City USA" designation. The primary guides for the urban forestry program are AFI 32- 7064, the Shaw AFB General Plan and the Shaw INRMP.

Urban forestry, is the management of woody landscape plant populations in developed or improved environments. Management of urban forests is intended to enhance the benefits from forest resources for military and civilian residents, workers and visitors while reducing maintenance costs and hazards to people and property. Traditional community forests are managed to prevent tree hazards such as broken limbs, dead or decaying trees and to sustain and develop woody plant populations and diversity to enhance the aesthetics and vitality of Shaw’s landscapes.

The military missions of Shaw AFB impacts natural areas through soil compaction associated with construction and operation activities and grounds maintenance activities such as landscape care, turf grass mowing and irrigation and the application of fertilizers and pesticides. Impacts influenced by the military mission include: BASH (bird aircraft strike hazard), creation/restoration of wildlife habitat, air and noise pollution and recreational and training activities.

Effective execution of any urban forest work requires interaction among managers in all aspects of community planning and design, natural resources, civil engineering and infrastructure construction and maintenance.

Tree City USA

The Base Forester is responsible for maintaining membership in the Arbor Day Foundation. Each year the Base Forester will set up an Arbor Day ceremony on Base during April as part of the Earth Day observance. All observances held will be publicized and reported through Public Affairs. The Base Forester shall forward information on those observances and details on Urban Forestry expenditures for the year, to the

South Carolina Forestry Commission along with the annual application for Shaw AFB's recertification as a Tree City USA. Currently, Shaw AFB has retained “Tree City Certification” for the past 15 years.

7.8 Forest Management

Applicability Statement

This section applies to AF installations that maintain forested land on AF property. This section **IS** applicable to Shaw AFB.

Program Overview/Current Management Practices

Current Forest Management Program and Initiatives

Active management by the Air Force of the forest assets at Poinsett Range began in 1995 when additional property was acquired to increase the total area from approximately 2,048 acres to the present 12,521 acres. The primary goal of the Forestry Program is to support the mission of the 20 FW. Restoring and maintaining healthy and functioning ecosystems will enable the Air Force to continue training with minimal regulatory intervention.

Prior to European settlement the longleaf pine ecosystem dominated most of the upland acreage at Poinsett Range. Over the next several hundred years the original longleaf was harvested and replaced with agricultural fields or allowed to develop into natural stands dominated by other tree species. Between 1950 and 1970 much of Poinsett Range was planted with slash pine, loblolly pine, longleaf pine and sand pine. In 1995 longleaf pine was the dominant species on only 25% of the upland portion of Poinsett Range. By 2014 the proportion dominated by longleaf pine had been increased to 50%. Additional increases are both expected and desired. Restoration of the longleaf pine ecosystem is a sound management goal that will complement RCW recovery, reintroduction of fire and other natural resource management objectives.

Carolina bays comprise much of the wetland portion of Poinsett Range. Tree species commonly found in these bays include pond cypress, pond pine, water tupelo, sweet bay, red bay and red maple. Atlantic white cedar (AWC) was also a common component in pre-colonial times, but by 1995 was scarce throughout its natural range. The last significant mature stand of AWC on Poinsett Range was leveled by Hurricane Hugo in 1989 and burned in a wildfire in 2001. Approximately 35 acres of AWC have been successfully restored in one Carolina bay to date. According to the SCDNR this was the largest successful AWC restoration project in the state at that time and demonstrates the potential for AWC restoration.

A growing population of red-cockaded woodpeckers (RCW), an endangered species, is present on Poinsett Range. Because this species has very particular habitat requirements, forest management practices on the upland portions of Poinsett Range favor maintenance and improvement of RCW habitat over other objectives.

Forest Types Found on Poinsett Range

Wetland forest comprise approximately 5,044 acres (40%) of Poinsett Range. Wetland stands were delineated in-house, based on the most recent aerial photography available. The upland managed forest of Poinsett Range was delineated into stands based on species composition, stocking and age. The current breakdown by dominant overstory species is as follows:

Longleaf pine	2,750 acres	44.1%
Slash pine	2,227 acres	35.6%

Loblolly pine	1,064 acres	17.0%
Other pines	21 acres	0.3%
Hardwoods	187 acres	3.0 %
	6,249 acres	

Much of the hardwood area is composed of scrub oaks which have little or no commercial timber value. The vast majority of the pine area is planted but contains more than one species. Another 1,228 acres of upland is used for non-forestry purposes such as range offices, storage areas, target areas, roads, power lines, firebreaks and wildlife fields.

Most of the merchantable plantations have been thinned at least once and current basal area averages about 65 square feet per acre. The midstory component of scrub oak is heavy in some areas due to many years of fire exclusion prior to Air Force ownership.

Poinsett Range presently has more acres of middle-aged trees than either young or mature trees. A forest that has proportionate area in all age classes can provide nearly equal amounts of forest products each year as well as relatively stable habitat for a number of wildlife species. The current age of the pine overstory by category is as follows.

1 – 20 years old	11.5%
21 - 45 years old	51.2%
46 - 70 years old	30.9%
71+ years old	6.4%

Pines over 30 years old may be large enough to be of current value to RCWs for foraging habitat, but they will generally not become valuable for nesting habitat until they reach an age of at least 60 years. There is no plan in place to automatically regenerate pine stands on Poinsett Range simply because they reach a particular age, so the average age should increase over time. That in turn should increase the availability of suitable foraging and nesting habitat for RCWs. But as the entire forest ages some of the older stands will be lost to insects, diseases, wildfires and storms, creating a need to establish more young plantations to even out the age distribution. One way to do that will be to regenerate off-site stands of other pine species and severely damaged stands of any species, with new plantations of longleaf pine.

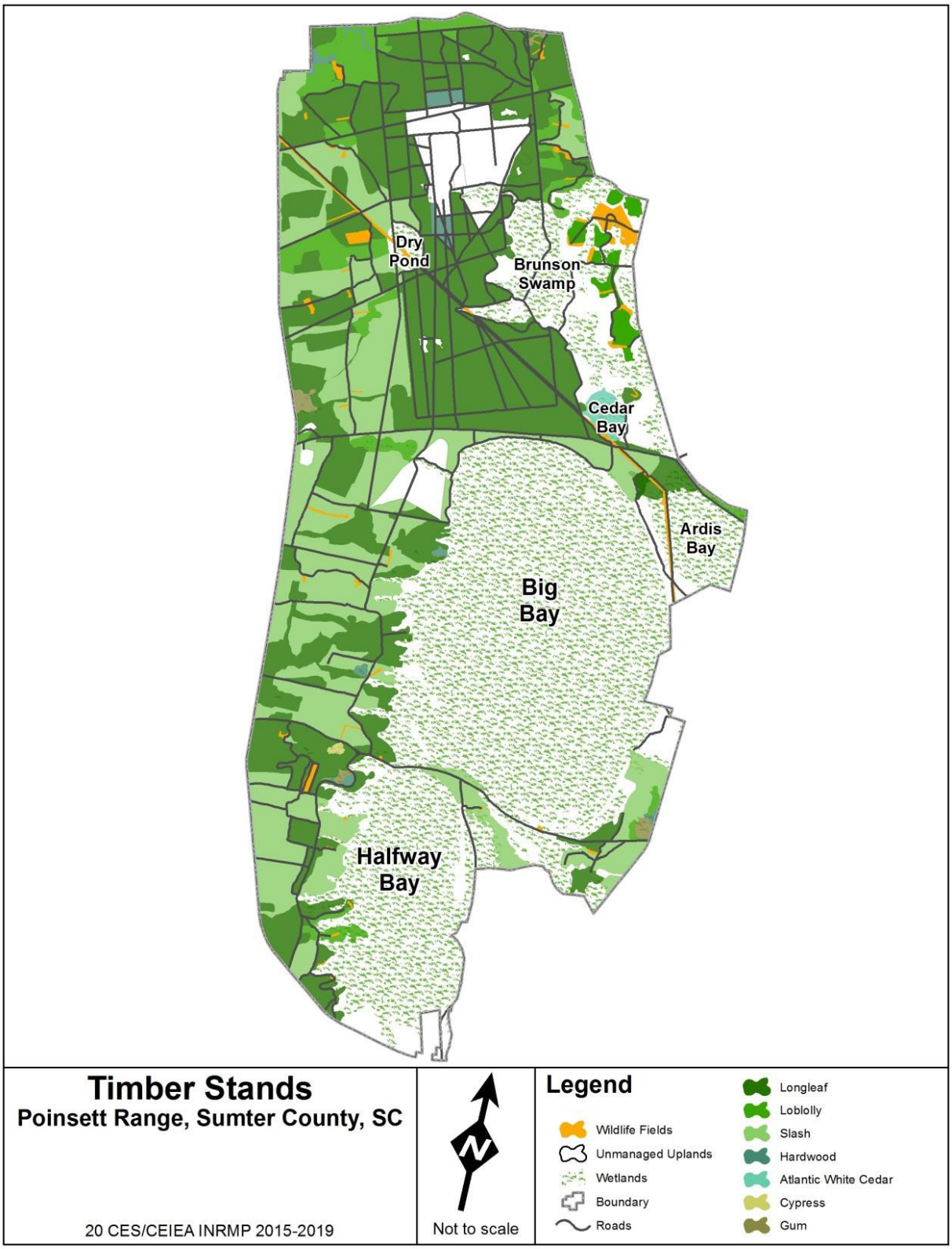
At present, the forest is being managed under an even-aged system. As more of the stands are converted to longleaf and thinned down to stocking levels suitable for RCWs, it will be possible to gradually change to uneven-aged management. Current timber stands on Poinsett Range are represented below in the Figure Timber Stands at Poinsett Range.

Current Status and Scope of Commercial Forestry Operations

Forestry operations provide an effective way to manipulate the forest environment to achieve the goals of ecosystem management. Practices employed include site preparation, tree planting, pre-commercial thinning, commercial thinning, regeneration harvesting and prescribed burning. A practice used to benefit a particular program, such as endangered species habitat enhancement, may or may not benefit another program such as invasive species control.

Timber harvesting has wide-ranging effects on many aspects of ecosystem management and biodiversity. Timber sales are held on Poinsett Range each year to enhance the ecosystem and meet management goals. The resulting income is deposited in the Forestry Account as explained in DoD Financial Management Regulation Volume 11A, Chapter 16 and serves as the source of funding for timber production activities on Air Force properties. Additional sales are sometimes held to salvage dying timber or to meet other emergency needs.

When feasible, timber sales are scheduled to coincide with the scheduled two week shut-down when Poinsett Range is swept for unexploded ordnance. Approximately 70% of Poinsett Range is located within the Target Safety Footprint. Access within the footprint is limited to times when aircraft are not conducting air-ground training. The decision on which stands to thin or regenerate each year is made based on analysis of existing stand conditions and perceived ecosystem needs.



Timber Stands at Poinsett Range

Existing Network of Forest Access Roads and Trails

The number and arrangement of forest access roads on Poinsett Range is adequate for forest management purposes. It is unlikely that any additional permanent roads will need to be built, but the condition of the roads varies. Some are accessible via two-wheel drive (2WD) vehicles under all weather conditions, while others can only be used by four-wheel drive (4WD) vehicles during part of the year. Wet stretches near the large Carolina bays and stretches of deep sand are the major problem areas. These bad road stretches are being gradually improved before they are needed for upcoming timber sales. Buyers are required, as one of the conditions in the timber sale contracts, to repair any damage to the roads caused by their logging crews.

There are also a number of trails present, mostly fire breaks that can sometimes be used by 4WD trucks as well as all - terrain vehicles (ATVs), utility vehicles (UTVs) and tractors. Many of these trails are located along the boundary between timber stands, making it easier to find the stand boundaries. Some of them are cleaned out each year in anticipation of the upcoming prescribed fire season. Others that are no longer needed are allowed to re-vegetate or are planted as wildlife food plots.

A few narrow foot trails are also present in some areas, providing easier access to long term monitoring plots and other areas that must be repeatedly visited.

Acceptable Timber Harvesting Practices

Both thinning and regeneration cuts are suitable for use on Poinsett Range. Most of the upland is composed of plantations of longleaf, slash, or loblolly pine. The primary forest management goals for these upland pine stands are restoration of the longleaf pine ecosystem and habitat improvement for RCWs. Longleaf is the preferred pine species for RCW habitat and much of the land which is currently planted with loblolly or slash is actually better suited for longleaf. Over time the loblolly and slash plantations will be converted to longleaf plantations.

That conversion must be done gradually because harvesting too many middle-aged loblolly and slash pine stands at one time would reduce available RCW foraging trees below the necessary numbers. The Base Forester will work cooperatively with other CEIEA staff to prepare a long- term strategy to convert off-site pine stands to longleaf pine.

At this time, all of the pine plantations are being managed under an even-aged system, in which all activities are prescribed on an area basis. After several thinning’s, the longleaf plantations will look less like a plantation and more like a natural stand. The average diameter at breast height (DBH), of the trees will be more than 16 inches and the basal area will range from 40 to 60 square feet per acre. From that point on it will be possible to change to uneven-aged management, specifically, group selection. This changeover will not occur over the entire property at one time, but rather as each of the current stands becomes suitable for group selection. Eventually the distinction between stands will become less important and the emphasis will shift to the overall property or to RCW foraging habitat circles.

All harvesting prescriptions on Poinsett Range go through an environmental review process. The proposed actions are routed through all 20 CES/CEIEA staff as well as the Range Operations Officer to ensure that harvesting will not adversely affect other programs. Comments are incorporated into the prescription, changes are made if necessary and the appropriate NEPA documentation is completed before harvesting begins.

<u>Thinning</u>

The general goal of all thinning should be to improve the quality of a timber stand, whether for RCW habitat, timber production, or other reasons. Although it is possible to thin a stand with one specific concept in mind, such as salvaging storm damage or favoring one species over another, most thinning projects actually include a number of different considerations.

Thinning is often needed to alleviate overcrowding. When an otherwise healthy stand is thinned for the first time, it is sometimes possible to accomplish that reduction by merely removing every third row. This is probably the simplest type of thinning to set up and carry out. But third-row thinning is not appropriate for every plantation.

When stocking levels are patchy, removing every fifth row and selectively removing some of the residual trees will yield better results. The success or failure of a thinning operation will depend on which trees are kept and which trees are removed. Removing the wrong trees can reduce or ruin the value of a stand for its intended purpose(s).

While selectively thinning, it is essential to keep in mind the favorable and unfavorable attributes of the individual trees and the environmental factors that affect those attributes. Using only one factor to assess the desirability of keeping or cutting a tree will yield variable results; it may work fine in one part of a stand and fail in another area. It is better to first eliminate trees that have absolutely undesirable traits and then to keep the best of the remainder.

Trees that appear to be unlikely to survive until the next thinning should be removed. Examples of this are trees that have very little live crown because they have been overtopped by adjacent larger trees or have suffered severe storm damage. Trees with large stem cankers or excessive lean are other examples.

Longleaf pine is preferred over other pine species on Poinsett Range and should be favored whenever possible. However, there is no advantage in keeping a suppressed longleaf that is unlikely to survive ahead of a healthy loblolly or slash that will contribute to the future value of the stand.

All trees need an adequate supply of water, nutrients and sunlight to thrive. Selective thinning should normally leave space between adjacent tree crowns. It is usually necessary to remove some good trees as well as culls to provide enough growing space. Larger diameter trees should generally be favored over smaller ones of similar quality; the larger diameter is often due to a better root system, better soil at that micro-site, or other conditions that makes that tree a better risk to keep.

The desired level of residual stocking after thinning is often expressed as a value of basal area per acre. Once the obvious culls have been marked for removal, basal area can be used to determine how many of the acceptable trees should be removed. Occasionally, a good tree must be removed from an area where the overall basal area is a little low simply because it is growing in too close a proximity to undesirable trees that can’t be removed without also removing the good tree.

Either the trees to be removed or the trees to be retained (whichever is fewer) must be plainly designated with tree marking paint to avoid any confusion in the harvesting operation. The timber marker must keep in mind how much room is needed for the harvesting equipment to operate without damaging the residual trees. In some cases it will be necessary to cut a few more trees than desired to provide that clearance.

Regeneration Cuts

Regeneration cuts include clearcutting, seed tree, shelter wood and selection. All of these are even-aged methods except selection, which is an uneven-aged method. Both the location and allowable size of regeneration cuts can be influenced by the goals of the harvests.

Clearcutting followed by planting provides the most potential control of the composition of the new timber stand. All methods allow control of the species established, but clearcutting plus planting provides better control of spacing, shortens the establishment period and allows the opportunity to utilize genetically improved seedlings. Those advantages are offset by higher up- front expenses. Clearcutting is the only option when there is no viable seed source present or when it is desirable to change species. The most common need for clearcutting on Poinsett Range is to replace off-site plantings of slash and loblolly pine on deep sands with a new plantation of more suitable longleaf pine. Stands severely damaged by ice storms, wildfire, or windstorms are generally regenerated using the clearcutting method but seed tree, shelter wood, or selection may also work if stand conditions are appropriate.

Clearcutting plus planting is the best way to establish additional areas with Atlantic white cedar, or to regenerate poorly drained loblolly pine sites around the wetland edges.

Some of the small, isolated wetlands on Poinsett Range are being inspected to determine whether it would be beneficial to remove the current sweetgum and scrub oak and to replant them with other species that would be of more value as wildlife habitat.

The seed tree method may be used to regenerate loblolly pine but its use should be limited to wetland fringes which are difficult to plant. In those very wet areas, the scattered seed trees should be left in place because trying to salvage them may cause excessive rutting for very little benefit. As few as 4 loblolly pine seed trees per acre can adequately reseed an area.

Shelter wood is a better choice for longleaf pine than seed tree. The larger number (12 to 20 per acre) of mature trees left to serve as the seed source compensate for the fact that the heavy longleaf seed do not disperse very far from the mature trees. Also, longleaf pines usually do not produce a good seed crop every year.

All regeneration methods require some form of competition control to allow the seedlings to become the dominant vegetation. Fire, herbicides, or both are commonly used for that control. The shelter wood and selection methods also employ the retained mature trees to help suppress competition. Longleaf pine is very intolerant of competition until after it begins active height growth so effective competition control is essential for that species. Loblolly pine is somewhat more tolerant of competition but still grows best when control is complete.

Longleaf pine can be successfully regenerated and maintained using group selection. This method requires a more detailed inventory of both sub-merchantable and merchantable stems in order to plan which trees should be harvested in any given year. Under this system, harvests are more frequent but less volume is removed per harvest. In some cases, the volume removed per acre is less than that removed in a thinning of a stand managed as even-age, which in turn reduces the value of that volume to a prospective buyer.

Group selection involves the removal of mature trees from a relatively small area, usually less than one acre and allowing natural seedlings to become established in the opening while competing vegetation is still partially suppressed by the surrounding mature trees. These small openings can be gradually enlarged by harvesting more of the adjacent mature trees after the first set of seedlings is successfully established.

Within a longleaf stand managed under the group selection method, the number of trees to be harvested from each diameter class in a given year is based on a comparison of the current diameter distribution with what is perceived to be the desired diameter distribution. Even in a relatively large stand, this system requires more inventory plots per acre and more frequent updates of the data, than an even-aged stand of the same size.

The availability of more accurate GPS/GIS systems makes it easier to keep track of and understand the extra data needed to successfully implement group selection.

A group selection stand could include longleaf ranging from 1-year-old to 120 years old or more. It is important to know exactly where the young saplings (1 to 4 feet tall) are located because they are far more susceptible to fire damage than either grass stage seedlings or larger trees. When burning these stands, plowing around groups of young saplings should be considered as a means of minimizing damage. And because longleaf pines do not typically produce good seed crops every year, the relative size of cone crops should be monitored before scheduling harvests.

Forest Management Issues and Concerns

Forest management practices in a single timber stand can affect far more than just the trees within that stand. It is crucial to try to foresee the effects of proposed practices before performing them. The Environmental Review Form (see Appendix Environment Review Form) used on Poinsett Range help minimize those problems by having other professionals with a different perspective review planned actions. This helps keep the Forestry program, like all natural resource programs, focused on ecosystem management and biodiversity. In turn, this provides a quality environment for military training.

Prescribed Burning and Smoke Management

Prescribed burns are performed on Poinsett Range for several different reasons, including site preparation prior to planting tree seedlings, fuel hazard reduction in stands with too much fuel in place, hardwood control in pine stands, promotion of more desirable wildlife forage and elimination of undesired vegetation in game food plots. Although a burn may be set up to achieve only one goal, it will almost always affect one or more of the other potential goals. Prescribed burns can also produce unfavorable effects such as direct mortality of desirable trees and smoke problems along highways and in nearby communities.

While active flying missions are in progress on Poinsett Range, heavy smoke in certain areas can interfere with those missions. The flying missions themselves make it unsafe for burn crews to work below. Also, burning can only be performed under certain weather conditions, so the number of potential burning days is limited. To partially compensate for that limitation, several potential sites are prepared and planned for burning on any given day. The sites have differing fuel loads and can be burned when the prevailing wind is from different directions.

Prescribe burns in the Impact Areas each year reduces the number and intensity of wildfires resulting from flying missions. It also reduces the time that flying missions must be suspended while wildfires are being suppressed.

Archaeological Sites

Some of the archeological sites on Poinsett Range that are eligible for the national register of historic places are currently overstocked with trees. Some sites were severely storm-damaged and still others are stocked with undesirable sand pines. Overstocked stands are more susceptible to pine bark beetle outbreaks that could spread to adjacent sites, including RCW clusters. Storm damage can not only increase the risk of bark beetles but also dramatically increases the risk of wildfire damage because of the accumulation of dead fuels and their arrangement. Sites containing sand pine are particularly troubling because sand pine does not live long enough or become large enough to have any value as RCW habitat. Sand pine also has little value for other wildlife species, almost no timber value and frequently breaks off or is wind thrown across access roads. Carefully monitored trial operations in 2008 and 2010 demonstrated that it is possible to operate heavy equipment in some eligible sites without damaging the integrity of the site. Proposals to

perform mechanical projects such as timber harvesting in other eligible sites will be intensively reviewed by the Cultural Resources Manager and other 20 CES/CEIEA staff members to determine their feasibility. Approvals have been gained and will be continue to be sought from State Historic Preservation Office (SHPO) for projects which pass the in-house review.

Inventory and Management Records

The forest stand inventory information is frequently used by all 20 CES/CEIEA personnel for management decisions. The layers most frequently viewed in GIS include the boundaries of timber harvests, prescribed burns, herbicide treatments, archeological site boundaries, tree planting records and timber stand boundary polygons. The value of these layers will increase as they are updated and new layers are added. Stand Boundary Adjustment and Re-numbering

All timber stands have been delineated in GIS. The timber stand boundaries are being adjusted when feasible to better coincide with other boundaries such as prescribed fire compartments and wildlife areas. This would further integrate program areas and facilitate our multi-discipline approach to ecosystem management.

The timber stand layer was last updated in 2007, utilizing GIS records and new aerial photos taken since the previous update. Many stand boundaries were changed and virtually all of the stand numbers were changed so they appear in sequence. The intention was to field check the new stand boundaries and then correct those using GPS/GIS. Much of the new data collected since then has been added to the attribute table and some modifications have been made to the boundaries.

The timber stand layer included 714 stands. Several new stands were created since 2007 as a result of small regeneration harvests. It is expected that the number of timber stands will decrease due to consolidation of adjacent stands and boundaries. As the stands grow older, the differences between them tend to become less important due to repeated thinning and other management activities.

Using Forest Management Practices to Achieve INRMP Goals

Forests are complex biological communities. Forest management practices carried out to change one condition often affect other conditions as well. The additional changes may be considered either positive or negative, depending on the perspective of the person judging them.

Commercial timber harvests provide an effective and economical way to control the composition of the forest resource at Poinsett Range. Harvesting can favor one species over another, improve forest health by reducing overcrowding, reduce the potential wildfire fuel load by salvaging poor quality trees before they die and manipulate tree age distribution through the judicious use of clearcutting.

Harvesting temporarily increases both the quality and quantity of natural wildlife forage. Clearcutting creates early successional openings that are beneficial for up to 10 years for certain wildlife species such as quail, rabbits, turkeys, whitetail deer and numerous songbirds, both for food and cover. Thinning promotes both herbaceous and succulent woody browse, improves RCW habitat, improves access in the event of a wildfire or airplane crash, breaks up the continuity of fuel on the forest floor and improves visibility for compatible human activities such as hunting and birdwatching.

Harvesting can also have a direct positive effect on the military mission of Poinsett Range through the removal of trees which interfere with Range Operations. This includes trees which are too close to critical overhead power lines and range security fences as well as trees which obscure visibility of the targets from

the scoring cameras. Communication with the Range Operations Officer is ongoing to identify areas where harvesting could benefit the military mission.

Not harvesting timber can also affect the military mission in a positive manner. A band of unthinned timber and brush is maintained around the perimeter of the South Target Area to block combat laser beams which have ricocheted when they hit the ground. That safety buffer reduces the risk of damage to personnel further downrange and possibly even personnel off the property.

Unstocked areas are regenerated by planting tree seedlings. Both the species and the number of trees per acre can be controlled. This is a primary tool for restoring longleaf pine, which is favored on the upland portion of Poinsett Range. Containerized longleaf seedlings are normally hand planted on 10 feet by 10 feet spacing (435 per acre) following chemical site preparation. In some cases, a hot prescribed fire is also used after application of the herbicide. Past experience has shown that effective site preparation is essential in order to have acceptable seedling survival.

Supplemental plantings of containerized longleaf seedlings are sometimes done in small openings created by beetle outbreaks, wildfires, wind storms, etc., in longleaf pine stands. This is usually done only if the area is relatively free of competition and in some respects is a way of beginning to convert a stand to uneven-aged management. These seedlings are often planted at a wider spacing, such as 15 feet X 15 feet because they are less likely to be commercially thinned.

AWC has been planted in at least four areas on Poinsett Range, one of the planted areas was successfully. The need for effective competition control may be even more important for AWC than for longleaf pine. Both species are very intolerant of competition, but the sites most suitable for AWC are wet and tend to have more competition than the longleaf sites. AWC should be planted on a spacing of 6 feet by 6 feet (1,210 per acre) to allow the AWC to dominate the site. Since AWC are easily damaged with fire and grow well in moist areas it is preferable to restrict AWC to sites that will never be intentionally burned.

Several pre-commercial thinning has occurred at Poinsett Range as the market for fuel chips has increased. In many longleaf plantations, other less desirable species have become established and have sometimes crowded out the preferred longleaf. At the other extreme, some stands of natural longleaf seedlings are seriously overstocked. Prescribed fire, hand-clearing and mechanical clearing are possible options, with the preferred method depending on the conditions at each site. Effective pre-commercial thinning would improve longleaf pine and RCW restoration efforts.

Constant monitoring for early detection of insect and disease problems is conducted to aid in the early recognition of potentially detrimental situations. Monitoring and inventory updates will fine-tune existing practices and help determine whether adjustments are needed to forest management practices.

The above forest management practices contribute greatly to the goals of restoring native ecosystems and improving habitat for the federally endangered RCW. Continued sharing of problems and successes with natural resource managers at other locations should improve current efforts to restore longleaf pine and AWC at Poinsett Range.

7.9 Wildland Fire Management

Applicability Statement

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

Program Overview/Current Management Practices

As defined by the National Wildfire Coordinating Group (NWCG), a wildland fire is any non- structure fire that occurs in a wildland. There are three distinct types of wildland fire:

- Wildfire – An unplanned, unwanted wildland fire including unauthorized human-caused fires, escaped wildland fire use events, escaped prescribed fire projects and all other wildland fires where the objective is to put the fire out.
- Prescribed Fire – Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist and National Environmental Policy Act requirements (when applicable) must be met, prior to ignition.
- Wildland Fire Use – The application of the appropriate management response to naturally- ignited wildland fires to accomplish specific resource management objectives in designated areas outlined in fire management plans.

Organizational Structure

The organizational structure for wildland fire activities at Poinsett Range, Shaw AFB and WRA is consistent with the standards established by the National Incident Management System and the NWCG. The Shaw AFB Fire and Emergency Services Chief (20 CES/CEF) is the Wildland Fire Program Manager (WFPM), as designated by the 20 Fighter Wing Commander. The WFPM is responsible for developing the WFMP and oversees all wildland fire activities at Poinsett Range, Shaw AFB and WRA including firefighting, fire-related training and the use of prescribed fire. The WFPM may delegate specific tasks related to wildland fire to other 20 FW organizations as appropriate to ensure implementation of the WFMP.

Interagency Cooperation and Mutual Aid Agreements

20 CES/CEF personnel are the initial responders to wildfires at Poinsett Range and Shaw AFB. Mutual aid agreements for these properties have been established with the City of Sumter Fire Department and Sumter County Fire Department to facilitate a cooperative response to wildfires when needed. There also is a mutual aid agreement between 20 CES/CEF and the South Carolina Forestry Commission (SCFC) for wildfires at Poinsett Range. 20 CES/CEF manages WRA as a geographically separate unit with a mutual aid agreement established with the Kershaw County Fire Service for fires at WRA. All of these agreements can be found in Tab 1, Wildland Fire Documents**.**

There is an intra-agency agreement between the 20 CES/CEF and 20 CES/CEIEA that outlines how prescribed fires are planned, coordinated and conducted at Poinsett Range (Tab 1, Wildland Fire Documents). Via that agreement, the authority to prepare, review, approve and implement prescribed fire plans for Poinsett Range is delegated to 20 CES/CEIEA.

Wildland Fire History

Since the beginning of public ownership in the 1940s and for the next 50 years, wildland fire was not used for resource management purposes at Poinsett Range. Although there is no documentation, any wildland fires that occurred during that time period probably were suppressed as soon as possible. The use of prescribed fire as a management tool at Poinsett Range was initiated in the mid-1990s to manage RCW habitat. The number of acres burned annually is variable (see Table Documented History of Wildland Fire at Poinsett Range.**)** and depends on a number of factors including weather conditions, soil and fuel moisture levels, the military training schedule and the availability of qualified prescribed fire personnel. Initially the prescribed fire program at Poinsett Range emphasized burning large acreages in an effort to ameliorate years of fire suppression. Unfortunately, not all of those prescribed fires were conducted under the best

environmental conditions and substantial pine mortality occurred in some areas. Although the need to burn large acreages still exists, sound resource stewardship is now the primary consideration when planning and conducting prescribed fires at Poinsett Range.

With two exceptions (2002 and 2003), 20 CES/CEIEA has documented all known wildland fires outside the designated training target arrays at Poinsett Range since 1998 (see Table Documented History of Wildland Fire at Poinsett Range.). The most significant wildfire occurred in April 2001 when approximately 2,941 acres of wetlands burned during the Big Bay Fire. The fire, which occurred during a period of prolonged drought, disrupted military training activities and created a public safety issue for several weeks. The incident was managed by 20 CES/CEF, with assistance from the SCFC and the City of Sumter and Sumter County fire departments. Approximately 616 acres of upland pine forest were burned out in order to contain the wildfire.

Documented History of Wildland Fire at Poinsett Range

Year	Acres Burned		
	Prescribed	Wildfire/Containment	Total
1995	1,812	_[a]	1,812
1996	1,874	_[a]	1,874
1997	738	_[a]	738
1998	66	11	77
1999	756	0	756
2000	1,306	0	1,306
2001	271	3,557	3,828
2002	200	_[a]	200
2003	0	7[b]	7
2004	232	27	259
2005	166	13	179
2006	256	25	281
2007	1,362	6	1,368
2008	1,376	0	1,376
2009	1,287	0	1,287
2010	1,508	3	1,511
2011	1,038	52	1,090
2012	1,347	203	1,550
2013	1,568	4	1,572
2014	1,258	25	1,283
2015	2496	41	2537
2016	909	4	913
2017	a	a	a

a - No data
b - Incomplete data

Wildland Fuel Factors

Fuels and weather are the two most important factors relative to wildland fire. Fuels are defined by type, moisture, loading and distribution. Grasses, leaves and deciduous shrubs are considered light fuels, whereas timber litter, evergreen shrubs and logging slash are considered heavy fuels. Fuel moisture is the percentage of water in the fuel. Fuel loading is the quantity of fuel in an area expressed as tons per acre. The horizontal distribution of fuels may be uniform or patchy and result in even and uneven fire spread, respectively. The types of vertical fuels include ground fuels that can result in peat fires, surface fuels that typically are associated with low intensity fires and aerial fuels that can cause catastrophic fires. Weather parameters that influence wildland fire behavior include temperature, wind, relative humidity and precipitation. All of these factors affect fuel moisture, fire danger, fire suppression tactics and the effectiveness of prescribed fire to achieve management objectives.

In the simplest terms, there are two habitat types at Poinsett Range – uplands and wetlands. There are approximately 7,477 acres of uplands, which include pine sandhills, planted pine plantations, mixed pine-hardwood associations and the facilities used for operational training. Prescribed fire is used to manage the forested uplands where RCWs occur with an ideal fire return interval of two to three years. Upland fires typically burn low to the ground with crown fires occurring only under extreme weather conditions. The wetlands at Poinsett Range cover approximately 5,044 acres and include bays, hardwood swamps and riparian areas. Wetland fires are usually small and slow moving except during periods of drought, low relative humidity and high winds. In general, prescribed fires currently are not used to manage wetlands at Poinsett Range.

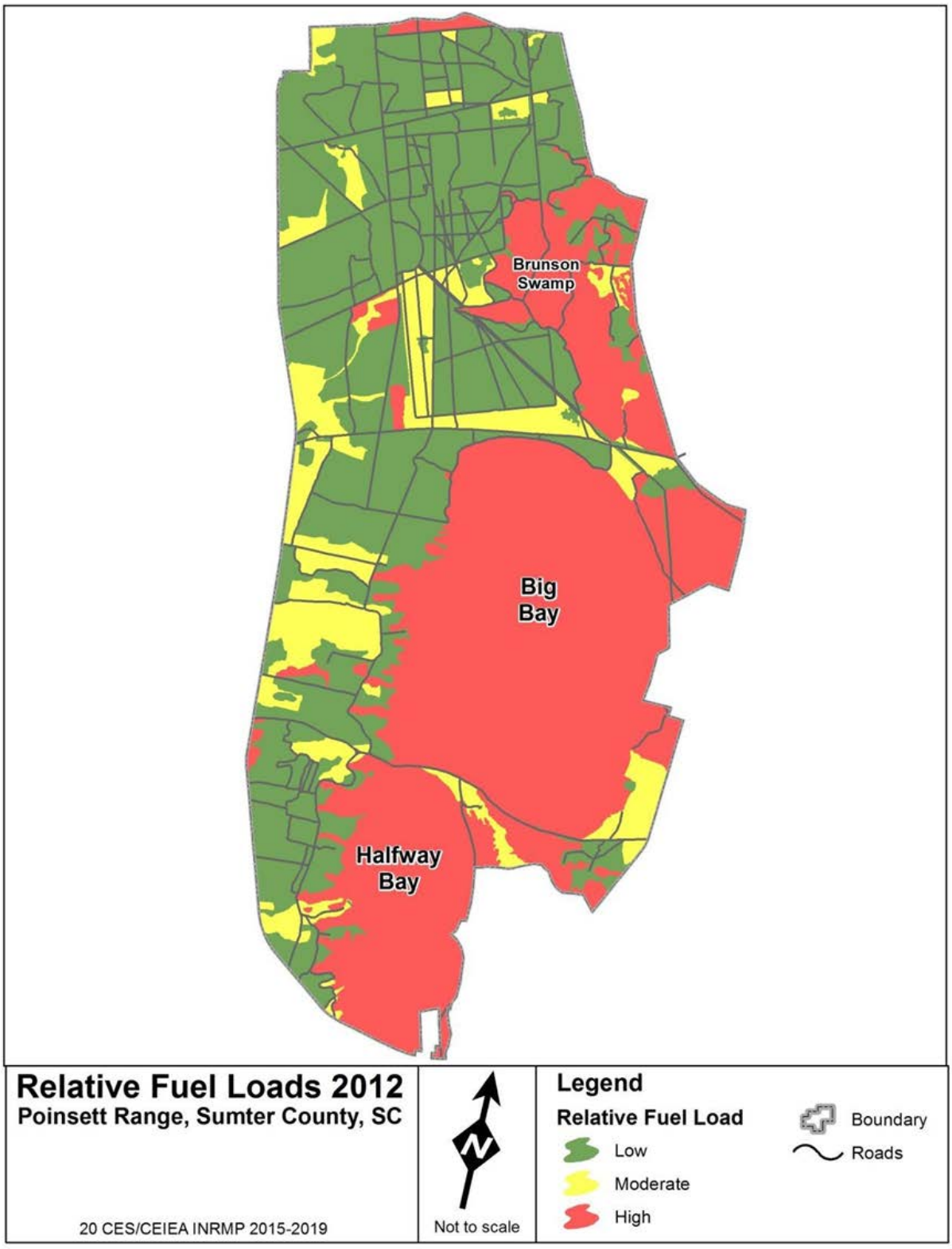
Known fire history and on-site assessments are used to estimate relative fuel load conditions at Poinsett Range. This information is updated periodically by 20 CES/CEIEA and used to identify high-risk areas and to prioritize prescribed fire needs. In 2012, there were approximately 5,783 acres with high fuel loads, 1,495 acres with medium fuel loads and 5,001 acres with low fuel loads (see Figure Managed RCW Foraging Habitat at Poinsett Range Relative to Dominant Pine Species and Age Class in 2012). Over 95% of the areas with high fuel loads were in wetlands (5,494 acres?) which currently are not managed with prescribed fire.

Risk Assessment/Decision Analysis Processes

20 CES/CEF and 20 OSS/OSTRG have developed an operational wildfire risk matrix for Poinsett Range (Attachment 7.7). The first part of the matrix is used to predict the ability of 20 CES/CEF firefighters stationed at Poinsett Range to control a wildfire based on surface wind speed, relative fire danger and availability of on-site resources. The second part of the matrix uses the Keech Byram Drought Index (KBDI) and the predicted temperature, relative humidity and wind speed to determine when operational training should be modified or suspended. Collectively, the matrix is an effective tool for minimizing the risk of wildfire caused by operational training at Poinsett Range and for determining when mutual aid may be required to control a wildfire. Prior to igniting a prescribed fire, 20 CES/CEIEA determines the temperature, relative humidity, wind speed, wind direction, fuel moisture and KBDI conditions to ensure these parameters are within the limits specified in the appropriate Prescribed Fire Plan.

Given the fire risk associated with operational training, 20 OSS/OSTRG maintains a permanent system of roads and firebreaks at Poinsett Range. 20 CES/CEIEA maintains an additional system of firebreaks that

are used during prescribed fires. Collectively, these roads and firebreaks create a strategic network that can be used for access, suppression and/or control in the event of a wildfire.



Relative Fuel Loads at Poinsett Range

Safety and Emergency Operations

Firefighter and public safety is the highest priority in every wildland fire event. Protective clothing worn by personnel involved in wildland fire activities must meet the requirements identified in National Fire Protection Association (NFPA) 1977 – Standard on Protective Clothing and Equipment for Wildland Fire Fighting.

Emergency operations associated with wildfire events at Poinsett Range, Shaw AFB and WRA will be conducted in accordance with the following documents:

- NFPA 1561,*Standard for Emergency Services Incident Management System*
- AFI 32-2001, *The Fire Protection Operations and Fire Prevention Program*
- AFI 13-212, *Range Planning and Operations, ACC Supplement*

At Poinsett Range, firefighting equipment and personnel must be in place when training missions are scheduled. In the event of a wildfire, the Range Control Officer or Range Operations Officer (ROO) will notify the senior firefighter on duty at the main Shaw AFB fire station and the 20 FW Command Post immediately. After determining the extent of the fire, the senior firefighter at Poinsett Range will keep 20 CES/CEF informed on the status of the fire via FM non-tactical radio or telephone and will request additional assistance from 20 CES/CEF or outside agencies if necessary. The range will close immediately and will remain closed until firefighting operations are terminated.

Smoke Management and Air Quality

Smoke management during wildland fire events is critical to avoid disruption to the military mission and to provide for public safety. The impact of the smoke produced by a wildfire will depend on current weather conditions and may be highly variable. For the duration of a wildfire event, the Incident Commander will ensure that the daily fire weather forecast issued by the SCFC is used to predict smoke direction and dispersal. The fire weather forecast is available on the SCFC website (http://www.state.sc.us/forest/bweather.htm) or by calling the SCFC Pee Dee Dispatch Center (800-777-3473). If the smoke from a wildfire is expected to affect training operations at Poinsett Range or Shaw AFB, the ROO and Airfield Operations Manager will be notified. If smoke is expected to reduce visibility on public roads, warning signs will be posted and traffic control personnel will be placed in critical areas as deemed necessary. (Note: 20 CES/CEIEA has smoke hazard warning signs that can be loaned to 20 CES/CEF upon request.) If air quality issues develop, the need to assist and/or evacuate residents will be evaluated. Until the wildfire is declared out and the smoke has dissipated, 20 FW/PA will coordinate with the local media to keep the public informed of the situation.

Natural and Cultural Resources Considerations

Whereas prescribed fire may be used to restore or enhance fire-dependent ecosystems, wildfires may yield adverse results. To help prevent negative impacts to natural and cultural resources at Poinsett Range, 20 CES/CEF will notify 20 CES/CEIEA in the early stages of a wildfire under the following circumstances:

- If the wildfire is outside the boundaries of the designated training target arrays and more than one acre in size.
- If the wildfire is located in managed RCW habitat, or is a threat to managed RCW habitat.
- If the wildfire is located in a protected cultural site, or is a threat to a protected cultural site.
- If the wildfire is located in wetlands, or is a threat to any wetlands.

- To assist firefighters at Poinsett Range, all RCW cavity trees are marked with one band of white paint approximately 4.5 feet above ground. A system to mark the boundaries of protected cultural sites is being considered but a final decision is pending.

Firebreaks, or control lines, are an essential element in wildland fire management, but they also have the potential to cause serious harm. Accordingly, specific considerations for firebreaks are listed below:

- Use existing roads and/or firebreaks when possible to minimize additional site disturbance.
- Minimize surface disturbance and erosion potential when disking new firebreaks.
- Do not create new firebreaks within 200 feet of RCW cavity trees or clusters.
- Do not locate firebreaks within 100 feet of cultural sites that are eligible for the national register unless approved by the 20 CES/CEIEA Cultural Resources Manager.
- Use hand lines or wet/foam lines, if possible, when firebreaks must be established in wetland areas.

Sensitive resources at Shaw AFB include wetlands and two cultural sites. From a wildland fire perspective, no significant natural or cultural resources have been identified at WRA.

Mission Impact Considerations

Potential mission impacts must be considered during any wildland fire event. Reduced visibility and/or poor air quality from smoke may disrupt both flight and ground training missions. Smoke also may negatively affect both on and off-duty Air Force personnel and reduce their level of readiness. Under the worst-case scenario, wildland fires can destroy property, seriously injure personnel or cause death.

Unexploded ordnance is an important safety issue during wildland fire events at Poinsett Range. Mission activities at Poinsett Range and Shaw AFB also must be considered. When missions are occurring, safety considerations may prevent fire fighters from suppressing a wildfire until the mission is completed or suspended. Active missions also may affect the location and timing of prescribed fires. However, prescribed fires may improve mission operations when used to reduce fuel loads around targets or other facilities.

Monitoring Requirements

The following environmental parameters will be monitored during every wildland fire event: temperature, wind speed, wind direction, relative humidity, precipitation, smoke movement and smoke dispersal. 20 CES/CEIEA will conduct an initial evaluation of each wildland fire event within one week of the fire being declared out. The date(s), type (wildfire or prescribed) and geographical boundaries of each fire will be recorded in the 20 CES/CEIEA Geographic Information System (GIS) database. Specific points that will be considered during an initial post-fire evaluation include:

- Amount of overstory foliage discoloration
- Amount of consumption and top kill of understory vegetation
- Consumption of needles on longleaf pine seedlings without injury to terminal bud
- Amount of litter remaining on forest floor
- Smoke dispersion into the upper atmosphere and avoiding smoke-sensitive areas
- Protection of sensitive natural and cultural resources including RCW cavity trees (any destroyed cavity trees will be replaced as soon as possible with artificial cavity inserts)
- Ability to contain the fire and prevent escapes
- Any adverse public reaction prior to, during or after the fire

20 CES/CEIEA will conduct additional evaluations as deemed appropriate or necessary. Points that will be considered during follow-up evaluations include:

- Resin exuding from pine trees indicating cambium damage or bark beetle attack
- Other signs of bark beetle attack
- Mortality of timber or other desirable vegetation
- Sprouting vigor of undesired vegetation
- Recovery of longleaf pine seedlings and effectiveness of controlling brown spot
- Remaining duff layer, mineral soil exposed or any soil erosion

The long-term effects of wildland fire will be monitored using a variety of methods including photographic plots, long-term monitoring plots, RCW foraging habitat data and timber cruise data.

Public Relations

20 FW/PA will issue all official statements regarding wildland fire events at Poinsett Range, Shaw AFB and WRA. Information dissemination is a proactive process that reduces the pressure on wildland fire managers and allows them to focus their attention on incident suppression or prescribed fire objectives. Organizations that 20 FW/PA may communicate with during a wildland fire event are listed in the Table Wildland Fire Contacts for 20 FW/PA.

The coordination and notification procedures for prescribed fires at Poinsett Range are outlined in the intra-agency agreement between the 20 CES/CEF and 20 CES/CEIEA (Tab 1, Wildland Fire Documents).

Wildland Fire Contacts for 20 FW/PA

Property	Organization	Phone Number
All	SCFC Pee Dee Dispatch Center	800-777-3473
	South Carolina Highway Patrol	803-896-9621 800-768-1501 (emergencies only)
	South Carolina Department of Transportation	803-737-2314
Poinsett Range and Shaw AFB	Sumter County Sheriff's Office	803-436-2774
	Sumter City/County Fire Departments	803-436-2600
WRA	Kershaw County Sheriff's Office	803-425-1512
	Kershaw County Fire Service	803-425-1522

Funding

Sufficient funding is necessary to properly train and equip wildland fire management personnel to ensure safe, effective and cost-efficient operations. Per AFI 32-7064, wildland fire management activities that are conducted to comply with environmental laws and regulations will be supported by conservation funds. Wildfire suppression, prescribed burning and other wildland fire management activities to support training, range use, munitions testing and evaluation and other mission activity will be supported by the responsible activity through direct funding or reimbursement. Funding for wildfire prevention and fuels management for hazard reduction is an installation operations and maintenance responsibility administered through AFCEC.

Physical Fitness Standards

20 CES/CEIEA personnel participating in prescribed fire must pass the NWCG Moderate Field Test (hike 2 miles with a 25-pound pack in 30 minutes or less) annually. 20 CES/CEIEA physical fitness records will be maintained by the Natural/Cultural Resources Manager and the Air Force Wildland Fire Center at Eglin AFB.

The physical fitness of 20 CES/CEF personnel participating in wildland fire activities will be evaluated annually by 20 MDG and the 20 CES/CEF physical fitness records will be maintained by the 20 MDG.

Environmental Impact Analysis Process

Any actions taken under this plan that may constitute a major federal action, as defined in 40 Code of Federal Regulations (CFR) Part 1508.18 (b) (2), must be evaluated for potential environmental affects in accordance with 32 CFR Part 989, Environmental Impact Analysis Process.

Prescribed Fire

The use of prescribed fire to manage natural ecological communities at Poinsett Range is necessary, both ecologically and legally. Fire is a natural ecological force in the southeastern United States and is as important as soil type and climate in determining vegetative composition and structure. By policy, AFI 32-7064 authorizes the use of prescribed fire to manage unimproved Air Force lands and to support other mission needs. The Endangered Species Act requires that appropriate measures be taken to manage federally listed species and their habitats. At Poinsett Range, prescribed fire is used to perpetuate habitat for the endangered RCW. Prescribed fires at Poinsett Range also are used to reduce hazardous fuels, improve access, reduce logging debris, control insects and diseases, prepare sites for pine regeneration, improve wildlife habitat, manage competing vegetation and perpetuate other fire-dependent species.

Via cooperative agreements through the AFWFC and USFWS and CSU/CEMML, the AFWFC assists 20 CES/CEIEA and the Shaw Fire Department in implementing the prescribed fire program. These agreements outline general procedures for implementing the wildland fire program but additional guidance to define responsibilities and lines of authority is needed. 20 CES/CEIEA is working with the AFWFC to develop an installation memorandum to further define roles and responsibilities. The Shaw Wildand Fire Support Module (SWFSM) is currently in the process of being organized. When fully staffed, the SWFSM will consist of 6 NWCG wildland fire qualified members with 2 personnel, the Lead and assistant qualified at the RXB2 Burn Boss level. Qualified detailers from other areas and organizations are also hired by AFWFC to supplement the SWFSM to assist 20 CES/CEIEA to conduct prescribed fires on Poinsett Range. 20 CES/CEIEA is responsible to the 20th Fighter Wing Commander for issues related to prescribed fire.

20 CES/CEIEA has divided Poinsett Range into seven fire management units using roads and firebreaks as boundaries. AFI 32-7064 requires written prescribed fire burn plans for each unit and also a Wildland Fire Management Plan (WFMP). The WFMP is scheduled to be completed by AFCEC/AFWFC contract in FY18. Four of seven required burn plans have been developed for Poinsett Range. The remaining 3 burn plans do not involve RCW at this time but are scheduled to be completed by the Shaw Wildland Fire Support Module before FY18. The burn plans outline unit specific procedures for safety, burn authorizations, implementation requirements and includes a list of individuals and organizations to notify before initiating a prescribed fire. Although the specifics vary depending on burn objectives and unit conditions, each plan specifies the number and types of resources required to conduct the burn and the temperature, relative humidity, wind, fuel moisture and drought index conditions that must be met in order for the burn to occur.

Most prescribed fires at Poinsett Range are conducted during the dormant season (December through mid-March). As the program progresses and fuel loads are reduced, growing-season burns will be conducted

when conditions are favorable. The number of acres burned annually will depend on a variety of factors including short and long-term weather conditions, scheduled training missions and the availability of qualified personnel. Although the goal is to burn at least 2,000 acres a year, safety and sound resource stewardship will override all other considerations.

An incident log will be maintained for every prescribed. The log will include a go/no-go checklist, on-site weather observations, ignition start and end times, personnel and equipment rosters and a summary of other major events associated with the fire. The date, KBDI value, purpose and geographical boundaries of each prescribed fire will be recorded by the SWFSM and maintained in the AFWFC GIS database.

After a prescribed fire, the Burn Boss will conduct an After Action Review (AAR) with the prescribed fire crew. Although the specifics may vary, the following questions will be discussed during each AAR:

- What was planned?
- What actually happened?
- Why did it happen?
- What can we do next time?

In addition to the monitoring activities discussed in the section Prescribed Burning and Smoke Management, other points that may be considered when assessing a prescribed fire include:

- Were the pre-burn preparations adequate?
- Were the stated objectives met?
- Were there any changes to the burn plan? Were changes documented?
- Were weather conditions, fuel conditions, fire behavior and smoke dispersion within planned limits?
- What were the effects on soil, air, vegetation, water and wildlife?
- Was the fire contained to the intended area? Were there any escapes? If so, how were they handled?
- Was the applied burning technique correct?
- How can similar burns be improved?

Because prescribed fires are conducted under a specified set of conditions, the smoke they produce can be managed. Prescribed fires will be performed in accordance with SCFC's Smoke Management Guidelines for Vegetative Debris Burning for Forestry, Agriculture and Wildlife Purposes in the State of South Carolina, Revised August 2006. Prescribed fires will be conducted on days when the fire weather forecast predicts that the wind will carry smoke away from smoke sensitive areas. When prescribed fires are conducted within 1,000 feet of a public road, warning signs will be posted by 20 CES/CEIEA to alert motorists of the potential smoke hazard regardless of the predicted wind direction. If the smoke does not behave as predicted and is blown toward smoke sensitive areas, the fire will be extinguished as quickly as possible and aggressively mopped up to reduce remaining hot spots and smoking debris. If the fire cannot be extinguished and/or there is a threat to public safety due to residual smoke, the Burn Boss will contact the senior fire officer on duty at the main Shaw AFB fire station and request assistance.

If a prescribed fire expands beyond the planned burn area, the Burn Boss will contact the senior fire officer on duty at the main Shaw AFB fire station to advise them of the situation and request additional resources as needed. The Burn Boss also will notify the RCO on duty at Poinsett Range.

7.10 Agricultural Outleasing

Applicability Statement

This section applies to AF installations that lease eligible AF land for agricultural purposes. This section **IS NOT** applicable to Shaw AFB.

Program Overview/Current Management Practices

Outleases are authorized when appropriate to lease DoD land to individuals for agricultural purposes. Currently, there are no agricultural outleases on properties controlled by Shaw AFB.

7.11 Integrated Pest Management Program

Applicability Statement

This section applies to AF installations that perform pest management activities in support of natural resources management, e.g. invasive species, forest pests, etc. This section **IS** applicable to Shaw AFB.

Program Overview/Current Management Practices

Shaw's Integrated Pest Management Plan (IPMP) is developed, revised and maintained by Entomology, 20 CES/CEOIE, located in building 300 at Shaw AFB. The IPMP is written in accordance with DODI 4150.7, references its relationship to the INRMP and provides all POC information for entomology. The IPMP is understood to be consistent with the INRMP and is reviewed by 20 CES/CEIEA. The Integrated Pest Management Program and the BASH Program both address and discuss how pest flora and fauna species are managed and controlled at Shaw AFB.

Executive Order (EO) 13112, *Invasive Species*, dated February 3, 1999, requires all federal agencies to prevent the introduction of invasive species, provide for their control and minimize their economic, ecological and human health impacts. Under EO 13112, AF installations, to the extent practicable and permitted by law, will not authorize, fund, or carry out management actions that are likely to cause the introduction or spread of invasive species.

Pest Species affecting Natural Resources

Preventing and mitigating the presence and/or introduction of non-native species is more feasible for higher plants and vertebrates than it is for invertebrates and microbes. It should be possible to stop the intentional introduction of most known harmful invasive species through improved policy and education. Unintentional introductions, especially of invertebrates and microbes, can also be reduced through policy and education but not stopped altogether.

The main invasive plant species occurring on Shaw AFB is kudzu. However, it is located on a slope north of the runways confined by the North Perimeter Road. Due to mowing of the airfield and the roadway, its spread is currently contained. It does serve its intended purpose for erosion control on the slope.

Poinsett Range has several invasive plants and animals present. A complete survey for invasives occurring on Poinsett Range was completed in 2015. As a result of this effort, all invasives were located, identified and a control action implemented. Follow-up control will be planned, programmed and implemented as necessary.

In 2013, feral hogs were first observed in numbers on Poinsett Range. Previously only a few individual hogs were observed usually during deer hunts. The NRM contacted USDA/WS to assist with the control of

feral hogs. Several feral hogs were removed by trapping in 2016. Since then, no hogs have been observed on Poinsett Range. 20 CES/CEIEA staff continue to monitor for feral hogs and if observed will re-instate control measures.

Invasive Species Detection, Identification and Monitoring

Invasive species that have been detected as occurring on or having the potential to occur on, Shaw AFB, Poinsett Range, or WRA are listed in the Table Current and Potential Invasive Plant Species and described in detail in the Appendix Descriptions of Current and Potential Invasive Plant Species. The current known locations of invasive plant species at Poinsett Range and Shaw AFB are shown in the Figure Map of Current Invasive Plant Species at Shaw AFB and the Figure Map of Current Invasive Plant Species at Poinsett Range, respectively.

Current and Potential Invasive Plant Species

Common Name	Scientific Name	Extent of Invasion		
	Current Invasive Species	Shaw AFB	PECR	WRA
Common bamboo	*Bambusa vulgaris*	Low		
Chinaberry tree	*Melia azedarach*	Low	Low	
Japanese honeysuckle	*Lonicera japonica*	Low		
Common reed	*Phragmites australis*	Low	Controlled	
Common privet	*Ligustrum vulgare*	Mod		
White poplar	*Populus alba*	Low		
Kudzu	*Pueraria lobata*	High	Controlled	
Potential Invasive Species				
Chinese tallow	*Sapium sebiferum*	Not applicable, identified as a potential invasive species		
Water thyme	*Hydrilla verticillata*	Not applicable, identified as a potential invasive species		
Cogan grass	*Imperata cylindrical*	Not applicable, identified as a potential invasive species		

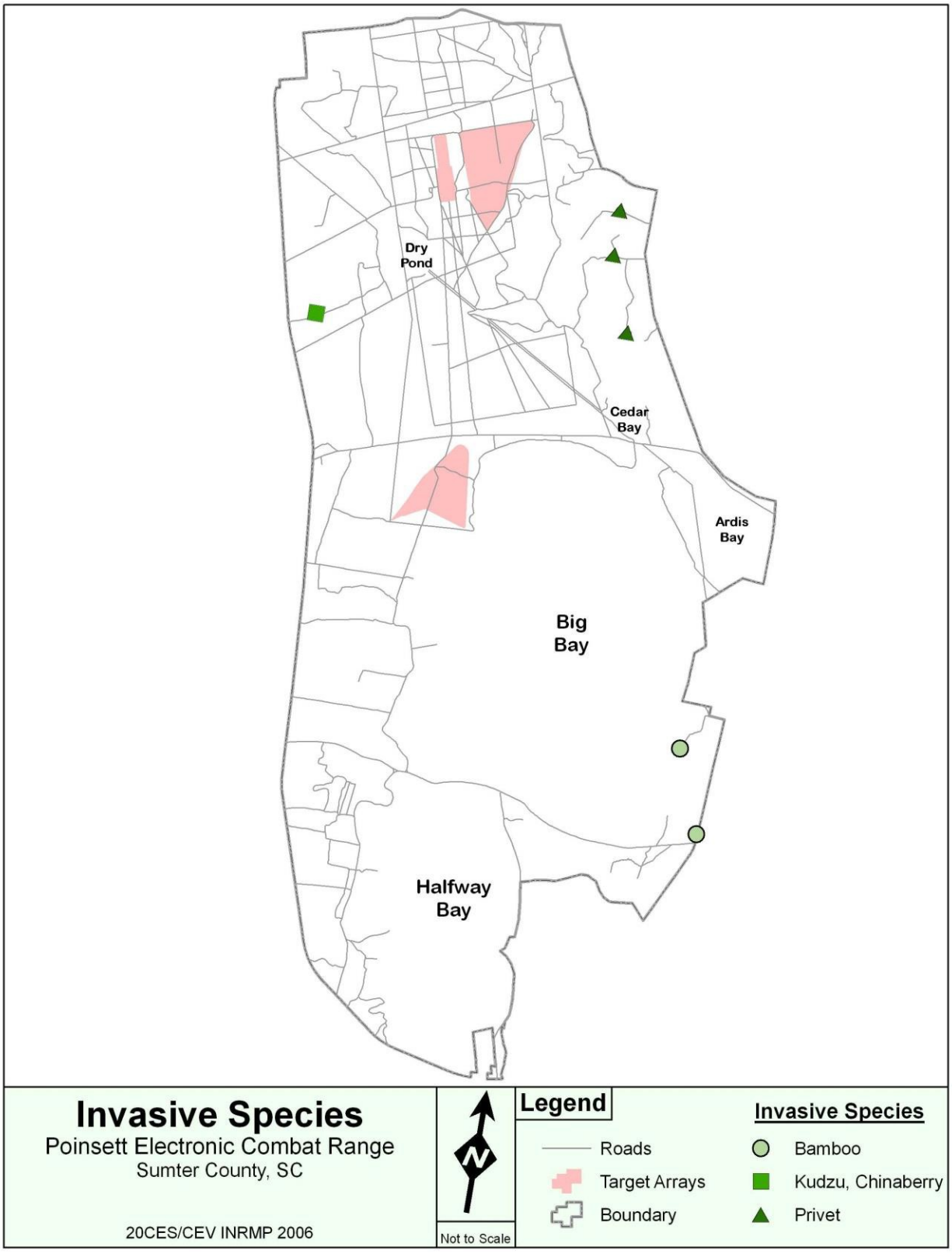
Shaw AFB, Poinsett Range and the WRA are monitored on a regular basis for the introduction of new invasive species. Known populations of previously identified invasive species are also monitored on a regular basis to track their status and ensure that their intrusion on native habitats is kept to a minimum. We are also taking measures to locate, identify and control all invasive plants and wildlife on Poinsett Range and Shaw AFB.

It should be noted that through the correct implementation of the INRMP and the work plans relating to invasive species, the threat of invasive species can be reduced significantly but may never be eliminated. The programs goal is to prevent new invasions and manage “invaded” native systems to maximize the benefit to native biodiversity.

Noxious Weeds

Noxious weeds are plants that are not native to the area and not widely prevalent and can cause harm to ecosystems. They can cause direct or indirect injury to crops, other useful plants, livestock, poultry, or other interests of agriculture such as irrigation, navigation, fish and wildlife resources and even the public health. Noxious weeds that have the potential to occur in South Carolina and/or Sumter Counts are listed in the Appendix Potential Noxious Weeds in Sumter County, SC.

Map of Current Invasive Plant Species at Shaw AFB



Map of Current Invasive Plant Species at Poinsett Range

7.12 Bird/Wildlife Aircraft Strike Hazard (BASH)

Applicability Statement

This section applies to AF installations that maintain a BASH program to prevent and reduce wildlife-related hazards to aircraft operations. This section **IS** applicable to Shaw AFB.

Program Overview/Current Management Practices

The Bird Airstrike Hazard Program (BASH) at Shaw AFB is based on BASH Plan 91-202 and is updated annually. The NEPA requirements of the BASH program have been addressed in the Environmental Assessment "Bird Aircraft Strike Hazard (BASH) Plan, Shaw AFB, Sumter, SC," June 2000. The BASH Plan provides a program for monitoring, reporting and eliminating potential BASH problems. A portion of the BASH Plan deals with the establishment of a Bird Hazard Working Group (BHWG) whose function is to review data on bird strikes and to identify and recommend action to reduce hazards. The BHWG will also recommend changes in operational procedures prepare informational programs for aircrews and serve as point of contact for off-base BASH issues. The Vice Commander, 20 FW, chairs the BHWG.

Any requirements for removal of wildlife will be determined jointly by 20 FW/SEF and 20 CES/CEIEA. The BHWG will disseminate BASH data, identify existing/potential BASH problems, brief and educate aircrews, report BASH encounters and make decisions on flight operations during Bird-Watch Conditions. Flight operational changes are made to avoid areas/times of known hazardous bird concentration and are dependent on Bird-Watch Conditions. Detailed flight operations, reporting guidelines and Bird-Watch Conditions can be found in Shaw AFB BASH Plan 91-202.

The Civil Engineer Squadron provides an environmental wildlife representative to the BHWG to monitor and advise the BHWG of environmental modifications needed to meet BASH Plan objectives. The main objective of the wildlife representative is to reduce BASH risks by the modification of the surrounding environment so as not to attract wildlife (i.e. birds, rodents and deer). Procedures for removal and control of wildlife are to be incorporated in the Land Management Plan per reference AFI 91-202, *The USAF Mishap Prevention Program.*

Existing and Potential Wildlife Hazards

By far the greatest BASH challenges on Shaw AFB are waterfowl. They are primarily associated with ponds on the Carolina Pines Golf Course. These pond sites attract waterfowl on a year-round basis, with periods of greatest intensity during the spring (nesting) and fall and winter migratory seasons.

Other animals that are observed occasionally on Shaw AFB include whitetail deer, coyotes and fox. Whitetail deer sometimes reach population levels where their numbers must be reduced. Other animals are removed if they frequent the airfield causing increased risk to aircraft.

Other animals cause indirect effects such as beaver and rodents. Beaver can be an issue as they build dams in waterways thus attracting waterfowl potentially into the paths of take-off and landings. Rodent populations attract raptors that may fly in the pathway of aircraft while hunting. Rodents are also a food source attracting coyotes and fox that could interfere with take- offs and landings should they wander onto the runways. However, the coyotes and foxes may also be a positive influence by reducing rodent numbers that serve as prey to attract raptors, which are a greater threat to aircraft than animals on the ground.

Issues of the BASH Program at Shaw AFB and Poinsett Range

There are a wide range of issues that involve Natural Resources at Shaw AFB and Poinsett Range. The most effective control for wildlife is to manage the habitat to dissuade wildlife. The Civil Engineer Squadron Operations Flight at Shaw AFB is responsible for incorporating BASH reducing elements into the Shaw AFB Land Management Plan. Detailed descriptions of the practices can be found in Shaw AFB BASH Plan 91-202. The greatest issue is the acquisition of funding to administer the needed aspects of the BASH program. To date, BASH needs have been minimal and adequate funding has been available.

How Natural Resources Management Program Supports BASH Plan Objectives

Some species or individual animals may be removed by trapping methods or shooting in accordance with the appropriate permits. Depredation permits are obtained in coordination with the appropriate federal and state agencies. Non-lethal efforts such as pyrotechnics, lights, noises and physically chasing to scare away wildlife are exhausted prior to depredation.

A migratory Bird depredation permit is obtained annually from the USFWS. In addition, a depredation permit for removal of wildlife is obtained from the SCDNR and all guidelines strictly followed.

7.13 Coastal Zone and Marine Resources Management

Applicability Statement

This section applies to AF installations that are located along coasts and/or within coastal management zones. This section **IS NOT** applicable to Shaw AFB.

Program Overview/Current Management Practices

There are no coastal zones or marine resources on any lands associated with Shaw AFB.

7.14 Cultural Resources Protection

Applicability Statement

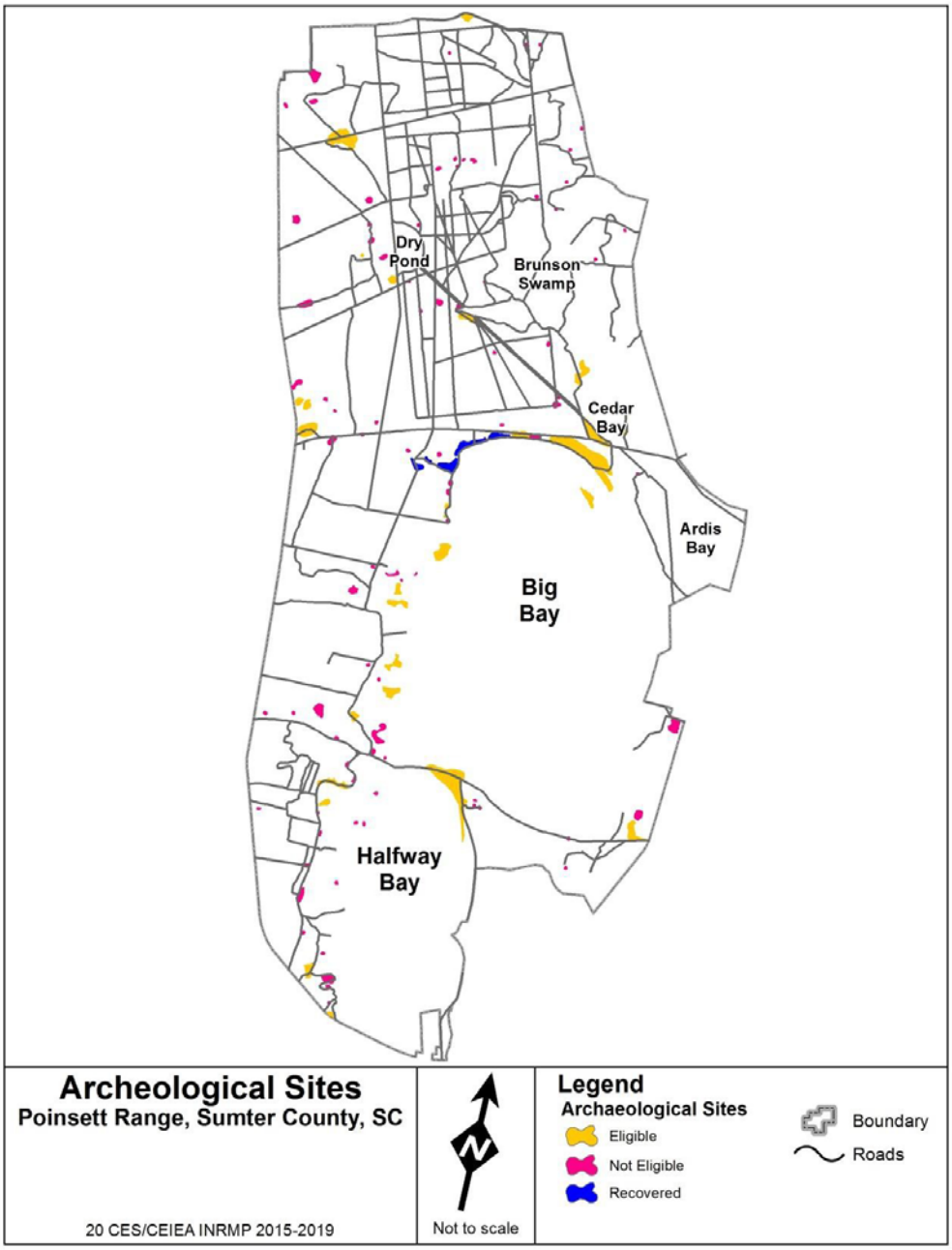
This section applies to AF installations that have cultural resources that may be impacted by natural resource management activities. This section **IS** applicable to Shaw AFB.

Program Overview/Current Management Practices

Over the past twenty years, archaeological surveys, testing and excavations have been undertaken at Shaw AFB and Poinsett Range in order to investigate archaeological sites. As a result of this work, 149 sites have been identified with 34 of those determined eligible for listing on the NHRP by the SCSHPO (see Map of Archaeological Sites at Poinsett Range.). While most of these sites have been damaged by years of agriculture, logging and construction, some of them have exhibited a great deal of physical integrity and/or have historical significance. Through the examination of these more important sites we have begun to understand a great deal more about the prehistoric inhabitants of this area. While prehistoric investigations performed thus far have revealed some interesting information, the work has just scratched the surface. No large-scale excavation has occurred at any of the historic sites, testing along with documentary research has provided some interesting preliminary information about the nineteenth and early twentieth century occupants. Despite over 20 years of archaeology and historical research at Shaw AFB and Poinsett Range, there is a great deal more to be learned.

Both Shaw AFB and Poinsett Range are situated in historically sensitive areas. Shaw AFB is located just north of US Hwy 76, which is an old road known as “Fish Road” running from Garner’s Ferry on the Wateree River to the town of Sumterville. Poinsett Range is located just south of the old town of Manchester

and along the old Catawba Trading Path, later known as the King's Highway. This road roughly follows modern-day SC Hwy 261.



Map of Archaeological Sites at Poinsett Range

Both Shaw AFB and Poinsett Range were attractive to prehistoric populations due to the well- drained soils adjacent to drainages and wetlands. Poinsett Range was particularly so due to the presence of two very large Carolina Bays known as Big Bay North and Halfway Bay. Prehistoric people may have occupied the high, dry sand ridges situated along the northern and western rim. Evidence of occupation around these bays ranges in age from early Paleoindians (12000 B.P. – before present) up through Mississippian inhabitants (450 B.P.).

7.15 Public Outreach

Applicability Statement

This section applies to all AF installations that maintain an INRMP. Shaw AFB **IS** required to implement this element.

Program Overview/Current Management Practices

Shaw AFB is active with community organizations involved in natural resources to ensure they know how the natural resources programs and military training mission work together.

The natural resources staff will periodically prepare public news releases and newspaper stories for the base newspaper, The Shaw Spirit, regarding natural resources programs as a public outreach effort. In addition, a variety of brochures, posters, videos and other natural resources educational materials will be prepared and distributed to the public as funding and time permits.

7.16 Geographic Information Systems (GIS)

Applicability Statement

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

Program Overview/Current Management Practices

GIS is the integrated asset management tool combining data management, analysis and visualization critical for all natural resource program functions. GIS is an ideal platform for managing current and historical spatial data used in ecosystem monitoring and management. GIS has become an integral part of program management for every program in 20 CES/CEIEA through concise integration of cross-programmatic data for efficient decision support. The GIS program integrates all activities and functions required by the INRMP to support the mission of the 20 Fighter Wing.

Resource Mapping

Data for GIS is collected through two primary techniques: digitization and GPS data collection. When appropriate, current aerial photography is used for digitizing visible features. This process reduces the overall time required for data collection by eliminating field work and data conversion and processing through direct manipulation of target database. Digitizing GIS data from aerial imagery does have spatial and temporal limitations based on available source imagery. Timely remote sensed data, such as aerial imagery are fundamental in data development and interpretation. Periodic updates to these data sets are vital and should be a high priority. When existing aerial photography does not meet resolution and accuracy requirements, data is collected in the field using GPS enabled data collectors. This process is vital in maintaining an accurate record of management activities as they are carried out, ensuring immediate synthesis in assessment and planning analysis.

There are two primary types of data in 20 CES/CEIEA GIS: 1) historical data, stored as annual snapshots since 1995 and 2) current data, depicting ground conditions. Both are held in centrally located databases accessible to all NR program managers. All current data undergo regular review for errors and inaccuracies which are corrected as needed. Maintaining a systematic process for updating and archiving GIS data is essential in creating data sets that retain value to resource managers through time. There are currently over 80 data layers organized programmatically, including infrastructure data, forestry data, habitat management

data, wildlife management data, ecological monitoring data and endangered species data. Historical data is also maintained so it can be easily integrated in long term decision making.

Equipment Availability

Access to infrastructure data maintained by Shaw Installation Geospatial Information and Services (IGI&S) is also available through the network. Natural Resource staff members have access to GIS software through a distributed licensing system maintained by Shaw IGI&S. In house GIS capabilities are necessary to provide rapid response for software and hardware troubleshooting and repair, reducing downtime and maintaining efficient management processes. Field data collection is accomplished using GPS data collection systems and notebook computers. Other GPS data collection hardware and software is available for use through the Shaw IGI&S and Civil Engineering. Access to several large format plotters maintained by the Engineering Flight is available. It is vital that the current system evolves to keep pace with available technology within the supported IT framework.

8.0 MANAGEMENT GOALS AND OBJECTIVES

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

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

Installation Supplement – Management Goals and Objectives

GOAL 1: INTEGRATE ALL NATURAL RESOURCES MANAGEMENT FUNCTIONS TO SUPPORT AND ENHANCE THE MILITARY MISSION AT SHAW AFB AND POINSETT RANGE.

- OBJECTIVE 1.1: Integrate all functions of natural resources management into a single cohesive plan.
  - PROJECT 1.1.1: Annually review the Shaw Base Plan 32-7064, Integrated Natural Resource Management (INRMP) and work plans for Shaw AFB to ensure the integration of and consistency among, the various activities identified within this INRMP.
  - PROJECT 1.1.2: Coordinate the implementation of natural resources management with other environmental programs.
  - PROJECT 1.1.3: Ensure that natural resources management is consistent with other base plans and principles.

  - PROJECT 1.1.4: Ensure the integration of new military infrastructure development with the principles and guidelines of this plan.
  - PROJECT 1.1.5: Update the INRMP as appropriate in accordance with AFI 32-7064.
  - PROJECT 1.1.6: Gain approval of INRMP with USFWS, SCDNR and Shaw AFB as required.
  - PROJECT 1.1.7: Coordinate and cooperate with AFCEC as needed to accomplish INRMP goals.
  - PROJECT 1.1.8: Comply with all laws and regulations that pertain to management of Shaw AFB natural resources.
- OBJECTIVE 1.2: Ensure mission impacts are considered in the planning and implementation process of natural resource management.
  - PROJECT 1.2.1: Ensure implementation of this INRMP is in compliance with the Sikes Act and supports the military mission.
  - PROJECT 1.2.2: Coordinate with other base entities involving them early in the natural resource planning process to ensure mission needs are addressed.
  - PROJECT 1.2.3: Provide the command with information needed to make decisions, which include natural resources-related values.
  - PROJECT 1.2.4: Ensure proper NEPA documentation is performed prior to any construction activity that may adversely affect environment or military mission.
  - PROJECT 1.2.5: Conduct internal reviews to gain trust and "buy-in" from base leadership, before consulting with outside agencies.
  - PROJECT 1.2.6: Ensure appropriate communication and partnering with base leadership compliance issues, specifically concerning endangered species and wetlands.
  - PROJECT 1.2.7: Provide educational immersions for commanders new to Shaw AFB and interpretive tours of natural resource assets and accomplishments.
  - PROJECT 1.2.8 Provide educational seminars for the base populace to inform them and conservation efforts.
  - PROJECT 1.2.9: Employ natural resource management techniques that will address and enhance mission needs both in the short and long-term.

GOAL 2: MAINTAIN AND RESTORE NATIVE ECOSYSTEMS COMPATIBLE WITH THE MILITARY MISSION.

- OBJECTIVE 2.1: Develop an estimated range of native plant communities present.
  - PROJECT 2.1.1: Conduct a plant survey for all Poinsett Range.
  - PROJECT 2.1.2: Determine species composition, structure, density and dominance of individual plant communities.
  - PROJECT 2.1.3: Utilizing GPS and GIS, develop and depict maps of existing conditions and track as changes occur.
- OBJECTIVE 2.2: Ensure no unnecessary loss of native plant communities.
  - PROJECT 2.2.1: Management activities will be reviewed by Shaw's 20 CES/CEIEA staff to ensure compatibility with ecosystem health. Military objectives and ecosystem health will supersede economic interests when considering management activities.
  - PROJECT 2.2.2: Internal environmental reviews will be conducted for management activities conducted by CEIEA staff.
- OBJECTIVE 2.3: Restore desired native plant community variation giving preference to natural processes (i.e., fire, hydrologic function).
  - PROJECT 2.3.1: Continue to use fire as a maintenance and restoration tool.

  - PROJECT 2.3.2: Assess the potential impacts of the use of natural processes.
  - PROJECT 2.3.3: Establish cooperative partnership with other agencies such as USFWS, USFS, CSU and AFWFC to restore native plant communities.
- OBJECTIVE 2.4: Define desired variation in native plant communities and identify sites outside of their natural range.
  - PROJECT 2.4.1: Identify and prioritize potential restoration sites.
  - PROJECT 2.4.2: Identify restoration and maintenance techniques to be employed.
- OBJECTIVE 2.5: Evaluate highly altered sites to assess their function and potential for restoration where appropriate.
  - PROJECT 2.5.1: Identify and map altered sites.
  - PROJECT 2.5.2: Develop evaluation criteria.
  - PROJECT 2.5.3: Prioritize potential restoration sites.
  - PROJECT 2.5.4: Develop restoration plans and begin restoration.
- OBJECTIVE 2.6: Ensure that native species composition and richness within each natural community is maintained.
  - PROJECT 2.6.1: Evaluate the role of management activities and natural processes on native species composition and richness.
  - PROJECT 2.6.2: Adopt/modify management practices to ensure native species composition and richness is maintained.
- OBJECTIVE 2.7: Use prescribed fire to enhance military mission flexibility and reduce the potential for emergency wildfire events through proactive wildland fire management.
  - PROJECT 2.7.1: Conduct prescribed fires to reduce fuel loads especially around Poinsett Range target areas.
  - PROJECT 2.7.2: Avoid or minimize adverse impacts to threatened or endangered species habitat, wetlands and cultural resources due to wildland fire.
  - PROJECT 2.7.3: Conduct prescribed burns on Poinsett Range (primarily from November through July).
  - PROJECT 2.7.4: Maintain firebreaks associated with areas where prescribed burns are planned by plowing, disking, or raking as needed throughout the year utilizing existing breaks as much as possible to protect assets.
- OBJECTIVE 2.8: Use wildland fire as primary tool for managing ecosystems.
  - PROJECT 2.8.1: Conduct prescribed fires to manage fire-dependent species to restore and maintain native ecosystems.
  - PROJECT 2.8.2: Use prescribed fire to promote and conserve biodiversity.
  - PROJECT 2.8.3: Utilize prescribed fire techniques that are ecologically sound and consistent with the military mission.
  - PROJECT 2.8.4: Use minimum impact suppression tactics when fighting wildfires whenever possible.
  - PROJECT 2.8.5: Avoid or minimize adverse impacts to threatened or endangered species habitat, wetlands and cultural resources due to wildland fire.
  - PROJECT 2.8.6: Evaluate wildland fuel conditions and implement strategies to eliminate or minimize hazardous situations.
  - PROJECT 2.8.7: Develop and maintain a system of permanent firebreaks for ecosystem protection.
- OBJECTIVE 2.9: Partner with other agencies to utilize available wildfire technical assistance.
  - PROJECT 2.9.1: Cooperate with AFWFC for qualified personnel to assist Shaw AFB Fire Department personnel with wildland fire risk assessment and training activities.

  - PROJECT 2.9.2: Qualified firefighters cooperating with the AFWFC may engage in firefighting activities if requested by Shaw AFB Fire Department.
  - PROJECT 2.9.3: During a wildfire event, 20 CES/CEIEA personnel will serve only as resource advisors.
  - PROJECT 2.9.4: Use minimum impact suppression tactics when fighting wildfires whenever possible.
  - PROJECT 2.9.5: Notify the appropriate state and local fire agencies and neighboring residents in wildland/urban interface areas of all wildland fires that have the potential to impact them.
  - PROJECT 2.9.6: Develop and maintain mutual aid and/or cooperative agreements with state, federal and private wildland fire management agencies.
- OBJECTIVE 2.10: Ensure that wildland fire activities are performed by certified and qualified individuals through wildland fire training and documentation.
  - PROJECT 2.10.1: Ensure minimum prescribed fire training requirements are completed by all participates in prescribed fires (S-130 Basic Firefighter, S-190 Introduction to Fire Behavior and I-100 Basic Incident Command System).
  - PROJECT 2.10.2: Ensure personnel permanently stationed at Shaw AFB must also attend the S.C. Forestry Commission's Certified Prescribed Fire Manager course.
  - PROJECT 2.10.3: Ensure "Burn Boss" is a certified Prescribed Fire Burn Boss Type 2 (RXB2).
  - PROJECT 2.10.4: Annually, all fire personnel must attend Annual Fire line Safety Refresher training (RT-130) and at a minimum pass the moderate-level work capacity test (hike 2 miles with a 25-pound pack in 30 minutes or less).
  - PROJECT 2.10.5: All personnel must maintain current certifications in CPR and standard first aid.
  - PROJECT 2.10.6: Ensure that all personnel engaged in wildland fire activities are wearing the proper personal protection equipment (PPE).
- OBJECTIVE 2.11: Prescribed Fire Documentation and Monitoring.
  - PROJECT 2.11.1: Document all prescribed fires and wildfires in GIS database.
  - PROJECT 2.11.2: Report all fires on Poinsett Range to the Air Force Wildland Fire Center.
  - PROJECT 2.11.3: Evaluate and document effects of wildland fire on Poinsett Range using a variety of methods including visual inspections, photographic plots, long-term monitoring plots and red-cockaded woodpecker (RCW) foraging habitat data.
- OBJECTIVE 2.12: Maintain healthy and functional natural ecosystems for sustainable human uses with minimal regulatory intervention to USAF training.
  - PROJECT 2.12.1: Assess impacts from roads, firebreaks, fence lines and other soil disturbances in the context of ecosystem management.
  - PROJECT 2.12.2: Identify and quantify specific impacts and disturbed sites.
  - PROJECT 2.12.3: Identify restoration methods.
  - PROJECT 2.12.4: Prioritize sites for restoration.
  - PROJECT 2.12.5: Restore or mitigate disturbed sites as discovered.
  - PROJECT 2.12.6: Evaluate longleaf pine ecosystems on the uplands on Poinsett Range.
  - PROJECT 2.12.7: Identify LLP stands needing improvements.
  - PROJECT 2.12.8: Identify areas to restore to native LLP stands.
  - PROJECT 2.12.9: Evaluate wetlands on Poinsett Range for the potential to restore Atlantic White Cedar stands.

    - PROJECT 2.12.10: Evaluate the effects from compatible human usage of natural resource assets.
    - PROJECT 2.12.11: Ensure the human use of natural resources benefits the mission without degradation to existing and future ecosystems.
    - PROJECT 2.12.12: Maintain the native biological diversity of ecosystems while allowing compatible human uses.
    - PROJECT 2.12.13: Consider public role in ecosystem management decisions.
    - PROJECT 2.12.14: Include collaboration with the public in decision processes to achieve sustainable goals
    - PROJECT 2.12.15: Incorporate stakeholder values and cooperative and inclusive planning into the decision making process.
- OBJECTIVE 2.13: Set up timber sales at Poinsett Range.
    - PROJECT 2.13.1: Maintain or improve wildlife habitat, especially for RCW.
    - PROJECT 2.13.2: Salvage damaged trees.
    - PROJECT 2.13.3: Increase stocking of longleaf pine relative to other species.
    - PROJECT 2.13.4: Eliminate off-site plantings.
    - PROJECT 2.13.5: Submit recommended harvest for USFWS for approval.
    - PROJECT 2.13.6: Begin roadwork and marking as soon as approval is received.
- OBJECTIVE 2.14: Timber Sale Administration at Poinsett Range.
    - PROJECT 2.14.1: Market forest products via Small Lot Sales when feasible.
    - PROJECT 2.14.2: Prepare detailed contract for each sale.
    - PROJECT 2.14.3: Solicit sealed bids from all interested/qualified bidders.
    - PROJECT 2.14.4: Coordinate oversight during harvest, including ingress-egress, safety briefing, radio availability, work needed to repair damage, etc.
    - PROJECT 2.14.5: Check settlements for accuracy, submit proceeds.
- OBJECTIVE 2.15: Forest Health Monitoring.
    - PROJECT 2.15.1: Evaluate stands for early detection of insect outbreaks, disease outbreaks.
    - PROJECT 2.15.2: Assess stands for damage caused by fire, herbicides, ice storms, windstorms, etc., to facilitate timely response to minimize damage.
    - PROJECT 2.15.3: Evaluation of stand health, noting location and type of problems.
    - PROJECT 2.15.4: Consult with United States Forest Service & South Carolina Forestry Commission (SCFC) as needed for disease diagnosis.

GOAL 3: MANAGE LANDSCAPE FOR ENHANCED BIODIVERSITY COMPATIBLE WITH THE MILITARY MISSION.

- OBJECTIVE 3.1: Manage for Threatened and Endangered Species.
    - PROJECT 3.1.1: Maintain an inventory of federally listed T/E species, federal candidate species and state-listed species that occur, or have the potential to occur, at Poinsett Range, Shaw AFB, or WRA.
    - PROJECT 3.1.2: Monitor federally listed T/E species, federal candidate species and state-listed species that are known to occur at Poinsett Range, Shaw AFB, or WRA.
    - PROJECT 3.1.3: Conduct surveys for federally listed T & E species, federal candidate species and state-listed species that have the potential to occur at Poinsett Range, Shaw AFB, or WRA.
    - PROJECT 3.1.4: Consult and coordinate with the USFWS and SCDNR on proposed or ongoing actions that may affect listed species or their habitats.

    - PROJECT 3.1.5: Provide proactive management that will continue to support the existing mission requirements as well as future mission changes or expansions.
    - PROJECT 3.1.6: Comply with state and federal regulations by maintaining all regulatory permits and submitting annual reports to permitting agencies as required and consulting with the USFWS about projects that have the potential to impact federally listed threatened and endangered species.
    - PROJECT 3.1.7: Monitor and survey listed species through annual review and update to inventory of protected and rare species that occur, or have the potential to occur, on properties administered by Shaw AFB.
- OBJECTIVE 3.2: Manage for Red-cockaded Woodpecker populations.
    - PROJECT 3.2.1: Inspect Red-cockaded Woodpecker (RCW) clusters and cavities during the nesting season (April through July) and at other times of the year as warranted.
    - PROJECT 3.2.2: Monitor Red-cockaded Woodpecker (RCW) population during the nesting season (April through July).
    - PROJECT 3.2.3: Monitor active clusters for nests, band nestlings and determine fledging success.
    - PROJECT 3.2.4: Determine the number of active clusters.
    - PROJECT 3.2.5: Determine the number of potential breeding groups.
    - PROJECT 3.2.6: Determine the number of adults per breeding group.
    - PROJECT 3.2.7: When necessary, translocate sub adult RCWs between 15 September and 1 January to augment recruitment clusters, improve spatial arrangement of groups and provision single birds with mates.
- OBJECTIVE 3.3: Assess Red-cockaded Woodpecker (RCW) Foraging Habitat.
    - PROJECT 3.3.1: Monitor overstory, midstory and ground cover conditions in existing and potential RCW foraging habitat.
    - PROJECT 3.3.2: Use habitat analysis software to assess current conditions relative to the standards established in the federal RCW Recovery Plan and to plan and prioritize management needs in specific stands.
- OBJECTIVE 3.4: Maintain cavities for Red-Cockaded Woodpecker populations.
    - PROJECT 3.4.1: Repair or replace damaged cavities.
    - PROJECT 3.4.2: Remove competitors and predators (flying squirrels, other birds, snakes, etc.).
    - PROJECT 3.4.3: Install artificial cavities to maintain a minimum of 4 suitable cavities per cluster and to create recruitment clusters as needed to promote population growth.
    - PROJECT 3.4.4: Rake fuels away from cavity trees prior to prescribed fire.
    - PROJECT 3.4.5: Manually remove hardwoods near cavity trees.
- OBJECTIVE 3.5: Hardwood Midstory Control in Red-cockaded Woodpecker (RCW) Habitat.
    - PROJECT 3.5.1: Use prescribed fire to control hardwoods and promote herbaceous vegetation in RCW clusters and foraging habitat.
    - PROJECT 3.5.2: Use physical methods to control hardwoods such as hand clearing, mechanical clearing and/or pine straw raking as needed to control hardwood vegetation in RCW clusters and foraging habitat.
    - PROJECT 3.5.3: Use herbicides as last resort to control undesirable hardwood vegetation.
- OBJECTIVE 3.6: Monitor Least for Terns.
    - PROJECT 3.6.1: Monitor buildings with gravel roofs during the least tern nesting season (May through July) to determine presence or absence of nesting activity.
    - PROJECT 3.6.2: Count the number of adults and nests on roofs where least terns are nesting.

- OBJECTIVE 3.7: Ensure wetland delineations are current and accurate.
  - PROJECT 3.7.1: Delineate wetlands on Shaw AFB as necessary for proper planning.
  - PROJECT 3.7.2: Review national wetland inventory of wetlands occurring on Poinsett Range.
  - PROJECT 3.7.3: Consult with USACE on projects that may affect wetlands to ensure protection and compliance with the Clean Water Act.
  - PROJECT 3.7.4: Seek alternatives for projects on Shaw AFB to avoid actions whenever possible which would either destroy or adversely modify wetlands.
  - PROJECT 3.7.5: Ensure compliance with the Rivers and Harbors Act to protect the navigable waters of the United States.
  - PROJECT 3.7.6: Ensure that water quality if maintained in accordance state water quality criteria.
  - PROJECT 3.7.7: Review all NEPA documentation prior to any construction activity in a wetland area.
  - PROJECT 3.7.8: 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 whenever feasible.
- OBJECTIVE 3.8: Sustain or improve the quality of the urban forest resources including celebration of Arbor Day and Tree City USA certification for Shaw AFB.
  - PROJECT 3.8.1: Review all plans for tree removals and planting of new shade trees on base.
  - PROJECT 3.8.2: Recommend needed changes to improve success of planting projects.
  - PROJECT 3.8.3: Hold Arbor Day observance.
  - PROJECT 3.8.4: Coordinate with Public Affairs to set up, publicize and report on observances.
  - PROJECT 3.8.5: Submit application for Tree City recertification to SCFC at end of year.
  - PROJECT 3.8.6: Coordinate with CEOSS and Housing Privatization for tree removals, plantings and maintenance done by contractors.

GOAL 4: DEVELOP AND IMPLEMENT INVASIVE/EXOTIC/NUISANCE SPECIES MANAGEMENT PROGRAM.

- OBJECTIVE 4.1: Manage natural resources to control invasive and exotic plant species.
  - PROJECT 4.1.1: Conduct a site assessment at PECR to determine the aerial extent and density of invasive/exotic plant species.
  - PROJECT 4.1.2: Identify specific species of invasive and exotic plants.
  - PROJECT 4.1.3: Evaluate and assign density levels for infestations.
  - PROJECT 4.1.4: Locate and map infested areas using a global positioning system (GPS).
  - PROJECT 4.1.5: Develop a cost estimate for treatment of invasive and exotic plants.
  - PROJECT 4.1.6: Prioritize species and areas for treatment to prevent AF mission encroachment and prevent the spread of invasive and exotic species.
  - PROJECT 4.1.7: Conduct control of invasive and exotic plant species infestations in accordance with all applicator laws and regulations both State (SC) and Federal.
  - PROJECT 4.1.8: Provide for restoration of native species and habitats that have been invaded.
  - PROJECT 4.1.9: Promote public education on invasive species.
  - PROJECT 4.1.10: Prevent the introduction of invasive species through sanitation protocols and inspections for on-site and off-site equipment including all contractor vehicles and equipment entering military lands.

    - PROJECT 4.1.11: Review all undertakings to prevent actions that are likely to cause or promote the introduction or spread of invasive or exotic species.
- OBJECTIVE 4.2: Manage natural resources to control nuisance wildlife species.
    - PROJECT 4.2.1: Conduct baseline survey of Shaw AFB, Poinsett Range and WRA for nuisance species.
    - PROJECT 4.2.2: Prioritize species considering potential harm to ecosystems.
    - PROJECT 4.2.3: Survey Poinsett Range to locate and estimate population of feral hogs.
    - PROJECT 4.2.4: Survey Poinsett Range to locate and estimate population of coyotes.
    - PROJECT 4.2.5: Locate and map nuisance wildlife global positioning system (GPS).
    - PROJECT 4.2.6: Develop a cost estimate for treatment of nuisance wildlife.
    - PROJECT 4.2.7: Develop a management plan that prioritizes species for control to prevent AF mission encroachment and the proliferation of nuisance species.
    - PROJECT 4.2.8: Conduct control of nuisance species in accordance with all federal and state regulations and permit requirement.
    - PROJECT 4.2.9: Provide for restoration of native species and habitats that have been harmed by nuisance wildlife.
    - PROJECT 4.2.10: Promote public education on nuisance wildlife species.
- OBJECTIVE 4.3: Obtain all permits as necessary to conduct Bird/Aircraft Strike Hazard (BASH) Reduction.
    - PROJECT 4.3.1: Annually submit application and obtain a migratory bird depredation permit from USFWS coordinating with US Department of Agriculture/Wildlife Services (USDA/WS).
    - PROJECT 4.3.2: Annually submit application and obtain a wildlife depredation permit from SCDNR.
- OBJECTIVE 4.4: Conduct Bird/Aircraft Strike Hazard (BASH) Reduction.
    - PROJECT 4.4.1: Conduct BASH surveys in cooperation with Flight Safety (20 FW/SEF).
    - PROJECT 4.4.2: Conduct hazing to dissuade wildlife for Air field and base ponds and wetlands I cooperation with 20 FW/SEF and Air Field Operations (20 OSS/OSSA).
    - PROJECT 4.4.3: Conduct depredations in accordance with permit conditions to remove wildlife threats from Air field and base ponds and wetlands in a coordinated effort with effort with 20 FW/SEF and 20 OSS/OSSA.
    - PROJECT 4.4.4: Serve as member of Bash Hazard Working Group (BHWG) chaired by 20FW/CV.
    - PROJECT 4.4.5: Serve as member of Air Operations Board and Air Space Range Committee chaired by 20 OG/CC.
- OBJECTIVE 4.5: Manage Habitat to Dissuade Wildlife Species Contributing to Bird/Aircraft Strike Hazard (BASH) on Shaw AFB.
    - PROJECT 4.5.1: Provide advice on habitat management to reduce and minimize BASH risks.
    - PROJECT 4.5.2: Coordinate with Ground Maintenance on activities including vegetation removal, maintenance height or attraction away from high risk areas.
- OBJECTIVE 4.6: Maintain Updated List of Aircraft Strike Hazard (BASH) Species.
    - PROJECT 4.6.1: Maintain record of species occurring on Shaw AFB that may attribute to BASH.
    - PROJECT 4.6.2: Report BASH activities and depredation activities as required to USFWS and SCDNR.

GOAL 5: DEVELOP AND IMPLEMENT MONITORING, INVENTORY and INFORMATION MANAGEMENT SYSTEMS TO ASSESS ECOSYSTEMS.

- OBJECTIVE 5.1: Conduct plant survey occurring on Poinsett Range.
  - PROJECT 5.1.1: Locate and identify invasive plant species.
  - PROJECT 5.1.2: Create a field herbarium to facilitate identification of plants.
  - PROJECT 5.1.3: Survey for threatened and endangered species.
  - PROJECT 5.1.4: Survey hydrophytes (wetlands) plants.
- OBJECTIVE 5.2: Bat Identification and Population surveys.
  - PROJECT 5.2.1: Establish bat listening stations and/or routes to document frequency recordings for species identification.
  - PROJECT 5.2.2: Determine bat species and populations.
  - PROJECT 5.2.3: Verify to extent possible non-existence of endangered bat species.
- OBJECTIVE 5.3: Identify furbearers on Shaw AFB and Poinsett Range.
  - PROJECT 5.3.1: Monitor population of coyotes on Shaw AFB and Poinsett Range utilizing scent traps, cameras and distress calls to determine predator population.
  - PROJECT 5.3.2: Monitor population of bobcat on Shaw AFB and Poinsett Range utilizing scent traps, cameras and distress calls to determine predator population.
  - PROJECT 5.3.3: Monitor population of other furbearers (bear, fox, raccoon, beaver, rabbit, etc.) on Shaw AFB and Poinsett Range utilizing scent traps, cameras and distress calls to determine predator population.
  - PROJECT 5.3.4: Determine trends and predation effects on native species.
- OBJECTIVE 5.4: Conduct Avian Species Surveys.
  - PROJECT 5.4.1: Establish seasonal routes to monitor for migrant and resident bird species.
  - PROJECT 5.4.2: Conduct windshield surveys listening and identifying species by specific vocalizations, flight patterns and observations.
  - PROJECT 5.4.3: Identify both migrant and resident Species of birds.
- OBJECTIVE 5.5: Monitor 8 Trap Locations for Herpetofauna (Reptile and Amphibian) Species Occurring at Poinsett Range.
  - PROJECT 5.5.1: Survey amphibian and reptile populations using current survey techniques.
  - PROJECT 5.5.2: Capture and identify individual amphibians and reptiles.
  - PROJECT 5.5.3: Record all data and document in GIS.
  - PROJECT 5.5.4: Determine positive and negative effects on ecosystem(s).
  - PROJECT 5.5.5: Evaluate population trends to prevent negative impact on Training Mission by utilizing current data for quick diagnostics and response.
- OBJECTIVE 5.6: Survey for Woodland Hawks, Falcons and Owls (Raptors) on Poinsett Range.
  - PROJECT 5.6.1: Continue established survey routes and techniques for continuity of data.
  - PROJECT 5.6.2: Monitor Raptors (birds of prey) for population and species.
  - PROJECT 5.6.3: Evaluate species as indicators of ecosystem health and diversity.
  - PROJECT 5.6.4: Assess risk of birds to Bird Aircraft Strike Hazard and potential impacts to mission.
- OBJECTIVE 5.7: Survey for Northern Bobwhite Quail (Colinus virginianus) on Poinsett Range.
  - PROJECT 5.7.1: Monitor population trends of Northern Bobwhite Quail.
  - PROJECT 5.7.2: Continue established survey routes and techniques for continuity of data.
  - PROJECT 5.7.3: Record all data and document in GIS.
  - PROJECT 5.7.4: Develop and initiate quail recovery techniques and integrate with established land management programs.

- OBJECTIVE 5.8: Maintain Small Mammal Species List Occurring at Poinsett Range.
  - PROJECT 5.8.1: Continue established transects and capture protocols.
  - PROJECT 5.8.2: Initiate other transects as needed for research and study due to prescribed burns, ground troop training, air to ground training, etc.
  - PROJECT 5.8.3: Capture and identify small mammals (mice, rats, moles, voles, etc.).
  - PROJECT 5.8.4: Record all data and document in GIS.
- OBJECTIVE 5.9: Operate a MAPS (Monitoring Avian Productivity and Survivorship) Bird Banding Station.
  - PROJECT 5.9.1: Ensure all required federal and state permits are current.
  - PROJECT 5.9.2: Prepare survey area and all necessary equipment (mist nets, poles, banding pliers, bird bands, capture bags, scales, etc.) prior to monitoring season.
  - PROJECT 5.9.3: Conduct 9 banding sessions at the Ardis Bird Banding Station between May and August.
  - PROJECT 5.9.4: Determine the species, sex and age of each bird captured and banded.
- OBJECTIVE 5.10: Alligator Surveys all Ponds and Surface Water at Poinsett Range.
  - PROJECT 5.10.1: Establish seasonal survey times and methods.
  - PROJECT 5.10.2: Continue nocturnal spotlight surveys to locate and count alligators.
  - PROJECT 5.10.3: Record all data and document in GIS.

GOAL 6: MANAGE WILDLIFE POPULATIONS FOR HEALTH, SUSTAINABLE HUMAN USAGE AND COMPATIBILTY WITH ECOSYSTEM MANAGEMENT PRINCIPLES AND THE MILITARY MISSION.

- OBJECTIVE 6.1: Manage Whitetail Deer Population on Poinsett Range.
  - PROJECT 6.1.1: Continue nocturnal surveys for deer on Poinsett Range.
  - PROJECT 6.1.2: Evaluate data to estimate deer population and establish harvest limits.
  - PROJECT 6.1.3: Obtain antlerless deer tags as appropriate through the SCDNR Antlerless Deer Quota Program.
  - PROJECT 6.1.4: Maintain biological records of harvest and surveys to be used in management decisions.
  - PROJECT 6.1.5: Report survey results, biological data and harvest levels to SCDNR as required.
- OBJECTIVE 6.2: Manage Upland Bird Population (Turkey, dove, quail) on Poinsett Range.
  - PROJECT 6.2.1: Continue surveys for turkey, dove and quail on Poinsett Range.
  - PROJECT 6.2.2: Evaluate data to estimate turkey populations and establish harvest limits.
  - PROJECT 6.2.3: Evaluate population data for quail and dove to estimate populations and establish harvest limits if sustainable.
  - PROJECT 6.2.4: Maintain biological records of harvest and surveys to be used in management decisions.
  - PROJECT 6.2.5: Report survey results, biological data and harvest levels to SCDNR as required.
- OBJECTIVE 6.3: Manage Habitat for Non-listed Wildlife Species.
  - PROJECT 6.3.1: Continue prescribed fire programs to improve wildlife habitat.
  - PROJECT 6.3.2: Identify existing and potential sites for habitat enhancements.
  - PROJECT 6.3.3: Provide adequate area of suitable forage, cover and breeding habitat for non-listed wildlife species.
  - PROJECT 6.3.4: Construct additional wildlife areas on Poinsett Range for wildlife benefit utilizing openings and changes in timber stand stocking for wildlife.

  - PROJECT 6.3.5: Submit budget annually to AFCEC for fish and wildlife management.
  - PROJECT 6.3.6: Collect and deposit user fees for hunt programs.
- OBJECTIVE 6.4: Conduct whitetail deer hunting for population control, herd health and quality of life enhancement for Shaw AFB community.
  - PROJECT 6.4.1: Establish and maintain safe deer stands.
  - PROJECT 6.4.2: Establish and maintain safe shooting areas, clear of obstructions and safety hazards.
  - PROJECT 6.4.3: Document all deer stand hunt areas in GIS.
  - PROJECT 6.4.4: Brief all hunters on safety and hunting rules and regulations applicable to Poinsett Range.
  - PROJECT 6.4.5: Conduct hunts for deer when Poinsett Range is not in use in coordination with Range Management.
  - PROJECT 6.4.6: Survey hunters for suggestions on improvements to enhance customer experience.
- OBJECTIVE 6.5: Conduct turkey hunts for population control, herd health and quality of life enhancement for Shaw AFB community.
  - PROJECT 6.5.1: Establish and maintain safe turkey hunt areas with clearly defined buffer areas.
  - PROJECT 6.5.2: Document all turkey hunt areas in GIS.
  - PROJECT 6.5.3: Brief all hunters on safety and hunting rules and regulations applicable to Poinsett Range.
  - PROJECT 6.5.4: Conduct hunts for turkey when Poinsett Range is not in use in coordination with Range Management.
  - PROJECT 6.5.5: Survey hunters for suggestions on improvements to enhance customer experience.
- OBJECTIVE 6.6: Provide Disability Accessible Facilities for hunters.
  - PROJECT 6.6.1: Provide for handicap transportation to and from hunt stands and areas.
  - PROJECT 6.6.2: Construct at least two ground blinds suitable for wheelchairs.
- OBJECTIVE 6.7: Outreach/ Education.
  - PROJECT 6.7.1: Conduct a youth only deer hunt in cooperation with SCDNR.
  - PROJECT 6.7.2: Establish interpretive trails and outdoor educational opportunities of natural areas.
  - PROJECT 6.7.3: Disseminate information and brochures.
  - PROJECT 6.7.4: Conduct outreach/safety education seminars.

GOAL 7: PROMOTE PLANNING AND COORDINATION OF MILITARY ACTIVITIES TO MINIMIZE ECOSYSTEM IMPACTS.

- OBJECTIVE 7.1: Ensure the integration of military land uses and ecosystem management.
  - PROJECT 7.1.1: Involve natural resource staff early in military mission planning indicating the importance of the integration of military activities into ecosystem management at Shaw AFB and Poinsett Range.
  - PROJECT 7.1.2: Continue the environmental review process, evaluating projects and plans for impacts on ecosystem health.
  - PROJECT 7.1.3: Integrate ecosystem management principles into installation plans and programs during reviews.
  - PROJECT 7.1.4: Complete environmental assessments as necessary to determine the effects of military uses on biotic health and ecological integrity.

  - PROJECT 7.1.5: Participate in planning meetings with base leadership advising them of natural resource conservation issues.
- OBJECTIVE 7.2: Promote sound natural resource stewardship in ways that will contribute to accomplishing the military mission.
  - PROJECT 7.2.1: Educate and inform military users of the importance of sound natural resources stewardship.
  - PROJECT 7.2.2: Hold regular briefings with the base leadership to keep them informed of issues to be addressed.
  - PROJECT 7.2.3: Develop Best Management Practice for military land uses.

GOAL 8: DEVELOP AND MAINTAIN SUPPORT MECHANISMS AND INFRASTRUCTURE TO ACHIEVE ECOSYSTEM MANAGEMENT GOALS.

- OBJECTIVE 8.1: Update Habitat Inventory Data.
  - PROJECT 8.1.1: Maintain most current habitat inventory data in appropriate stand layer for use in the USFWS RCW foraging habitat matrix tool.
  - PROJECT 8.1.2: Evaluate habitat data for program management activities.
  - PROJECT 8.1.3: Periodically reassess stand delineations based on data collected.
- OBJECTIVE 8.2: Maintain GIS database of 20 CES/CEIEA Assets.
  - PROJECT 8.2.1: Ensure that GIS/GPS related hardware and software licenses are current.
  - PROJECT 8.2.2: Update GIS with relevant upgrades and service patches as appropriate.
  - PROJECT 8.2.3: Archive End of Year Data.
  - PROJECT 8.2.4: Conduct Quality Assurance/Quality Control audits on GIS Data for 20 CES/ CEIEA of both spatial and tabular data.
  - PROJECT 8.2.5: Ground truth GIS data not readily verified by other documentation.
  - PROJECT 8.2.6: Update datasets as new aerial photography is taken.
  - PROJECT 8.2.7: Collect GPS data of assets and activities to correct deficiencies as necessary.
- OBJECTIVE 8.3: Obtain resources necessary for ecosystem management.
  - PROJECT 8.3.1: Assess resources requirements, personnel, vehicles, etc.
  - PROJECT 8.3.2: Request resources as identified.
  - PROJECT 8.3.3: Integrate the budget process for all natural resources programs.
  - PROJECT 8.3.4: Ensure general security and personal safety for the protection of natural resources.
  - PROJECT 8.3.5: Provide the necessary manpower and enable natural resource staff efforts to perform with validated workloads.

GOAL 9: DEVELOP PARTNERSHIPS IN THE MANAGEMENT OF NATURAL RESOURCES.

- OBJECTIVE 9.1: Develop an open line of communication with regulatory agencies.
  - PROJECT 9.1.1: Identify specific points of contact for all regulatory agencies.
  - PROJECT 9.1.2: Consult with regulatory offices in a professional and courteous manner as needed.
  - PROJECT 9.1.3: Conduct/attend informal communications to maximize information exchange.
- OBJECTIVE 9.2: Strengthen partnerships with other conservation agencies and organizations.
  - PROJECT 9.2.1: Continue efforts to establish a regional wildland fire support module at Poinsett Range.

  - PROJECT 9.2.2: Establish/strengthen partnerships with other conservation agencies and organizations when feasible.
  - PROJECT 9.2.3: Continue active participation in RCW working groups.
- OBJECTIVE 9.3: Provide outreach to adjacent private landowners to promote natural resource stewardship.
  - PROJECT 9.3.1: Annually review identity and contact information of adjacent landowners to Shaw AFB and Poinsett Range.
  - PROJECT 9.3.2: Inform adjacent landowners of our ecosystem management program and projects of interests as appropriate.
  - PROJECT 9.3.3: Develop contact with adjacent landowners to exchange information on common interests such as prescribed burning.
  - PROJECT 9.3.4: Inform landowners adjacent to Poinsett Range of the occurrence of prescribed burns.
  - PROJECT 9.3.5: Inform private landowners about the RCW Safe Harbor Program in South Carolina and other federal landowner incentive programs as applicable.
- OBJECTIVE 9.4: Identify, encourage and support research that fosters ecosystem management goals.
  - PROJECT 9.4.1: Through the appropriate working groups, identify research needs and advocate funding.
  - PROJECT 9.4.2: Participate in local, regional and statewide forums and establish/maintain relationships with state and federal agencies and private and public educational and research institutions.

GOAL 10: EVALUATE ECOSYSTEMS TO PROVIDE ADAPTIVE MANAGEMENT FLEXIBILITY AND STRATEGIC FEEDBACK.

- OBJECTIVE 10.1: Establish a unified ecosystem evaluation approach to provide more flexibility for adaptive management.
  - PROJECT 10.1.1: Continue INRMP monthly goal tracker of natural resource projects.
  - PROJECT 10.1.2: Evaluate past project completion rates and current management style to identify obstacles.
  - PROJECT 10.1.3: Determine most effective management schemes that allow flexibility without significant impacts.
  - PROJECT 10.1.4: Implement the most effective decision making process to achieve natural resource management goals.
  - PROJECT 10.1.5: Continue weekly meetings with CEIEA staff to keep each other informed of activities, address current issues and improve coordination and cooperation of work efforts.
  - PROJECT 10.1.6: Plan for the uncertainty of ecosystem management and the unpredictable behavior of natural systems in the development of adaptive institutions and policy processes.
  - PROJECT 10.1.7: Revise goals, objectives and work plans as necessary.

9.0 INRMP IMPLEMENTATION, UPDATE, AND REVISION PROCESS

9.1 Natural Resources Management Staffing and Implementation

The Sikes Act, as amended, requires the preparation and implementation of an INRMP on military installations. Shaw AFB has had an active INRMP since March 1996. This INRMP is reviewed annually

as directed by AFI 32-7064. This INRMP will be implemented by actions to achieve the goals and objectives stated in Chapter 8. Projects, focused on the accomplishment of these goals and objectives, will form the foundation for budget requests from ACC. Each goal will be accomplished to the maximum extent possible if funding is available. Projects may be accomplished by contractors, in-house staff, volunteers, or through cooperative agreements with state and federal agencies or other private organizations. The Air Force programming procedures will be followed by Shaw AFB to request funding for these projects. The Shaw AFB organizations responsible for implementing the INRMP are identified in the table below.

Shaw AFB Organizations Responsible for INRMP Implementation

Shaw AFB Organization	INRMP Role
20 CES/CEIEA	Planning, Reviewing, Updating, Revising and Implementing all INRMP Work Plan Goals and Objectives
20 CES/CC	Annual Review Update/Approval, Delegated INRMP revision/approval
20 FW/CC	INRMP Revision/Approval (Delegated)

As required, NEPA compliance for projects will be assured through appropriate analysis pursuant to AFI 32-7061, *The Environmental Impact Analysis Process*, including categorical exclusions, environmental assessments, or environmental impact statements.

There are a number of organizations on Shaw AFB, Poinsett Range and WRA that are crucial to proper implementation of the INRMP.

Development and implementation of the overall INRMP is the responsibility of the Natural Resources Section, 20 CES/CEIEA. In addition, the 20 Civil Engineer Squadron plays a tremendous role in many additional fiscal and management oversight issues. Strong interaction occurs with several other CES functions including the Shaw Fire Department (20 CES/CEF); the Engineering Flight (20 CES/CEN); the CE Operations Flight (20 CES/CEO); the Housing Element (20 CES/CEIH) and the Resources Element (20 CES/CEIAF). As agencies within the overall Civil Engineer framework, these organizations provide various types of expertise and guidance in the planning, development and implementation of this INRMP.

Wing Safety and Airfield Operations play an important role in INRMP implementation supporting the BASH program. Coordination and cooperation with these organizations are crucial in protecting the safety and the airman and aircraft at Shaw AFB. 20 CES/CEIEA personnel serve on the Bash Hazard Working Group (BHWG), the Air Operations Board (AOB) and the Airspace Range Committee (ARC). The specifics duties of each organization are outlined in the BASH Plan in section 15.0 Associated Plans Tab 2.

There are five full-time Air Force Civilian Professional Staff members to support the implementation of the INRMP. In addition, cooperative agreements are in place to provide support in other key areas. At a minimum, funding to continue these contracts and full-time professionals will be required to ensure that this INRMP is fully implemented. The current breakdown of Natural Resource Professionals is detailed in the table below.

Natural Resource Professionals

Natural Resource Manager	GS-0401-12
Biological Scientist (Environmental) Endangered Species	GS-0401-11
Biological Scientist (Environmental) Cultural Resources, Wetlands	GS-0401-11
Biological Scientist (Environmental) Wildlife, Monitoring	GS-0401-11
Forester (Environmental) Forestry, Urban Forestry	GS-0460-11

9.2 Monitoring INRMP Implementation

Because of the dynamic nature of the natural resource program, there are expected variations in requirements during the course of a year. Some projects may be moved to a higher priority status than originally planned and some may be lowered or removed due to changes in ecosystems, work priorities or funding limitations. The INRMP implementation and monitoring effort will collect all changes and ensure they are appropriately reviewed and documented and INRMP planning altered to fit current ecosystem and military mission needs.

Close coordination exists between CEIEA and the 20 Operations Group (20 OG), primarily at Poinsett Range. The Range Operations Officer (ROO) at Poinsett Range is the daily contact point for integrating work efforts in natural and cultural resource with the mission support and training ongoing at Poinsett Range. Coordination with the Range Control Officer (RCO) and the Range Manager at Poinsett Range is paramount for safety concerns when conducting natural and cultural resources efforts at Poinsett Range. When the range is active, a large percentage of the property may be off limits. Frequent contact with precise information regarding location is necessary to ensure safety and security at the range. All incoming 20 CES/CEIEA staff report to the RCO upon arrival at the range and as locations change, verify with the RCO that this movement is acceptable from a range safety and security perspective. The RCO is always notified when any 20 CES/CEIEA personnel leave the range. The ROO is notified of any planned work efforts from 20 CES/CEIEA that potentially impact the mission. Coordination with the ROO and other range officials and 20 OG personnel is conducted as required to ensure negative mission impacts do not occur.

9.3 Annual INRMP Review and Update Requirements

AFI 32-7064 details specific criteria for the annual update review and approving authorities. The 20 FW/CC has delegated approving authority for the INRMP's annual updates and review to the 20 Civil Engineer Squadron Commander or Deputy Commander, dated May 4, 2006. This delegation also states that major revision authority for the INRMP will remain with the 20 Fighter Wing Commander or Vice-Commander.

During the annual review cycle each year, the Natural Resources Manager (NRM) will review all the accomplishments outlined in the previous year's approved work plans. The NRM will verify the results of INRMP implementation analyze the results and report findings as needed regarding what has and has not been accomplished. He will then work with the various program managers on the upcoming annual work plan submittal to ensure all appropriate needs are addressed in that years' work plans.

The annual reviews will incorporate all requirements of Section 2.6., "Annual INRMP Review and Coordination" as noted in AFI 32-7064.

10.0 ANNUAL WORK PLANS

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

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

PROJECT DATA – ANNUAL WORK PLAN **THREATENED AND ENDANGERED SPECIES SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	State and Federal Regulatory Compliance
Purpose of Project	To support the Air Force training mission by ensuring all federal and state regulatory requirements regarding the federally endangered red-cockaded woodpecker (RCW) and other protected species are met
Contribution to INRMP Management Goals and Mission Support	Maintain and restore native ecosystems (Goal 1) Develop and implement monitoring (Goal 3) Minimize military impacts to the ecosystem (Goal 6) Develop leadership in management of native systems (Goal 8) Support and enhance the military mission (Goal 10)
Location or Land Management Units	Poinsett Range Shaw AFB Wateree Recreational Area
Description and Schedule	Maintain all regulatory permits and submit annual reports to permitting agencies as required. Consult with the USFWS about projects that have the potential to impact federally listed threatened and endangered species ECD: 31 Dec
Material/Labor Requirements	Materials and labor provided by 20 CES/CEIEA
Source of Funds	Conservation Funding Level - 0
Required Outside Agency Coordination	USFWS SCDNR U.S. Geological Survey
Priority within this Annual Work Plan	High

Impact on Mission, Other Projects and Ecosystem Dynamics	Failure to remain in compliance with state and federal regulatory agencies could impact the Air Force training mission. Regulatory compliance is required to maintain authorizations that allow capture and handling of species protected by the Endangered Species Act and the Migratory Bird Treaty Act

PROJECT DATA - ANNUAL WORK PLAN **THREATENED AND ENDANGERED SPECIES SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Listed Species Survey and Monitoring
Purpose of Project	To support the Air Force training mission by maintaining an inventory of federally listed threatened and endangered species, federal candidate species, state-listed species and species of federal or state concern that occur, or have the potential to occur on properties administered by Shaw AFB
Contribution to INRMP Management Goals and Mission Support	Maintain and restore native ecosystems (Goal 1) Develop and implement monitoring (Goal 3) Minimize military impacts (Goal 6) Support and enhance the military mission (Goal 10)
Location or Land Management Units	Poinsett Range Shaw AFB Wateree Recreational Area
Description and Schedule	Annually review and update the inventory of protected and rare species that occur, or have the potential to occur, on properties administered by Shaw AFB. Develop projects to survey for and/or monitor applicable species as appropriate ECD: 30 Sep
Material/Labor Requirements	Materials and labor provided by 20 CES/CEIEA
Source of Funds	Conservation Funding Level - 0
Required Outside Agency Coordination	USFWSSCDNR
Priority within this Annual Work Plan	High - performed by permanent staff
Impact on Mission, Other Projects and Ecosystem Dynamics	New additions to the list of federally threatened and endangered species could impact the Air Force training mission; maintaining a current inventory will facilitate a rapid review and response if necessary. Also may impact existing and/or future projects related to forest and wildlife management

PROJECT DATA - ANNUAL WORK PLAN **THREATENED AND ENDANGERED SPECIES SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Red-cockaded Woodpecker (RCW) Population Monitoring
Purpose of Project	To support the Air Force training mission by documenting short and long-term population trends for the federally endangered RCW
Contribution to INRMP Management Goals and Mission Support	Maintain and restore native ecosystems (Goal 1) Develop and implement monitoring (Goal 3) Minimize military impacts to the ecosystem (Goal 6) Develop leadership in management of native systems (Goal 8) Implement adaptive management evaluation system (Goal 9) Support and enhance the military mission (Goal 10)

Location or Land Management Units	Poinsett Range
Description and Schedule	Monitor the RCW population during the nesting season (April through July). Determine the number of active clusters and potential breeding groups, determine the number of adults per breeding group, monitor active clusters for nests, band nestlings and determine fledging success ECD: 30 Sep
Material/Labor Requirements	Federal and state permits, elevated camera system, Swedish climbing ladders and belt, bird bands and banding pliers, binoculars and spotting scope and pole traps. Materials and labor provided by 20 CES/CEIEA and/or contractors
Source of Funds	Conservation Funding Level - 0
Required Outside Agency Coordination	USFWS SCDNR U.S. Geological Survey
Priority within this Annual Work Plan	High - performed by permanent staff
Impact on Mission, Other Projects and Ecosystem Dynamics	A declining trend in the RCW population could impact the Air Force training mission; monitoring will facilitate a rapid review and response if necessary. Monitoring is required to remain in compliance with the Endangered Species Act and the RCW Recovery Plan

PROJECT DATA – ANNUAL WORK PLAN **THREATENED AND ENDANGERED SPECIES SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Red-cockaded Woodpecker (RCW) Cluster/Cavity Management
Purpose of Project	To support the Air Force training mission by managing the nesting and roosting habitat for the federally endangered RCW
Contribution to INRMP Management Goals and Mission Support	Maintain and restore native ecosystems (Goal 1) Develop and implement monitoring (Goal 3) Minimize military impacts to the ecosystem (Goal 6) Develop leadership in management of native systems (Goal 8) Support and enhance the military mission (Goal 10)
Location or Land Management Units	Poinsett Range
Description and Schedule	Inspect RCW cavities during the nesting season (April through July) and at other times of the year as warranted. Repair or replace damaged cavities, remove competitors and manually remove hardwoods near cavity trees. Install artificial cavities to maintain a minimum of 4 suitable cavities per cluster and to create recruitment clusters as needed to promote population growth. Rake fuels away from cavity trees prior to burning ECD: 30 Sep
Material/Labor Requirements	Federal and state permits, binoculars and spotting scopes, artificial cavity boxes, Swedish climbing ladders and belt, elevated camera system, chainsaws, weed eaters and hand tools. Materials and labor provided by 20 CES/CEIEA and/or contractors
Source of Funds	Conservation Funding Level - 0
Required Outside Agency Coordination	USFWS
Priority within this Annual Work Plan	High - performed by permanent staff
Impact on Mission, Other Projects and Ecosystem Dynamics	Failure to manage RCW nesting and roosting habitat could impact the Air Force training mission. Cluster and cavity management is required to

	remain in compliance with the Endangered Species Act and the RCW Recovery Plan

PROJECT DATA – ANNUAL WORK PLAN **THREATENED AND ENDANGERED SPECIES SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Red-cockaded Woodpecker (RCW) Foraging Habitat Assessment
Purpose of Project	To support the Air Force training mission by monitoring foraging habitat conditions for the federally endangered RCW
Contribution to INRMP Management Goals and Mission Support	Maintain and restore native ecosystems (Goal 1) Develop and implement monitoring (Goal 3) Minimize military impacts to the ecosystem (Goal 6) Develop leadership in management of native systems (Goal 8) Implement adaptive management evaluation system (Goal 9) Support and enhance the military mission (Goal 10)
Location or Land Management Units	Poinsett Range
Description and Schedule	Monitor overstory, midstory and ground cover conditions in existing and potential RCW foraging habitat. Use habitat analysis software to assess current conditions relative to the standards established in the federal RCW Recovery Plan and to plan and prioritize management needs in specific stands ECD: 31 Dec 2018
Material/Labor Requirements	Data loggers, GPS units and RCW Foraging Matrix software. Materials and labor provided by 20 CES/CEIEA and/or contractors
Source of Funds	Conservation Funding Level - 0
Required Outside Agency Coordination	USFWS
Priority within this Annual Work Plan	High – performed by permanent staff if contractor not available
Impact on Mission, Other Projects and Ecosystem Dynamics	A declining trend in the RCW habitat quality could impact the Air Force training mission; monitoring will facilitate a rapid review and response if necessary. Monitoring is required to remain in compliance with the Endangered Species Act and the RCW Recovery Plan

PROJECT DATA – ANNUAL WORK PLAN **THREATENED AND ENDANGERED SPECIES SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Red-cockaded Woodpecker (RCW) Translocation
Purpose of Project	To support the Air Force training mission by maintaining or increasing the size of the federally endangered RCW population
Contribution to INRMP Management Goals and Mission Support	Maintain and restore native ecosystems (Goal 1) Minimize military impacts to the ecosystem (Goal 6) Develop leadership in management of native systems (Goal 8) Support and enhance the military mission (Goal 10)
Location or Land Management Units	Poinsett Range
Description and Schedule	When necessary, translocate sub adult RCWs between 15 September and 1 January to augment recruitment clusters, improve spatial arrangement of groups and provision single birds with mates. ECD: 31 Dec
Material/Labor Requirements	Federal and state permits, Swedish climbing ladders and belt, pole traps, spotting scopes and binoculars and transport boxes. Materials and labor

	provided by 20 CES/CEIEA and/or contractors
Source of Funds	Conservation Funding Level - 1
Required Outside Agency Coordination	USFWS SCDNR
Priority within this Annual Work Plan	Medium - performed by permanent staff if required
Impact on Mission, Other Projects and Ecosystem Dynamics	A decline in the RCW population could impact the Air Force training mission. Translocation is an effective tool that can be used to reverse population declines and remain in compliance with the Endangered Species Act and the RCW Recovery Plan

PROJECT DATA – ANNUAL WORK PLAN

Threatened and Endangered Species
SHAW AFB, SC
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

Project Name	Longleaf Pine Ecosystem Restoration
Purpose of Project	To support the Air Force training mission by restoring the native longleaf pine ecosystem and red-cockaded woodpecker (RCW) habitat by under planting stands of off-site pine (slash and loblolly) with longleaf pine
Contribution to INRMP Management Goals and Mission Support	Integrate all natural resources management functions (Goal 1) Maintain and restore native ecosystems (Goal 2) Manage landscape for enhanced biodiversity (Goal 3) Minimize ecosystem impacts (Goal 7) Develop partnerships (Goal 9) Evaluate ecosystems for adaptive management (Goal 10)
Location or Land Management Units	Poinsett Range
Description and Schedule	Identify and prepare stands to be under planted (October through January); plant seedlings (January or February); monitor results from (year-round).
Material/Labor Requirements	Containerized longleaf pine seedlings and equipment required to hand plant seedlings. Materials and labor provided by 20 CES/CEIEA and/or the U.S. Fish and Wildlife Service with funds obtained through AFCEC
Source of Funds	Conservation Funding Level - 0

Required Outside Agency Coordination	U.S. Fish and Wildlife Service
Priority within this Annual Work Plan	High - performed by permanent staff and/or contractors
Impact on Mission, Other Projects and Ecosystem Dynamics	Failure to restore the longleaf pine ecosystem at Poinsett Range could impact the Air Force training mission. Restoration of the longleaf pine ecosystem is required to maintain compliance with the Sikes Act and the RCW Recovery Plan

PROJECT DATA – ANNUAL WORK PLAN **THREATENED AND ENDANGERED SPECIES SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Hardwood Midstory Control
Purpose of Project	To support the Air Force training mission by maintaining suitable midstory habitat conditions for the federally endangered RCW
Contribution to INRMP Management Goals and Mission Support	Maintain and restore native ecosystems (Goal 1) Minimize military impacts to the ecosystem (Goal 6) Develop leadership in management of native systems (Goal 8) Support and enhance the military mission (Goal 10)
Location or Land Management Units	Poinsett Range
Description and Schedule	Use prescribed fire, hand clearing, mechanical mowing, fuel chipping, herbicides and/or pine straw raking as needed to control hardwood vegetation in RCW clusters and foraging habitat. ECD: 30 Sep
Material/Labor Requirements	Chainsaws, weed eaters, hand tools, tractor and bush hog, herbicides and herbicide application equipment. Materials and labor provided by 20 CES/CEIEA and/or contractors
Source of Funds	Conservation Funding Level - 0
Required Outside Agency Coordination	USFWS
Priority within this Annual Work Plan	High - performed by permanent staff and/or contractors
Impact on Mission, Other Projects and Ecosystem Dynamics	Failure to maintain suitable midstory conditions in RCW habitat could impact the Air Force training mission. Management of midstory hardwoods is required to remain in compliance with the Endangered Species Act and the RCW Recovery Plan

PROJECT DATA – ANNUAL WORK PLAN

Threatened and Endangered Species
SHAW AFB, SC
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

Project Name	Native Groundcover Restoration
Purpose of Project	To support the Air Force training mission by restoring native groundcover vegetation at Poinsett Range to improve the quality of the longleaf pine ecosystem and red-cockaded woodpecker (RCW) habitat
Contribution to INRMP Management Goals and Mission Support	Integrate all natural resources management functions (Goal 1) Maintain and restore native ecosystems (Goal 2) Manage landscape for enhanced biodiversity (Goal 3) Minimize ecosystem impacts (Goal 7) Develop partnerships (Goal 9) Evaluate ecosystems for adaptive management (Goal 10)
Location or Land Management Units	Poinsett Range
Description and Schedule	Determine appropriate groundcover species to plant, purchase seed and identify and prepare sites for planting from (October through February); plant seed (April and May); monitor results(year-round)
Material/Labor Requirements	Seed, herbicides and equipment to apply herbicides and plant seed. Materials and labor provided by 20 CES/CEIEA and/or by the U.S. Fish and Wildlife Service with funds obtained through AFCEC
Source of Funds	Conservation Funding Level - 0
Required Outside Agency Coordination	U.S. Fish and Wildlife Service
Priority within this Annual Work Plan	High - performed by permanent staff and/or contractors
Impact on Mission, Other Projects and Ecosystem Dynamics	Failure to restore native groundcover vegetation at Poinsett Range could impact the Air Force training mission. Improving the quality of the longleaf pine ecosystem and RCW habitat is required to maintain compliance with the Sikes Act and the RCW Recovery Plan

PROJECT DATA – ANNUAL WORK PLAN **THREATENED AND ENDANGERED SPECIES SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Least Tern Monitoring
Purpose of Project	To support the Air Force training mission by monitoring least tern

	nesting activity on buildings with gravel roofs; the least tern is listed as Threatened by the State of South Carolina
Contribution to INRMP Management Goals and Mission Support	Develop and implement monitoring (Goal 3) Minimize military impacts to the ecosystem (Goal 6) Implement adaptive management evaluation system (Goal 9) Support and enhance the military mission (Goal 10)
Location or Land Management Units	Shaw AFB
Description and Schedule	Monitor buildings with gravel roofs during the least tern nesting season (May through July) to determine presence or absence of nesting activity; count the number of adults and nests on roofs where least terns are nesting. ECD: 1 Aug
Material/Labor Requirements	Spotting scope and binoculars. Materials and labor provided by 20 CES/CEIEA
Source of Funds	Conservation Funding Level - 1
Required Outside Agency Coordination	USFWS SCDNR
Priority within this Annual Work Plan	Low - performed by permanent staff
Impact on Mission, Other Projects and Ecosystem Dynamics	Failure to identify roofs with nesting least terns could impact the Air Force training mission. Monitoring will facilitate a rapid review and response to proposed activities that would disturb least terns during the nesting season.

PROJECT DATA – ANNUAL WORK PLAN **FORESTRY SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Timber Sale Set-up at Poinsett Range
Purpose of Project	Maintain or improve wildlife habitat, especially for RCW, salvage damaged trees, increase stocking of longleaf pine relative to other species, eliminate off-site plantings
Contribution to INRMP Management Goals and Mission Support	Support and enhance the military mission (Goal 1) Maintain and restore native ecosystems (Goal 2) Manage for Sustainable Uses of Natural Resources (Goal 3) Develop and implement monitoring (Goal 4)
Location or Land Management Units	Stands and acreages to be determined based on updated stand boundaries, volumes and ecosystem needs
Description and Schedule	Coordinate with other 20 CES/CEIEA staff, set priorities for areas to treat. Submit recommended harvest for USFWS for approval. Begin roadwork and marking as soon as approval is received. ECD: 1 Dec
Material/Labor Requirements	Set up by Forester Harvesting done by Contract Logging Crew
Source of Funds	Funding Level – 0
Required Outside Agency Coordination	USFWS approval needed because of impact on RCW
Priority within this Annual Work Plan	High

Impact on Mission, Other Projects and Ecosystem Dynamics	Improves health of forest ecosystems, improves habitat for RCW, provides income for Air Force Forestry program

PROJECT DATA – ANNUAL WORK PLAN **FORESTRY SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Timber Sale Administration at Poinsett Range
Purpose of Project	Maintain or improve wildlife habitat, especially for RCW, salvage damaged trees, increase stocking of longleaf pine relative to other species, eliminate off-site plantings
Contribution to INRMP Management Goals and Mission Support	Support and enhance the military mission (Goal 1) Maintain and restore native ecosystems (Goal 2) Manage for Sustainable Uses of Natural Resources (Goal 3) Develop and implement monitoring (Goal 4)
Location or Land Management Units	Stands to be treated, acreages and treatments determined by inspection by 20 CES/CEIEA staff
Description and Schedule	Market all forest products via Small Lot Sales to increase efficiency. Prepare detailed contract for each sale. Solicit sealed bids from all interested/qualified bidders. Coordinate oversight during harvest, including ingress-egress, safety briefing, radio availability, work needed to repair damage, etc. Check settlements for accuracy, submit proceeds. ECD: 31 Dec
Material/Labor Requirements	Oversight by Forester and other 20 CES/CEIEA staff Harvesting done by Contract Logging Crew
Source of Funds	Funding Level – 0
Required Outside Agency Coordination	USFWS approval needed because of impact on RCW habitat.
Priority within this Annual Work Plan	Med
Impact on Mission, Other Projects and Ecosystem Dynamics	Improves health of forest ecosystems, improves habitat for RCW, provides income for Air Force Forestry program

PROJECT DATA - ANNUAL WORK PLAN **FORESTRY SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Forest Health Monitoring
Purpose of Project	Early detection of insect outbreaks, disease outbreaks and damage caused by fire, herbicides, ice storms, windstorms, etc., to facilitate timely response to minimize damage
Contribution to INRMP Management Goals and Mission Support	Support and enhance the military mission (Goal 1) Maintain and restore native ecosystems (Goal 2) Develop and implement monitoring (Goal 4) Develop/Maintain mechanisms for Ecosystem Goals (Goal 8)
Location or Land Management Units	Poinsett Range in entirety; in addition, planted pine portions of Shaw AFB
Description and Schedule	On-going evaluation of stand health, noting location and type of problems. Base Forester to follow-up and solicit additional assistance as warranted and consult with other 20 CES/CEIEA personnel if action is needed.

	As Needed, ECD: 31 Dec
Material/Labor Requirements	In-house staff
Source of Funds	Forestry & Conservation Funding Level – 0
Required Outside Agency Coordination	United States Forest Service & South Carolina Forestry Commission (SCFC) may be needed for diagnosis. United States Fish and Wildlife Service (USFWS) may be needed if undertaking might impact Red-cockaded Woodpecker (RCW)
Priority within this Annual Work Plan	Med
Impact on Mission, Other Projects and Ecosystem Dynamics	Failure to identify and correct problems promptly could lead to widespread damage to native ecosystems and impair restoration efforts and improvements.

PROJECT DATA - ANNUAL WORK PLAN **FORESTRY SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Urban Forestry: Arbor Day, Tree City, maintenance & removals
Purpose of Project	Sustain or improve quality of the urban forest resources on Shaw AFB
Contribution to INRMP Management Goals and Mission Support	Support and enhance the military mission (Goal 1) Manage for Sustainable Uses of Natural Resources (Goal 3) Develop leadership in management of native systems (Goal 9)
Location or Land Management Units	All Shaw AFB land northwest of airfield plus developed areas southeast of airfield; (undeveloped pine plantations are potential timber production areas until developed)
Description and Schedule	Entire year: Review all plans for tree removals and planting of new shade trees on Base, recommend needed changes to improve success of planting projects. Hold Arbor Day observance. Work with Public Affairs to set up, publicize and report on observances held. December: submit application for Tree City recertification to SCFC ECD: 10 June
Material/Labor Requirements	Removals, plantings, & maintenance done by contractors through CEOSS and Housing Privatization; Arbor Day & Tree City sessions by Base Forester
Source of Funds	CES and Conservation Funding Level – 0
Required Outside Agency Coordination	SCFC, Clemson University Extension Service, Arbor Day Foundation
Priority within this Annual Work Plan	Med
Impact on Mission, Other Projects and Ecosystem Dynamics	Meeting Tree City requirements and increasing Urban Forestry knowledge will help meet mandated Quality of Life Initiative at Shaw AFB

PROJECT DATA – ANNUAL WORK PLAN **BIRD/WILDLIFE AIR STRIKE HAZARD SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Obtain all permits as necessary to conduct Bird/Aircraft Strike Hazard (BASH) Reduction
Purpose of Project	To provide for the removal of animals that pose a risk for BASH

Contribution to INRMP Management Goals and Mission Support	Promote planning and coordination of military activities (Goal 6) Support and enhance the military mission (Goal 10)
Location or Land Management Units	Shaw AFB
Description and Schedule	Permits to be renewed annually or obtained on an as needed basis. Permit applications and reporting requirements must be coordinated as appropriate and is used for programming justification ECD: 31 Dec
Material/Labor Requirements	None
Source of Funds	None
Required Outside Agency Coordination	USFWS, SCDNR, USDA/WS
Priority within this Annual Work Plan	High – performed by permanent staff
Impact on Mission, Other Projects and Ecosystem Dynamics	Provides safety for airman and aircraft; Coordinate with Wing Safety (20 FW/SEF)

PROJECT DATA - ANNUAL WORK PLAN **BIRD/WILDLIFE AIR STRIKE HAZARD SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Conduct Bird/Aircraft Strike Hazard (BASH) Reduction
Purpose of Project	To reduce likelihood of collision between military aircraft and wildlife
Contribution to INRMP Management Goals and Mission Support	Promote planning and coordination of military activities (Goal 6) Support and enhance the military mission (Goal 10) Implement an exotic species management program (Goal 4)
Location or Land Management Units	Shaw AFB in entirety and Poinsett Range if necessary
Description and Schedule	Conduct BASH surveys as needed in coordination with 20 FW/SEF. Waterfowl and wildlife removal is performed as needed by hazing and depredation in a coordinated effort with 20 FW/SEF and Air Field Operations (20 OSS/OSSA). Annual reporting required to USFWS and SCDNR ECD: 31 Dec
Material/Labor Requirements	1 -2 persons; Assist as needed and provide equipment when available and feasible.
Source of Funds	None
Required Outside Agency Coordination	Required permits obtained through consultation with USFWS, SCDNR and USDA/WS as required.
Priority within this Annual Work Plan	High - performed by permanent staff
Impact on Mission, Other Projects and Ecosystem Dynamics	Provides safety for airman and aircraft; Coordinate with Wing Safety

PROJECT DATA - ANNUAL WORK PLAN **BIRD/WILDLIFE AIR STRIKE HAZARD SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Manage Habitat to Dissuade Wildlife Species Contributing to Bird/Aircraft Strike Hazard (BASH) on Shaw AFB

Purpose of Project	To keep base habitat from being attractive for species contributing to BASH
Contribution to INRMP Management Goals and Mission Support	Manage for human uses (Goal 2) Promote planning and coordination of military activities (Goal 6) Support and enhance the military mission (Goal 10)
Location or Land Management Units	Wetlands on north end of base, wooded areas, base ponds, flight line
Description and Schedule	Provide advice on habitat management to reduce and minimize BASH risks. Includes removal, maintenance height or attraction away from high risk areas.
Material/Labor Requirements	20 CES/CEIEC advisory to Bash Hazard Working Group (BHWG) and Grounds Maintenance Contract ECD: 31 Dec
Source of Funds	None
Required Outside Agency Coordination	Coordinate with 20 FW/SEF and 20 OSS/OSSA. Member of BHWG
Priority within this Annual Work Plan	Med - performed by permanent staff
Impact on Mission, Other Projects and Ecosystem Dynamics	Provides safety for airman and aircraft; Coordinate with 20 FW/SEF

PROJECT DATA - ANNUAL WORK PLAN **BIRD/WILDLIFE AIR STRIKE HAZARD SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Maintain Updated List of Bird/Aircraft Strike Hazard (BASH) Species Posing Potential or Actual risk
Purpose of Project	Maintain record of species occurring on Shaw AFB that may attribute to BASH
Contribution to INRMP Management Goals and Mission Support	Ecosystem management (Goal 1) Develop and implement monitoring (Goal 3) Support and enhance the military mission (Goal 10)
Location or Land Management Units	Shaw AFB in entirety
Description and Schedule	Continually throughout the year. Data derived from BASH surveillance and casual observations ECD: 31 Dec
Material/Labor Requirements	Reportable observations and records maintained in coordination with 20 FW/SEF and 20 OSS/OSSA
Source of Funds	None
Required Outside Agency Coordination	None
Priority within this Annual Work Plan	Low - performed by permanent staff
Impact on Mission, Other Projects and Ecosystem Dynamics	Provides safety for airman and aircraft; Coordinate with 20 FW/SEF

PROJECT DATA - ANNUAL WORK PLAN **WETLANDS SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Ensure wetland delineations are current and accurate
Purpose of Project	To locate jurisdictional wetlands to meet mission planning requirements

	and maintain compliance with current regulations
Contribution to INRMP Management Goals and Mission Support	Maintain and restore the health and integrity of native systems (Goal 1) Promote planning and coordination of military activities (Goal 6) Support and enhance the military mission (Goal 10)
Location or Land Management Units	Shaw AFB
Description and Schedule	Ensure all wetlands on Shaw AFB have been delineated for planning purposes. ECD: 31 Dec
Material/Labor Requirements	20 CES/CEIEA employee labor
Source of Funds	Conservation Funding Level – 1
Required Outside Agency Coordination	US Army Corp of Engineers (USACE)
Priority within this Annual Work Plan	Low - performed by permanent staff
Impact on Mission, Other Projects and Ecosystem Dynamics	Provides for mission infrastructure improvements without delays; No impact on other projects

PROJECT DATA – ANNUAL WORK PLAN **WILDLAND FIRE MANAGEMENT SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Prescribed Fire Training and Documentation
Purpose of Project	To support the Air Force training mission by ensuring 20 CES/CEIEA and/or personnel provided by the Air Force Wildland Fire Center meet the minimum training requirements to participate in prescribed burns
Contribution to INRMP Management Goals and Mission Support	Restore and maintain native ecosystems (Goal 1) Develop mechanisms to achieve management goals (Goal 7) Support and enhance the military mission (Goal 10)
Location or Land Management Units	NA
Description and Schedule	Minimum prescribed fire training requirements are S-130 Basic Firefighter, S-190 Introduction to Fire Behavior and I- 100 Basic Incident Command System. Burn Boss must be a certified Prescribed Fire Burn Boss Type 2 (RXB2). Each year, all personnel must attend Annual Fire line Safety Refresher training (RT-130) and pass the moderate-level work capacity test (hike 2 miles with a 25-pound pack in 30 minutes or less). All personnel must maintain current certifications in CPR and standard first aid. Personnel permanently stationed at Shaw AFB must also attend the S.C. Forestry Commission's Certified Prescribed Fire Manager course ECD: 31 Dec
Material/Labor Requirements	None
Source of Funds	Conservation Funding Level - 0
Required Outside Agency Coordination	S.C. Forestry Commission U.S. Forest Service USFWS
Priority within this Annual Work Plan	Med - coordination performed by permanent staff
Impact on Mission, Other Projects and Ecosystem Dynamics	A lack of qualified prescribed fire personnel could impact the Air Force training mission. Prescribed fire is required to manage habitat for the federally endangered red-cockaded woodpecker (RCW) and to remain in compliance with the Endangered Species Act and the RCW Recovery Plan. Only qualified personnel can participate in prescribed burns

PROJECT DATA – ANNUAL WORK PLAN **WILDLAND FIRE MANAGEMENT SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Firebreak Maintenance
Purpose of Project	To support the Air Force training mission by developing and maintaining a system of firebreaks to use when conducting prescribed fires and to facilitate access and firefighting operations in the event of a wildfire
Contribution to INRMP Management Goals and Mission Support	Maintain and restore native ecosystems (Goal 1) Protect and preserve cultural resources (Goal 5) Develop mechanisms to achieve management goals (Goal 7) Support and enhance the military mission (Goal 10)
Location or Land Management Units	Poinsett Range
Description and Schedule	Firebreaks associated with areas where prescribed burns are planned will be refreshed or created by plowing, disking, or raking. Firebreak maintenance will occur as needed throughout the year and existing breaks will be used as much as possible ECD: 31 Dec
Material/Labor Requirements	Tractors, plows, disc harrows, hay rakes, bulldozers, chain saws, pole saws and hand tools. Materials and labor provided by 20 CES/CEIEA and/or the Air Force Wildland Fire Center
Source of Funds	Conservation Funding Level - 0
Required Outside Agency Coordination	S.C. Forestry Commission
Priority within this Annual Work Plan	Med – performed by permanent staff and/or personnel provided by the Air Force Wildland Fire Center
Impact on Mission, Other Projects and Ecosystem Dynamics	Failure to maintain an effective firebreak system could impact the Air Force training mission. Firebreaks are needed to protect valuable training assets from wildfires and to conduct prescribed burns, which are required to manage habitat for the federally endangered red-cockaded woodpecker (RCW) and to remain in compliance with the Endangered Species Act and the RCW Recovery Plan. New firebreaks will not be placed within 200 feet of an RCW cavity tree or within eligible cultural sites, but existing firebreaks within eligible cultural sites may be maintained

PROJECT DATA – ANNUAL WORK PLAN **WILDLAND FIRE MANAGEMENT SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Plan and Conduct Prescribed Fires
Purpose of Project	To support the Air Force training mission by reducing hazardous fuels, improving access and managing habitat for the federally endangered red-cockaded woodpecker (RCW) and other wildlife species.
Contribution to INRMP Management Goals and Mission Support	Maintain and restore native ecosystems (Goal 1) Develop mechanisms to achieve management goals (Goal 7) Support and enhance the military mission (Goal 10)
Location or Land Management Units	Poinsett Range
Description and Schedule	Prescribed burns may be conducted at any time, but primarily will occur from November through July. ECD: 30 Sep
Material/Labor Requirements	Personal protective equipment, wildland fire engines, water pumpers, tractors, discs, plows, rakes, flappers, fuel, drip torches and all-terrain vehicles. Materials and labor provided by 20 CES/CEIEA and/or the

	Air Force Wildland Fire Center
Source of Funds	Conservation Funding Level - 0
Required Outside Agency Coordination	Shaw AFB Fire Department S.C. Forestry Commission Sumter Fire Department
Priority within this Annual Work Plan	Med –Performed by permanent staff and/or personnel provided by the Air Force Wildland Fire Center
Impact on Mission, Other Projects and Ecosystem Dynamics	Failure to conduct prescribed burns could impact the Air Force training mission. Prescribed burning provides direct mission support through annual burning of the areas around the targets, which has reduced the number of training-related wildfires by 95% per the Range Operations Officer. Prescribed fire is required to manage habitat for the federally endangered RCW and to remain in compliance with the Endangered Species Act and the RCW Recovery Plan. Prescribed fire also is required to restore natural ecological communities and to minimize the chances of catastrophic wildfires by reducing fuel loads

PROJECT DATA – ANNUAL WORK PLAN **WILDLAND FIRE MANAGEMENT SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Wildland Fire Documentation and Monitoring
Purpose of Project	To support the Air Force training mission by documenting the dates and locations of prescribed fires and wildfires and monitoring their short and long-term effects
Contribution to INRMP Management Goals and Mission Support	Maintain and restore native ecosystems (Goal 1) Develop and implement monitoring (Goal 3) Implement adaptive management evaluation system (Goal 9) Support and enhance the military mission (Goal 10)
Location or Land Management Units	Poinsett Range Shaw AFB Wateree Recreational Area
Description and Schedule	All prescribed fires and all wildfires will be documented in the 20 CES/CEIEA GIS database and reported to the Air Force Wildland Fire Center. Effects will be monitored using a variety of methods including visual inspections, photographic plots, long-term monitoring plots and red-cockaded woodpecker (RCW) foraging habitat data. ECD: 30 Sep
Material/Labor Requirements	Portable GPS units, GIS software, digital cameras and data loggers. Materials and labor provided by 20 CES/CEIEA and/or the Air Force Wildland Fire Center
Source of Funds	Conservation Funding Level - 0
Required Outside Agency Coordination	None
Priority within this Annual Work Plan	Med - performed by permanent staff and/or personnel provided by the Air Force Wildland Fire Center
Impact on Mission, Other Projects and Ecosystem Dynamics	Failure to monitor the effects of prescribed fires and wildfires could impact the Air Force training mission. Monitoring is required to determine if prescribed burns are meeting their objectives and to assess the amount of damage caused by wildfires. An effective prescribed fire program is required to manage habitat for the federally endangered RCW and to remain in compliance with the Endangered Species Act and the RCW Recovery Plan.

PROJECT DATA – ANNUAL WORK PLAN **WILDLAND FIRE MANAGEMENT SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Wildland Fire Technical Assistance
Purpose of Project	To support the Air Force training mission by providing information and assistance to the Shaw AFB Fire Department on issues related to wildland fire
Contribution to INRMP Management Goals and Mission Support	Maintain and restore native ecosystems (Goal 1) Minimize military impacts (Goal 6) Implement adaptive management evaluation system (Goal 9) Support and enhance the military mission (Goal 10)
Location or Land Management Units	Poinsett Range Shaw AFB Wateree Recreational Area
Description and Schedule	Upon request, 20 CES/CEIEA and/or personnel provided by the Air Force Wildland Fire Center will assist Shaw AFB Fire Department personnel with wildland fire risk assessment and training activities. During a wildfire event, 20 CES/CEIEA personnel will serve only as resource advisors but personnel provided by the Air Force Wildland Fire Center may engage in firefighting activities if requested by Shaw AFB Fire Department. ECD: 30 Sep
Material/Labor Requirements	None Funding Level - 1
Source of Funds	Conservation
Required Outside Agency Coordination	S.C. Forestry Commission Sumter Fire Department Kershaw County Fire Service
Priority within this Annual Work Plan	Low - performed by permanent staff and/or personnel provided by the Air Force Wildland Fire Center
Impact on Mission, Other Projects and Ecosystem Dynamics	Wildland fire risk assessments supports the Air Force mission by identifying assets that are vulnerable to catastrophic wildfires and providing information needed to develop plans for protecting those assets. Assisting Shaw AFB Fire Department with training activities helps ensure qualified personnel are available to respond in the event of a wildfire

PROJECT DATA - ANNUAL WORK PLAN **INVASIVES, SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Invasive Plants
Purpose of Project	To locate, identify and control invasive and exotic plant species on Poinsett Range and determine threat and level of invasive species infestation to protect ecosystems and prevent negative impact on Training Mission.
Contribution to INRMP Management Goals and Mission Support	Support and enhance the military mission (Goal 1) Maintain and restore native ecosystems (Goal 2) Manage for sustainable uses of Natural Resources (Goal 3) Develop and implement monitoring (Goal 4)
Location or Land Management Units	Poinsett Range
Description and Schedule	Survey all of Poinsett Range to locate and identify invasive plant species. Work by staff or contract will be coordinated within

	Natural/Cultural Resources and Range Operations as to date and times. ECD: 30 Sep
Material/Labor Requirements	2-5 people, Expert botanist for plant identification
Source of Funds	Conservation Funding Level 1
Required Outside Agency Coordination	Proper notification to USFWS, SCDNR, Clemson University Extension Service and USDA APHIS as necessary.
Priority within this Annual Work Plan	Med
Impact on Mission, Other Projects and Ecosystem Dynamics	Invasive species have the potential to destroy entire ecosystems and would negatively the Air Forces ability to provide a natural environment for training. Work by staff or contract will be coordinated within Natural/Cultural Resources and Range Operations as to date and times.

PROJECT DATA - ANNUAL WORK PLAN **INVASIVES SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Invasive Wildlife
Purpose of Project	To locate, identify and control invasive, nuisance or predator animals on Poinsett Range and Shaw AFB and determine threat and level of invasive species infestation to protect ecosystems and prevent negative impact on Training Mission.
Contribution to INRMP Management Goals and Mission Support	Support and enhance the military mission (Goal 1) Maintain and restore native ecosystems (Goal 2) Manage for sustainable uses of Natural Resources (Goal 3) Develop and implement monitoring (Goal 4)
Location or Land Management Units	Shaw AFB and Poinsett Range
Description and Schedule	Survey all of Shaw AFB and Poinsett Range to locate, identify and control invasive/nuisance/predator animal species. Priority to control species contributing to BASH on Shaw AFB. Work by staff or contract will be coordinated within Natural/Cultural Resources, Flight Operations, Range Operations and Security Forces as to date and times. ECD: 30 Sep
Material/Labor Requirements	2-5 people, Expert Animal Control Biologists, USDA Wildlife Services
Source of Funds	Conservation Funding Level 1
Required Outside Agency Coordination	USDA Wildlife Services, Columbia SC
Priority within this Annual Work Plan	Med
Impact on Mission, Other Projects and Ecosystem Dynamics	Invasive and nuisance animal species have the potential to destroy entire ecosystems and would negatively the Air Forces ability to provide a natural environment for training. Work by staff or contract will be coordinated within Natural/Cultural Resources and Range Operations as to date and times.

PROJECT DATA – ANNUAL WORK PLAN **GEOGRAPHIC INFORMATION SYSTEMS SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Update Habitat Inventory Data

Purpose of Project	To populate timber stand information in GIS and RCW foraging partitions with most current overstory, midstory and groundcover data collected in habitat inventory cruise
Contribution to INRMP Management Goals and Mission Support	Develop and implement monitoring (Goal 3) Develop and implement exotic species mgmt. (Goal 4) Minimize military impacts to the ecosystem (Goal 6) Develop mechanisms to achieve management goals (Goal 7) Develop leadership in management of native systems (Goal 8) Implement adaptive management evaluation system (Goal 9) Support and enhance the military mission (Goal 10)
Location or Land Management Units	Poinsett Range
Description and Schedule	Maintain most current habitat inventory data in appropriate stand layer for use in the USFWS RCW foraging habitat matrix tool and for program management activities. Periodically reassess stand delineations based on data collected. ECD: 30 Sep
Material/Labor Requirements	GIS software licenses, desktop computers and GPS data collection hardware. Participation from the Endangered Species Manager. Field data collection
Source of Funds	Conservation Level of Funding – 1
Required Outside Agency Coordination	NA
Priority within this Annual Work Plan	Med - performed by permanent staff if contractor not available
Impact on Mission, Other Projects and Ecosystem Dynamics	This project will generate polygons that will be the primary land management units on Poinsett Range. To provide current data for RCW foraging habitat analyses and other GIS projects

PROJECT DATA – ANNUAL WORK PLAN **GEOGRAPHIC INFORMATION SYSTEMS SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Maintain GIS licensing, updates/upgrades.
Purpose of Project	To ensure that GIS/GPS related hardware and software licenses are kept current and updated with relevant upgrades and service patches.
Contribution to INRMP Management Goals and Mission Support	Supports all goals of INRMP
Location or Land Management Units	NA
Description and Schedule	All software licenses will be kept current, hardware system upgrades and software updates will be performed as needed to ensure uninterrupted service for program managers. This process is ongoing and continuous. ECD: 1 July
Material/Labor Requirements	In-house technical expertise
Source of Funds	Conservation Level of Funding – 1
Required Outside Agency Coordination	NA
Priority within this Annual Work Plan	Low
Impact on Mission, Other Projects and	These tasks ensure uninterrupted GIS/GPS service for program managers.

Ecosystem Dynamics	

PROJECT DATA - ANNUAL WORK PLAN **GEOGRAPHIC INFORMATION SYSTEMS SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Archive End of Year Data
Purpose of Project	To preserve a snapshot of annual conditions on Poinsett Range that can be used in long-term management decisions
Contribution to INRMP Management Goals and Mission Support	Supports all INRMP goals thru preservation of historical data
Location or Land Management Units	NA
Description and Schedule	All GIS data will be archived annually and as needed. This ensures snapshots of conditions and activities at Poinsett Range will be preserved. Project to be accomplished in January of each year and as required for certain datasets ECD: 30 Sep
Material/Labor Requirements	In-house technical expertise
Source of Funds	Conservation Level of Funding – 1
Required Outside Agency Coordination	NA
Priority within this Annual Work Plan	Low
Impact on Mission, Other Projects and Ecosystem Dynamics	This impacts future projects by allowing program managers to incorporate historical conditions and activities into the decision making process

PROJECT DATA - ANNUAL WORK PLAN **GEOGRAPHIC INFORMATION SYSTEMS SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	GIS Quality Assurance/Quality Control
Purpose of Project	To ensure data held in the GIS is spatially accurate and relevant
Contribution to INRMP Management Goals and Mission Support	Supports all goals of INRMP
Location or Land Management Units	NA
Description and Schedule	This is a continuous project that involves verifying accuracy of both spatial and tabular data stored in the GIS. This process can include ground truthing data not readily verified by other documentation, updating datasets as new aerial photography is taken, GPS data collection and correcting other errors as they are found ECD: 30 Sep
Material/Labor Requirements	GIS software licenses, desktop computers, GPS data collection hardware. Coordination with all program managers and limited periods of field data collection
Source of Funds	Conservation Level of Funding – 1
Required Outside Agency Coordination	NA

Priority within this Annual Work Plan	Low - performed by permanent staff if contractor not available
Impact on Mission, Other Projects and Ecosystem Dynamics	Ensures timeliness and accuracy for integration of all 20 CES/CEIEA programs

PROJECT DATA – ANNUAL WORK PLAN **FISH AND WILDLIFE SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Manage Deer
Purpose of Project	To maintain sustainable healthy populations of whitetail deer
Contribution to INRMP Management Goals and Mission Support	Maintain and restore ecosystem (Goal 1) Manage for sustainable human uses (Goal 2) Support and enhance the military mission (Goal 10)
Location or Land Management Units	All areas of Poinsett Range
Description and Schedule	Monitor populations and conduct control hunts for whitetail deer as populations warrant. Seasons will correspond to SCDNR published seasons. SCDNR regulations, in addition to Shaw AFI regulations, will apply. ECD: 31 Dec
Material/Labor Requirements	20 CES/CEIEA Staff Minimum of 3 people during hunts and three vehicles to transport hunters to/from hunting areas
Source of Funds	57X Funding Level – 2 Revenue Generating
Required Outside Agency Coordination	SCDNR Youth deer hunt to be conducted in cooperation with SCDNR first Saturday of November
Priority within this Annual Work Plan	Low - performed by permanent staff
Impact on Mission, Other Projects and Ecosystem Dynamics	Provides quality of life for base troops. Coordinate with volunteer "Hunt Masters" to assist with deer hunts, habitat improvements and deer stand maintenance

PROJECT DATA - ANNUAL WORK PLAN **FISH AND WILDLIFE SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Manage Turkey
Purpose of Project	To maintain sustainable healthy populations turkey and other upland bird species such as Dove and Quail
Contribution to INRMP Management Goals and Mission Support	Maintain and restore ecosystem (Goal 1) Manage for sustainable human uses (Goal 2) Support and enhance the military mission (Goal 10)
Location or Land Management Units	All areas of Poinsett Range
Description and Schedule	Monitor populations and conduct control hunts for turkey, dove and quail as populations warrant. Seasons will correspond to SCDNR published seasons. SCDNR regulations, in addition to Shaw AFI regulations, will apply. ECD: 31 Aug
Material/Labor Requirements	20 CES/CEIEA Staff Minimum of 3 people during hunts and three vehicles to transport hunters

	to/from hunting areas
Source of Funds	57X Funding Level – 2 Revenue Generating
Required Outside Agency Coordination	SCDNR
Priority within this Annual Work Plan	Low - performed by permanent staff
Impact on Mission, Other Projects and Ecosystem Dynamics	Provides quality of life for base troops. Coordinate with volunteer "Hunt Masters" to assist with hunts, habitat improvements and area maintenance

PROJECT DATA - ANNUAL WORK PLAN **FISH AND WILDLIFE SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Manage Habitat for Non-listed Wildlife Species
Purpose of Project	Identify existing and potential sites for habitat enhancements and implement improvements. To provide adequate area of suitable forage, cover and breeding habitat for non-listed wildlife species
Contribution to INRMP Management Goals and Mission Support	Ecosystem management (Goal 1) Manage for sustainable human uses (Goal 2) Manage exotic species (Goal 4) Support and enhance the military mission (Goal 10)
Location or Land Management Units	All of Poinsett Range.
Description and Schedule	Construct additional wildlife areas on Poinsett Range for wildlife benefit. Work with forester, endangered species coordinator and cultural resource manager to utilize openings and changes in timber stand stocking for wildlife. ECD: 30 Sep
Material/Labor Requirements	Dozer, tractor, brush cutting, pesticide applicators, tillage and planting equipment, seed, fertilizer, lime, native live plant material, 2-4 people
Source of Funds	57X Funding Level - 3
Required Outside Agency Coordination	None
Priority within this Annual Work Plan	Low - performed by permanent staff and volunteers
Impact on Mission, Other Projects and Ecosystem Dynamics	No negative mission impacts. Coordination with forestry, cultural resources and endangered species program managers

PROJECT DATA – ANNUAL WORK PLAN **OUTDOOR RECREATION SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Deer Hunting
Purpose of Project	Provide outdoor recreational opportunities to enhance quality of life for Shaw AFB community
Contribution to INRMP Management Goals and Mission Support	Ecosystem management (Goal 1) Manage for human uses (Goal 2) Support and enhance the military mission (Goal 10)
Location or Land Management Units	Poinsett Range
Description and Schedule	Conduct hunting program for deer. Maintain existing deer stands. Evaluate hunting areas around stands for obstructions and safety hazards. Survey hunters for suggestions on improvements to enhance customer experience. ECD: 31 Dec
Material/Labor Requirements	20 CES/CEIEA Staff to organize/manage hunts, Materials for observation stands, volunteer "Hunt Masters" for labor assistance

Source of Funds	57X Funding Level - 1
Required Outside Agency Coordination	SCDNR for season regulations and antler-less deer quota program permit
Priority within this Annual Work Plan	Low
Impact on Mission, Other Projects and Ecosystem Dynamics	Enhances Quality of life for troops by providing outdoor recreational opportunities

PROJECT DATA - ANNUAL WORK PLAN **OUTDOOR RECREATION SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Turkey Hunting
Purpose of Project	Provide opportunities to enhance quality of life for Shaw AFB community
Contribution to INRMP Management Goals and Mission Support	Ecosystem management (Goal 1) Manage for human uses (Goal 2) Support and enhance the military mission (Goal 10)
Location or Land Management Units	Poinsett Range
Description and Schedule	Conduct hunting program for turkey, dove and quail on Poinsett Range as populations permit. Evaluate hunting areas for safety hazards. ECD: 31 May
Material/Labor Requirements	20 CES/CEIEA Staff to organize/manage hunts, volunteer "Hunt Masters" for labor assistance
Source of Funds	57X Funding level – 1
Required Outside Agency Coordination	SCDNR for season regulations
Priority within this Annual Work Plan	Low
Impact on Mission, Other Projects and Ecosystem Dynamics	Enhances Quality of life for troops by providing outdoor recreational opportunities

PROJECT DATA - ANNUAL WORK PLAN **OUTDOOR RECREATION SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Provide Disability Accessible Facilities
Purpose of Project	Provide hunting opportunities and facilities for disabled customers
Contribution to INRMP Management Goals and Mission Support	Manage for human uses (Goal 2) Support and enhance the military mission (Goal 10)
Location or Land Management Units	At least two locations will have a ground blind setup to be handicap accessible
Description and Schedule	Construct two ground blinds suitable for wheelchairs ECD: 30 Sep
Material/Labor Requirements	Material for blinds, volunteer "Hunt Masters" to assist with construction
Source of Funds	57X Funding Level - 3
Required Outside Agency Coordination	None
Priority within this Annual Work Plan	Low
Impact on Mission, Other Projects and Ecosystem Dynamics	Allows disabled troops to participate enhancing quality of life otherwise not possible. No impact with other projects

PROJECT DATA - ANNUAL WORK PLAN **OUTDOOR RECREATION SHAW AFB, SC**

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN	
Project Name	Outreach / Education
Purpose of Project	Enhance public awareness of recreational opportunities and promote understanding for conservation and stewardship
Contribution to INRMP Management Goals and Mission Support	Manage for human uses (Goal 2) Support and enhance the military mission (Goal 10)
Location or Land Management Units	None
Description and Schedule	Establish interpretive trails and outdoor educational opportunities of natural areas. Disseminate information and brochures; conduct outreach/safety education seminars 30 Dec
Material/Labor Requirements	Publishing materials Tools and Lumber for signs, boardwalks, steps
Source of Funds	57X Funding Level - 3
Required Outside Agency Coordination	SCDNR for additional information
Priority within this Annual Work Plan	Low
Impact on Mission, Other Projects and Ecosystem Dynamics	Informs troops of quality of life opportunities available. No Impact on other projects

PROJECT DATA - ANNUAL WORK PLAN **ECOSYSTEM MONITORING SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Conduct plant surveys
Purpose of Project	To identify plant species to include all species with emphasis on invasive, threatened and endangered, hydrophytes (wetlands). Create a field herbarium for quick reference by staff biologist to ensure compliance with T&E Species Act and prevent negative impact on Training Mission
Contribution to INRMP Management Goals and Mission Support	Support and enhance the military mission (Goal 1) Maintain and restore native ecosystems (Goal 2) Manage for sustainable uses of Natural Resources (Goal 3) Develop and implement monitoring (Goal 4)
Location or Land Management Units	Poinsett Range
Description and Schedule	Utilize; "best" methodologies for plant identification and collection,by expert Botanist for field herbarium ECD: 30 Sep
Material/Labor Requirements	2-5 people, plant field guides, plant press, proper field supplies, i.e. bug spray, clothes, rain gear, boots, glasses, knowledge of local fauna, wildlife and terrain
Source of Funds	Conservation Funding Level 1
Required Outside Agency Coordination	Note: Use of SCDNR State Plant List for Sumter Co.; notification to Agency if plant not previously listed, observed during surveys; notification would apply to USFWS if warranted, i.e. T&E Listed Species
Priority within this Annual Work Plan	Low
Impact on Mission, Other Projects and Ecosystem Dynamics	Coordinate within Natural/Cultural Resources, Security Forces Squadron and Range Operations Officer for survey date and times; collection techniques and data documentation are in accordance with scientific community standards

PROJECT DATA - ANNUAL WORK PLAN

ECOSYSTEM MONITORING SHAW AFB, SC INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN	
Project Name	Bats
Purpose of Project	Determine bat species, populations and verify no endangered bat species
Contribution to INRMP Management Goals and Mission Support	Support and enhance the military mission (Goal 1) Maintain and restore native ecosystems (Goal 2) Manage for sustainable uses of Natural Resources (Goal 3) Develop and implement monitoring (Goal 4)
Location or Land Management Units	Poinsett Range
Description and Schedule	Establish bat listening stations and/or routes, document frequency recordings for species identification. ECD: 31 Dec
Material/Labor Requirements	Listening device designed to recognize bat frequencies. 2-3 biologists
Source of Funds	Conservation Funding Level 1.
Required Outside Agency Coordination	Note: Use of SCDNR State Bat List for Sumter Co.; notification to Agency if animal not previously listed, observed during surveys; notification would apply to USFWS if warranted, i.e. T&E Listed Species
Priority within this Annual Work Plan	Low - performed by contractors
Impact on Mission, Other Projects and Ecosystem Dynamics	Coordinate within Natural/Cultural Resources, Security Forces Squadron and Range Operations Officer for survey date and times; collection techniques and data documentation are in accordance with scientific community standards

PROJECT DATA – ANNUAL WORK PLAN ECOSYSTEM MONITORING SHAW AFB, SC INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN	
Project Name	Birds
Purpose of Project	Identify Species both migrant and resident, determine positive and negative effects on range ecosystem(s), prevent negative impact on Training Mission by utilizing current data for quick diagnostics and response
Contribution to INRMP Management Goals and Mission Support	Support and enhance the military mission (Goal 1) Maintain and restore native ecosystems (Goal 2) Manage for sustainable uses of Natural Resources (Goal 3) Develop and implement monitoring (Goal 4)
Location or Land Management Units	Poinsett Range
Description and Schedule	Ornithologists establish routes and conduct windshield surveys listening and identifying sp. specific vocalizations. Fall, Winter, Spring and Summer. ECD: 31 Dec
Material/Labor Requirements	1-2 people, Binoculars, tape recorder Field Guides for Birds in North America, appropriate weather gear
Source of Funds	Conservation Funding Level 1. Funded
Required Outside Agency Coordination	Note: Use of SCDNR State Mammal List for Sumter Co.; notification to Agency if animal not previously listed observed during surveys; notification would apply to (USFWS) if warranted, i.e. Threatened and Endangered (T&E) Listed Species
Priority within this Annual Work Plan	Low
Impact on Mission, Other Projects and Ecosystem Dynamics	Coordinate within Natural/Cultural Resources, Security Forces Squadron and Range Operations Officer for survey date(s) and times;

	collection techniques and data documentation are in accordance with scientific community standards

PROJECT DATA – ANNUAL WORK PLAN **ECOSYSTEM MONITORING SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Monitoring Avian Productivity and Survivorship (MAPS)
Purpose of Project	To support the Air Force training mission by monitoring the breeding status and productivity of bird species and contributing to continental efforts to assess short and long-term trends in bird populations
Contribution to INRMP Management Goals and Mission Support	Support and enhance the military mission (Goal 1) Maintain and restore native ecosystems (Goal 2) Develop and implement monitoring (Goal 4) Minimize military impacts to the ecosystem (Goal 7) Develop leadership in management of native systems (Goal 9) Implement adaptive management evaluation system (Goal 10)
Location or Land Management Units	Poinsett Range
Description and Schedule	Conduct 9 banding sessions at the Ardis Bird Banding Station between May and August. During each 6-hour banding session determine the species, sex and age of each bird captured and banded. ECD: 30 Sep
Material/Labor Requirements	Federal and state permits, mist nets and poles, banding pliers and bird bands. Material and labor provided by 20 CES/CEIEA and/or contractors
Source of Funds	Conservation Funding Level - 1
Required Outside Agency Coordination	U.S. Geological Survey SCDNR Institute for Bird Populations
Priority within this Annual Work Plan	Low - performed by permanent staff
Impact on Mission, Other Projects and Ecosystem Dynamics	Negative trends in breeding bird populations could impact the Air Force training mission; monitoring will facilitate a rapid review and response if necessary

PROJECT DATA – ANNUAL WORK PLAN **ECOSYSTEM MONITORING SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Raptors
Purpose of Project	Monitor Raptors (birds of prey) for population and species, good indicator species for ecosystem health and diversity; large populations may increase Bird Aircraft Strike Hazard risks and impact mission. Birds are protected under the Migratory Bird Treaty Act
Contribution to INRMP Management Goals and Mission Support	Support and enhance the military mission (Goal 1) Maintain and restore native ecosystems (Goal 2) Manage for sustainable uses of Natural Resources (Goal 3) Develop and implement monitoring (Goal 4)
Location or Land Management Units	Poinsett Range
Description and Schedule	Survey two, 4.5-mile established routes, east of the impact area and west of Big Bay; surveys should begin at sunrise stopping every 0.5 miles for no <5 min. Five Great Horned Owl vocalizations are broadcast at each station for 15 seconds with 30 second periods of listening in between and then Red Shouldered Hawk vocalizations are broadcast for 60 seconds

	with a 2 minute listening period. ECD: 1 Aug
Material/Labor Requirements	1-2 people, Johnny Stewart Game Caller, Raptor recordings, binoculars, transportation, Field Guides
Source of Funds	Conservation Funding Level 1. Surveys may be completed in- house by staff biologist at a condensed level
Required Outside Agency Coordination	Note: Use of SCDNR State Bird List for Sumter Co.; notification to Agency if Raptor not previously listed, observed during surveys; notification would apply to USFWS if warranted, i.e. T&E Listed Species (consult/permit required before any depredation)
Priority within this Annual Work Plan	Low - performed by permanent staff BASH
Impact on Mission, Other Projects and Ecosystem Dynamics	Coordinate within Natural/Cultural Resources, Security Forces Squadron and Range Operations Officer for survey date(s) and times, observation techniques and data documentation in accordance with scientific community standards

PROJECT DATA – ANNUAL WORK PLAN **ECOSYSTEM MONITORING SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Quail
Purpose of Project	Monitor population trends of Northern Bobwhite Quail, develop and initiate quail recovery techniques and integrate with established land management programs
Contribution to INRMP Management Goals and Mission Support	Support and enhance the military mission (Goal 1) Maintain and restore native ecosystems (Goal 2) Manage for sustainable uses of Natural Resources (Goal 3) Develop and implement monitoring (Goal 4)
Location or Land Management Units	Poinsett Range
Description and Schedule	Survey two 5.5-mile established routes located east of the impact area and west of Big Bay, stopping at listening stations every 0.5 miles for 5 minutes beginning at sunrise. Hatch normally occurs June-August with peak calling 15 June-10 July. ECD: 1 Aug
Material/Labor Requirements	1-2 people, field glasses, transportation, notebook
Source of Funds	Conservation Funding Level 1. Surveys may be completed in- house by staff biologist at a condensed level
Required Outside Agency Coordination	Note: Physical observations by all staff members are documented and reported to SCDNR for July/August
Priority within this Annual Work Plan	Low - performed by permanent staff
Impact on Mission, Other Projects and Ecosystem Dynamics	Coordinate within Natural/Cultural Resources, Security Forces Squadron and Range Operations Officer for survey dates and times, listening techniques and data documentation are in accordance with scientific community standards

PROJECT DATA – ANNUAL WORK PLAN **ECOSYSTEM MONITORING SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Herpetofauna
Purpose of Project	Monitor amphibian and reptile population trends, determine positive and negative effects on range ecosystem(s), prevent negative impact on Training Mission by utilizing current data for quick diagnostics and response

Contribution to INRMP Management Goals and Mission Support	Support and enhance the military mission (Goal 1) Maintain and restore native ecosystems (Goal 2) Manage for sustainable uses of Natural Resources (Goal 3) Develop and implement monitoring (Goal 4)
Location or Land Management Units	Poinsett Range
Description and Schedule	Monitor eight pre-established plots with three sets of array systems for one week of each month, March through June. Traps are opened, inventoried for four days and closed on the fourth day. (schedule following precipitation for best results) ECD: 31 Oct
Material/Labor Requirements	1-3 people, reptile and amphibian field guides, five gallon buckets, lids, aluminum flashing, metals stakes, tools, ties, gloves and water dip pails
Source of Funds	Conservation Funding Level 1. Funded
Required Outside Agency Coordination	Note: Use of SCDNR State Amphibian and Reptile List for Sumter Co.; notification to Agency if animal not previously listed, observed during surveys; notification would apply to USFWS if warranted, i.e. T&E Listed Species
Priority within this Annual Work Plan	Low - performed permanent staff and contractors
Impact on Mission, Other Projects and Ecosystem Dynamics	Coordinate within Natural/Cultural Resources, Security Forces Squadron and Range Operations Officer for survey date and times; collection techniques and data documentation are in accordance with scientific community standards

PROJECT DATA – ANNUAL WORK PLAN **ECOSYSTEM MONITORING SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Furbearers
Purpose of Project	Monitor population trends, determine positive and negative effects on range ecosystem(s), prevent negative impact on Training Mission by utilizing current data for quick diagnostics and response
Contribution to INRMP Management Goals and Mission Support	Support and enhance the military mission (Goal 1) Maintain and restore native ecosystems (Goal 2) Manage for sustainable uses of Natural Resources (Goal 3) Develop and implement monitoring (Goal 4)
Location or Land Management Units	Poinsett Range
Description and Schedule	Small Mammal trapping can occur Feb-Sept. Trapping normally occurs on established Land Condition Training Assessment (LCTA) transects but may occur on habitats selected for research and study due to prescribed burns, ground troop training, air to ground training, etc. ECD: 31 Dec
Material/Labor Requirements	1-2 people, 16-Sherman Live traps, baited with peanut butter/rolled oats/bird seed, set at 12.5 meter intervals 5 meters perpendicular along transect, Mammal Field Guides for South Carolina and North America
Source of Funds	Conservation Funding Level 1. Surveys may be completed in- house by staff biologist at a condensed level
Required Outside Agency Coordination	Note: Use of SCDNR State Mammal List for Sumter Co.; notification to Agency if animal not previously listed observed during surveys; notification would apply to USFWS if warranted, i.e. Threatened and Endangered (T&E) Listed Species
Priority within this Annual Work Plan	Low - performed by permanent staff
Impact on Mission, Other Projects and Ecosystem Dynamics	Coordinate within Natural/Cultural Resources, Security Forces Squadron and Range Operations Officer for survey date(s) and times; collection

	techniques and data documentation are in accordance with scientific community standards

PROJECT DATA – ANNUAL WORK PLAN **ECOSYSTEM MONITORING SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Alligators
Purpose of Project	Monitor alligator population for potential hazardous risks to any ground personnel working, training or visiting Poinsett Range.
Contribution to INRMP Management Goals and Mission Support	Support and enhance the military mission (Goal 1) Maintain and restore native ecosystems (Goal 2) Manage for sustainable uses of Natural Resources (Goal 3) Develop and implement monitoring (Goal 4)
Location or Land Management Units	Poinsett Range (Note ecological sensitive areas adjacent to Weeks Pond; Jurisdictional Wetlands, Waters of the US and Carolina Bays)
Description and Schedule	For best results conduct nocturnal surveys with spot lights (May-Oct) (Weeks Pond requires surveys from boat) Shoreline and diurnal surveys may also be conducted for fair population estimates. ECD: 31 Dec
Material/Labor Requirements	Binoculars, Spotting Scopes, Field Guides, Camera/Video, Boat, Safety Gear, Weather Proof Data Sheets, 2-3 Biologists, Hand-Held Spotlight(s) 20 CES/CEIEC Staff
Source of Funds	Conservation Level 1 Surveys may be conducted at condensed level in-house
Required Outside Agency Coordination	Poinsett Range Operations, United States Army Corp of Engineers (Wetlands)
Priority within this Annual Work Plan	Low – performed by permanent staff
Impact on Mission, Other Projects and Ecosystem Dynamics	Coordinate within Natural Cultural Resources, Security Forces Squadron and Range Operations Officer for work dates and times.

PROJECT DATA – ANNUAL WORK PLAN **ECOSYSTEM MONITORING SHAW AFB, SC** **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**	
Project Name	Maintain List of Wildlife Species
Purpose of Project	Identify list of all wildlife species occurring on Shaw AFB, Poinsett Range and WRA
Contribution to INRMP Management Goals and Mission Support	Support and enhance the military mission (Goal 1) Maintain and restore native ecosystems (Goal 2) Manage for sustainable uses of Natural Resources (Goal 3) Develop and implement monitoring (Goal 4)
Location or Land Management Units	Poinsett Range
Description and Schedule	Natural Resource personnel document sightings of furbearers and utilize scent post and camera surveys. 31 Dec
Material/Labor Requirements	Binoculars, spotting scopes, field guides, motion cameras, field log books, Dow-rod, bait/scent, sand or print slurry, 1-3 people
Source of Funds	Conservation Funding Level 2. Surveys may be completed in- house by staff biologist at a condensed level
Required Outside Agency Coordination	Note: Use of SCDNR State Mammal List for Sumter Co.; notification to Agency if animal not previously listed, observed during surveys; notification would apply to USFWS if warranted, i.e. T&E Listed

	Species
Priority within this Annual Work Plan	Low - performed by permanent staff
Impact on Mission, Other Projects and Ecosystem Dynamics	Coordinate within Natural/Cultural Resources, Security Forces Squadron and Range Operations Officer for survey dates times, survey techniques and species identification are in accordance with scientific community standards

11.0 REFERENCES

11.1 Standard References *(Applicable to all AF installations)*

1. AFI 32-7064, *Integrated Natural Resources Management*
2. Sikes Act
3. eDASH Natural Resources Program Page
4. Natural Resources Playbook – a Internal AF reference available at https://cs1.eis.af.mil/sites/ceportal/CEPlaybooks/NRM2/Pages/

11.2 Installation References

- N/A

12.0 ACRONYMS

12.1 Standard Acronyms *(Applicable to all AF installations)*

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

12.2 Installation Acronyms

- **AOB** - Air Operations Board
- **ARC** - Air/Space Range Committee
- **AWC** - Atlantic White-Cedar
- **LCTA** - Land Condition Trend Analysis
- **EM -** Ecosystem Monitoring
- **NEW** - Net Explosive Weight
- **Poinsett Range** - Poinsett Electronic Combat Range
- **RCW** - Red-cockaded woodpecker
- **RST** - Regional Support Team
- **RTLA** - Range Training Land Assessment
- **Shaw AFB** - Shaw Air Force Base
- **SCDHEC** - South Carolina Department of Health and Environmental Control
- **SCDNR** - South Carolina Department of Natural Resources
- **WRA** - Wateree Recreational Area

13.0 DEFINITIONS

13.1 Standard Definitions *(Applicable to all AF installations)*

- Natural Resources Playbook – Definitions Section

13.2 Installation Definitions

- N/A

14.0 APPENDICES

Appendix A. Annotated Summary of Key Legislation Related to Design and Implementation of the INRMP

Federal Public Laws and Executive Orders	
National Defense Authorization Act of 1989, Public Law (P.L.) 101-189; Volunteer Partnership Cost-Share Program	Amends two Acts and establishes volunteer and partnership programs for natural and cultural resources management on DoD lands.
Defense Appropriations Act of 1991, P.L. 101-511; Legacy Resource Management Program	Establishes the "Legacy Resource Management Program" for natural and cultural resources. Program emphasis is on inventory and stewardship responsibilities of biological, geophysical, cultural, and historic resources on DoD lands, including restoration of degraded or altered habitats.
EO 11514, Protection and Enhancement of Environmental Quality	Federal agencies shall initiate measures needed to direct their policies, plans, and programs to meet national environmental goals. They shall monitor, evaluate, and control agency activities to protect and enhance the quality of the environment.
EO 11593, Protection and Enhancement of the Cultural Environment	All Federal agencies are required to locate, identify, and record all cultural resources. Cultural resources include sites of archaeological, historical, or architectural significance.
EO 11987, Exotic Organisms	Agencies shall restrict the introduction of exotic species into the natural ecosystems on lands and waters which they administer.
EO 11988, Floodplain Management	Provides direction regarding actions of Federal agencies in floodplains, and requires permits from state, territory and Federal review agencies for any construction within a 100-year floodplain and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for acquiring, managing and disposing of Federal lands and facilities.
EO 11989, Off-Road vehicles on Public Lands	Installations permitting off-road vehicles to designate and mark specific areas/trails to minimize damage and conflicts, publish information including maps, and monitor the effects of their use. Installations may close areas if adverse effects on natural, cultural, or historic resources are observed.
EO 11990, Protection of Wetlands	Requires Federal agencies to avoid undertaking or providing assistance for new construction in wetlands unless there is no practicable alternative, and all practicable measures to minimize harm to wetlands have been implemented and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; and (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.
EO 12088, Federal Compliance With Pollution Control Standards	This EO delegates responsibility to the head of each executive agency for ensuring all necessary actions are taken for the prevention, control, and abatement of environmental pollution. This order gives the U.S. Environmental Protection Agency (US EPA) authority to conduct

Federal Public Laws and Executive Orders	
	reviews and inspections to monitor Federal facility compliance with pollution control standards.
EO 12898, Environmental Justice	This EO requires certain federal agencies, including the DoD, to the greatest extent practicable permitted by law, to make environmental justice part of their missions by identifying and addressing disproportionately high and adverse health or environmental effects on minority and low-income populations.
EO 13112, Exotic and Invasive Species	To prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.
EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds	The U.S. Fish and Wildlife Service (USFWS) has the responsibility to administer, oversee, and enforce the conservation provisions of the Migratory Bird Treaty Act, which includes responsibility for population management (e.g., monitoring), habitat protection (e.g., acquisition, enhancement, and modification), international coordination, and regulations development and enforcement.
United States Code	
Animal Damage Control Act (7 U.S.C. § 426-426b, 47 Stat. 1468)	Provides authority to the Secretary of Agriculture for investigation and control of mammalian predators, rodents, and birds. DoD installations may enter into cooperative agreements to conduct animal control projects.
Bald and Golden Eagle Protection Act of 1940, as amended; 16 U.S.C. 668-668c	This law provides for the protection of the bald eagle (the national emblem) and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the Act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the Act.
Clean Air Act, (42 U.S.C. § 7401– 7671q, July 14, 1955, as amended)	This Act, as amended, is known as the Clean Air Act of 1970. The amendments made in 1970 established the core of the clean air program. The primary objective is to establish Federal standards for air pollutants. It is designed to improve air quality in areas of the country which do not meet Federal standards and to prevent significant deterioration in areas where air quality exceeds those standards.
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (Superfund) (26 U.S.C. § 4611–4682, P.L. 96-510, 94 Stat. 2797), as amended	Authorizes and administers a program to assess damage, respond to releases of hazardous substances, fund cleanup, establish clean-up standards, assign liability, and other efforts to address environmental contaminants. Installation Restoration Program guides cleanups at DoD installations.
Endangered Species Act (ESA) of 1973, as amended; P.L. 93-205, 16 U.S.C. § 1531 et seq.	Protects threatened, endangered, and candidate species of fish, wildlife, and plants and their designated critical habitats. Under this law, no Federal action is allowed to jeopardize the continued existence of an endangered or threatened species. The ESA requires consultation with the USFWS and the NOAA Fisheries (National Marine Fisheries Service) and the preparation of a biological evaluation or a biological

Federal Public Laws and Executive Orders	
	assessment may be required when such species are present in an area affected by government activities.
Federal Aid in Wildlife Restoration Act of 1937 (16 U.S.C. § 669–669i; 50 Stat. 917) (Pittman-Robertson Act)	Provides Federal aid to states and territories for management and restoration of wildlife. Fund derives from sports tax on arms and ammunition. Projects include acquisition of wildlife habitat, wildlife research surveys, development of access facilities, and hunter education.
Federal Environmental Pesticide Act of 1972	Requires installations to ensure pesticides are used only in accordance with their label registrations and restricted-use pesticides are applied only by certified applicators.
Federal Land Use Policy and Management Act, 43 U.S.C. § 1701–1782	Requires management of public lands to protect the quality of scientific, scenic, historical, ecological, environmental, and archaeological resources and values; as well as to preserve and protect certain lands in their natural condition for fish and wildlife habitat. This Act also requires consideration of commodity production such as timbering.
Federal Noxious Weed Act of 1974, 7 U.S.C. § 2801–2814	The Act provides for the control and management of non-indigenous weeds that injure or have the potential to injure the interests of agriculture and commerce, wildlife resources, or the public health.
Federal Water Pollution Control Act (Clean Water Act [CWA]), 33 U.S.C. §1251–1387	The CWA is a comprehensive statute aimed at restoring and maintaining the chemical, physical, and biological integrity of the nation's waters. Primary authority for the implementation and enforcement rests with the US EPA.
Fish and Wildlife Conservation Act (16 U.S.C. § 2901–2911; 94 Stat. 1322, PL 96-366)	Installations encouraged to use their authority to conserve and promote conservation of nongame fish and wildlife in their habitats.
Fish and Wildlife Coordination Act (16 U.S.C. § 661 et seq.)	Directs installations to consult with the USFWS, or state or territorial agencies to ascertain means to protect fish and wildlife resources related to actions resulting in the control or structural modification of any natural stream or body of water. Includes provisions for mitigation and reporting.
Lacey Act of 1900 (16 U.S.C. § 701, 702, 32 Stat. 187, 32 Stat. 285)	Prohibits the importation of wild animals or birds or parts thereof, taken, possessed, or exported in violation of the laws of the country or territory of origin. Provides enforcement and penalties for violation of wildlife related Acts or regulations.
Leases: Non-excess Property of Military Departments, 10 U.S.C. § 2667, as amended	Authorizes DoD to lease to commercial enterprises Federal land not currently needed for public use. Covers agricultural outleasing program.
Migratory Bird Treaty Act 16 U.S.C. § 703–712	The Act implements various treaties for the protection of migratory birds. Under the Act, taking, killing, or possessing migratory birds is unlawful without a valid permit.
National Environmental Policy Act of 1969 (NEPA), as amended; P.L. 91-190, 42 U.S.C. § 4321 et seq.	Requires Federal agencies to utilize a systematic approach when assessing environmental impacts of government activities. Establishes the use of environmental impact statements. NEPA proposes an interdisciplinary approach in a decision-making process designed to identify unacceptable or unnecessary impacts on the environment. The Council of Environmental Quality (CEQ) created Regulations for Implementing the National Environmental Policy Act [40 Code of

Federal Public Laws and Executive Orders	
	Federal Regulations (CFR) Parts 1500– 1508], which provide regulations applicable to and binding on all Federal agencies for implementing the procedural provisions of NEPA, as amended.
National Historic Preservation Act, 16 U.S.C. § 470 et seq.	Requires Federal agencies to take account of the effect of any federally assisted undertaking or licensing on any district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places (NRHP). Provides for the nomination, identification (through listing on the NRHP), and protection of historical and cultural properties of significance.
National Trails Systems Act (16 U.S.C. § 1241–1249)	Provides for the establishment of recreation and scenic trails.
National Wildlife Refuge Acts	Provides for establishment of National Wildlife Refuges through purchase, land transfer, donation, cooperative agreements, and other means.
National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. § 668dd–668ee)	Provides guidelines and instructions for the administration of Wildlife Refuges and other conservation areas.
Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. § 3001–13; 104 Stat. 3042), as amended	Established requirements for the treatment of Native American human remains and sacred or cultural objects found on Federal lands. Includes requirements on inventory, and notification.
Rivers and Harbors Act of 1899 (33 U.S.C. § 401 et seq.)	Makes it unlawful for the USAF to conduct any work or activity in navigable waters of the United States without a Federal Permit. Installations should coordinate with the U.S. Army Corps of Engineers (USACE) to obtain permits for the discharge of refuse affecting navigable waters under National Pollutant Discharge Elimination System (NPDES) and should coordinate with the USFWS to review effects on fish and wildlife of work and activities to be undertaken as permitted by the USACE.
Sale of certain interests in land, 10 U.S.C. § 2665	Authorizes sale of forest products and reimbursement of the costs of management of forest resources.
Soil and Water Conservation Act (16 U.S.C. § 2001, P.L. 95-193)	Installations shall coordinate with the Secretary of Agriculture to appraise, on a continual basis, soil/water-related resources. Installations will develop and update a program for furthering the conservation, protection, and enhancement of these resources consistent with other Federal and local programs.
Sikes Act (16 U.S.C. § 670a–670l, 74 Stat. 1052), as amended	Provides for the cooperation of DoD, the Departments of the Interior (USFWS), and the State Fish and Game Department in planning, developing, and maintaining fish and wildlife resources on a military installation. Requires development of an Integrated Natural Resources Management Plan and public access to natural resources, and allows collection of nominal hunting and fishing fees. NOTE: AFI 32-7064 sec 3.9. Staffing. As defined in DoDI 4715.03, use professionally trained natural resources management personnel with a degree in the natural sciences to develop and implement the installation INRMP. (T-0). 3.9.1. Outsourcing Natural Resources

Federal Public Laws and Executive Orders	
	Management. As stipulated in the Sikes Act, 16 U.S.C. § 670 et. seq., the Office of Management and Budget Circular No. A-76, Performance of Commercial Activities, August 4, 1983 (Revised May 29, 2003) does not apply to the development, implementation and enforcement of INRMPs. Activities that require the exercise of discretion in making decisions regarding the management and disposition of government owned natural resources are inherently governmental. When it is not practicable to utilize DoD personnel to perform inherently governmental natural resources management duties, obtain these services from federal agencies having responsibilities for the conservation and management of natural resources.
DoD Policy, Directives, and Instructions	
DoD Instruction 4150.07 DoD Pest Management Program dated 29 May 2008	Implements policy, assigns responsibilities, and prescribes procedures for the DoD Integrated Pest Management Program.
DoD Instruction 4715.1, Environmental Security	Establishes policy for protecting, preserving, and (when required) restoring and enhancing the quality of the environment. This instruction also ensures environmental factors are integrated into DoD decision-making processes that could impact the environment, and are given appropriate consideration along with other relevant factors.
DoD Instruction (DODI) 4715.03, Natural Resources Conservation Program	Implements policy, assigns responsibility, and prescribes procedures under DoDI 4715.1 for the integrated management of natural and cultural resources on property under DoD control.
OSD Policy Memorandum – 17 May 2005 – Implementation of Sikes Act Improvement Amendments: Supplemental Guidance Concerning Leased Lands	Provides supplemental guidance for implementing the requirements of the Sikes Act in a consistent manner throughout DoD. The guidance covers lands occupied by tenants or lessees or being used by others pursuant to a permit, license, right of way, or any other form of permission. INRMPs must address the resource management on all lands for which the subject installation has real property accountability, including leased lands. Installation commanders may require tenants to accept responsibility for performing appropriate natural resource management actions as a condition of their occupancy or use, but this does not preclude the requirement to address the natural resource management needs of these lands in the installation INRMP.
OSD Policy Memorandum – 1 November 2004 – Implementation of Sikes Act Improvement Act Amendments: Supplemental Guidance Concerning INRMP Reviews	Emphasizes implementing and improving the overall INRMP coordination process. Provides policy on scope of INRMP review, and public comment on INRMP review.
OSD Policy Memorandum – 10 October 2002 – Implementation of Sikes Act Improvement Act: Updated Guidance	Provides guidance for implementing the requirements of the Sikes Act in a consistent manner throughout DoD and replaces the 21 September 1998 guidance Implementation of the Sikes Act Improvement Amendments. Emphasizes implementing and improving the overall INRMP coordination process and focuses on coordinating with stakeholders, reporting requirements and metrics, budgeting for

Federal Public Laws and Executive Orders	
	INRMP projects, using the INRMP as a substitute for critical habitat designation, supporting military training and testing needs, and facilitating the INRMP review process.
USAF Instructions and Directives	
32 CFR Part 989, as amended, and AFI 32-7061, Environmental Impact Analysis Process	Provides guidance and responsibilities in the EIAP for implementing INRMPs. Implementation of an INRMP constitutes a major federal action and therefore is subject to evaluation through an Environmental Assessment or an Environmental Impact Statement.
AFI 32-7062, Air Force Comprehensive Planning	Provides guidance and responsibilities related to the USAF comprehensive planning process on all USAF-controlled lands.
AFI 32-7064, Integrated Natural Resources Management	Implements AFPD 32-70, Environmental Quality; DODI 4715.03, Natural Resources Conservation Program; and DODI 7310.5, Accounting for Sale of Forest Products. It explains how to manage natural resources on USAF property in compliance with Federal, state, territorial, and local standards.
AFI 32-7065, Cultural Resources Management	This instruction implements AFPD 32-70 and DoDI 4710.1, Archaeological and Historic Resources Management. It explains how to manage cultural resources on USAF property in compliance with Federal, state, territorial, and local standards.
AFPD 32-70, Environmental Quality	Outlines the USAF mission to achieve and maintain environmental quality on all USAF lands by cleaning up environmental damage resulting from past activities, meeting all environmental standards applicable to present operations, planning its future activities to minimize environmental impacts, managing responsibly the irreplaceable natural and cultural resources it holds in public trust and eliminating pollution from its activities wherever possible. AFPD 32-70 also establishes policies to carry out these objectives.
Policy Memo for Implementation of Sikes Act Improvement Amendments, HQ USAF Environmental Office (USAF/ILEV) on January 29, 1999	Outlines the USAF interpretation and explanation of the Sikes Act and Improvement Act of 1997.

Appendix B. Poinsett Range Soil Descriptions

Appendix C. Lists and Flora and Fauna

Appendix D. Descriptions of Current and Potential Invasive Plant Species

Appendix E. Potential Noxious Weeds in Sumter County, SC

Appendix F. Environmental Restoration Sites

Appendix G. Common Aquatic Herbicides

Appendix H. Common Wildlife Diseases

Appendix I. Environmental Review Form

15.0 ASSOCIATED PLANS

Tab 1 – Wildland Fire Management Plan

Tab 2 – Bird/Wildlife Aircraft Strike Hazard (BASH) Plan

Tab 3 – Golf Environmental Management (GEM) Plan

Tab 4 – Integrated Cultural Resources Management Plan (ICRMP)

Tab 5 – Integrated Pest Management Plan (IPMP)